

LiveCorp Submission

Updated on have your say: 14/09/2023

LiveCorp has provided an update to its submission to address an error in the modelling for the FTE estimates in the Attachment *Performance and value of the live sheep export trade* prepared by ACIL Allen.

ACIL Allen advised LiveCorp of this error in its modelling. ACIL Allen has corrected the error and updated the direct FTE numbers (and related charts) for the national and Western Australian sheep industry in the report so that the figures accurately reflect the industry and the live sheep export trade's performance and value.

The updated version of the report (dated August 2023) was provided by LiveCorp on 7 September 2023 has been added to the have your say website under the new heading, 0821 Live Corp (Updated).

The original submission and attachments will remain published under its original title.

Any questions relating to this change please contact, Livesheep.phaseout@aff.gov.au

Thankyou,

Live Sheep Phase out Secretariat.

LiveCorp Submission

June 2023

Live Sheep export by sea independent panel consultation process

Australian Livestock Export Corporation Ltd (LiveCorp)

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1 Introduction

This submission by the Australian Livestock Export Corporation Limited (LiveCorp) is written in response to an invitation to provide input into the consultation process associated with a decision to phase out live sheep exports by sea.

As noted in the consultation paper *“Phase out of live sheep exports by sea: consultation paper”*¹, an Independent Panel has been established to advise the Australian Government on how and when the government will phase out live sheep exports by sea.

This submission by LiveCorp is designed to assist the Panel in its deliberations.

LiveCorp is a not-for-profit industry body, funded through statutory levies collected on the live export of sheep, goats and cattle (beef and dairy), being one of the 15 Australian Rural Research and Development Corporations (RDCs).

LiveCorp is the only RDC focused solely on the livestock export industry, using its funds to support Australian livestock exporters attain world leading animal welfare outcomes, gain market access and improve supply chain efficiency.

LiveCorp does not engage in agri-political activity. Consequently, given the sensitivity, and political differences, surrounding any decision to prohibit live sheep exports, LiveCorp will not comment directly on many aspects to be considered by the Independent Panel.

Rather this submission is aimed at furnishing the Panel with factual background information on Australian live sheep exports and on other matters of relevance to its considerations.

2 Live sheep exports, a trade of long-standing

Trade in live sheep exports by sea can be traced back to the very beginnings of European settlement in Australia. Indeed, an Australian livestock industry would not exist if not for trade in live animals.

The first live sheep were imported into Australia with the First Fleet in 1788. There were 29 fat-tailed sheep listed on the fleet’s manifest, collected from the Cape of Good Hope in South Africa².

Merino sheep first arrived in Australia in 1797, again from the Cape of Good Hope. Bad weather nearly doubled the expected time at sea, and more than half the sheep perished. From these imports, however, grew the very substantial Australian wool and sheepmeat industry.

For many years Australia “rode on the sheep’s back”. The prosperity enjoyed by Australia through the production and export of wool would not have occurred but for long haul imports of live sheep by sea.

Livestock exports also played a key role in the development of Australian livestock industries.

Like livestock imports, livestock exports can be traced back to the very early days of the colonies of both New South Wales and the then Van Dieman’s Land (Tasmania).

- In 1829 the Hobart Town Courier recorded livestock exports from the penal colony to Great Britain worth £74 and to the British colonies worth £1,320.

¹ Department of Agriculture, Fisheries and Forestry, 2023, Consultation paper: phase out of live sheep exports by sea, Canberra, February. CC BY 4.0.

² Austin, N., 2011, *The Australian livestock export trade : from the First Fleet to the world's greatest livestock breeding country*, Hardie Grant Publishing, Neutral Bay, N.S.W., 159pp.

- From 1845 small shipments of live sheep were exported from Western Australia to Mauritius and Singapore³.
- As the 19th century progressed, demand for livestock from other countries led to frequent shipments of cattle and sheep from Australia. Included amongst these exports was a shipment of sheep from South Australia to the United States in 1860⁴.

The beginnings of the sheep trade from Western Australia to the Middle East in significant numbers can be traced to the 1940s and 1950s. A returned soldier who had served Australia in the Middle East during World War II, at one stage being a prisoner of war, recognised the demand for sheepmeat in the region and the potential for a sheep trade from Australia to the Middle East⁵.

From about 1960 dedicated livestock carriers began to ply the trade. Between 1960 and 1966 sheep were shipped in loads of about 2,500 head, but through the late 1960s and 1970s the live export trade expanded further, with the introduction of ships with capacity to carry 50,000 sheep⁶.

As the trade grew in importance in the 1960s and 1970s, investment occurred from live sheep exporters and importers in all parts of the supply chain. This included major investment in ships, farms, feedlots (in both Australia and the importing country) and pellet mills. The General Manager of Rural Export and Trading WA, Murray Frangs, recently placed the investment made by their parent company, Kuwait Livestock Transport and Trading (KLTT), at “hundreds of millions of dollars”.

“Hundreds of millions of dollars have been spent by KLTT and trading partners to invest in infrastructure and facilities throughout Australia ... to maintain the capacity to import live sheep as it has done for over 50 years”, Mr Frangs said⁷.

The very long-standing nature of the live sheep export trade, and large levels of investment involved, as described above, may serve to guide the Panel in its recommendations.

3 Recent history: the role played by live exports following removal of the wool reserve price scheme and subsequent flock liquidation

As noted in Section 1 of this submission, trade in livestock has been a feature of Australian agriculture since the First Fleet, initially as imports, but soon after as an export industry. Exports of live sheep reached their zenith in importance in the 1990s and early 2000s at a time of need by the Australian sheep industry.

In January 1991 the wool price reserve scheme was abandoned. Prior to the abandonment of this scheme wool prices had reached more than 1,000c/kg (with a maximum reserve price of 830c/kg). Wool prices crashed following abandonment of the reserve price scheme and producers reacted by liquidating their flocks.

³ Petrie, C., 2019, Live export—a chronology, Parliament of Australia, September, https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp1920/Chronologies/LiveExport.

⁴ Austin, N., op cit.

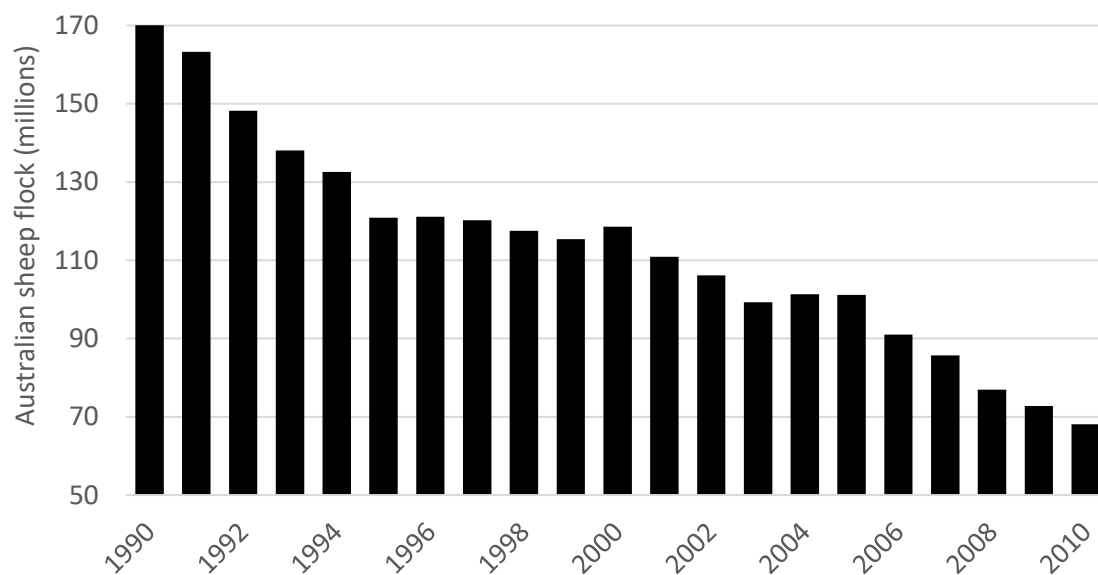
⁵ Ibid

⁶ Petrie, C., op cit.

⁷ Hayes, J., Stanley, M. and Prendergast J., 2023, WA industry to consider 'legal avenues' if federal government's live sheep export ban goes ahead, WA Country Hour, 3rd March, <https://www.abc.net.au/news/2023-03-03/live-export-ban-agriculture-minister-murray-watt-wa-legal-action/102050164>.

The Australian flock peaked at 170 million head in 1990⁸. By 2010 the flock had dropped to substantially less than half this level (see Chart 1).

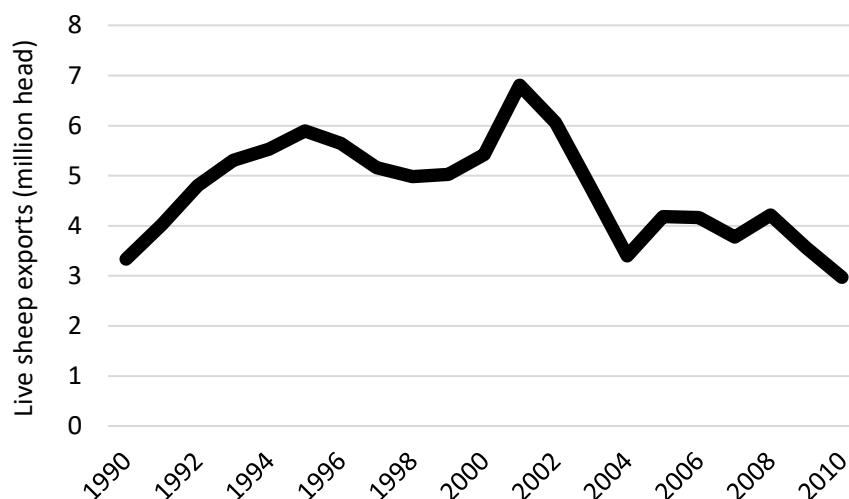
Chart 1: Australian sheep flock 1990 - 2010



Source: Australian Bureau of Statistics

With the floor price removed and a market crash, graziers needed every available selling option as flocks were liquidated. Sometimes no viable options were available and sheep were shot in the paddock. However, live sheep exports played a vital role during this period in securing overseas demand for many Australian sheep. Throughout the period 1991 to 2009 Australian live sheep exports consistently remained above 3.5 million head and reached a maximum annual total of 6.8 million head in 2001 (see Chart 2).

Chart 2: Australian live sheep exports 1990 - 2010



Source: Australian Bureau of Statistics

⁸ Meat & Livestock Australia, undated, "Australia: sheep flock by state", MLA Market Information Statistics Database, downloaded 08/06/2023.

If not for live sheep exports undoubtedly many more sheep would have been shot in paddocks. For some, live exports were able to form a conduit between sheep excess to the needs of wool producers in Australia, but demanded by customers overseas, particularly in the Middle East.

The above is recent history. Agricultural markets are notoriously volatile, undergoing major swings on a semi-regular basis. The example of the flock liquidation, following removal of the reserve price wool scheme, demonstrates the benefits which may flow from maintaining demand options and markets with the widest possible scope.

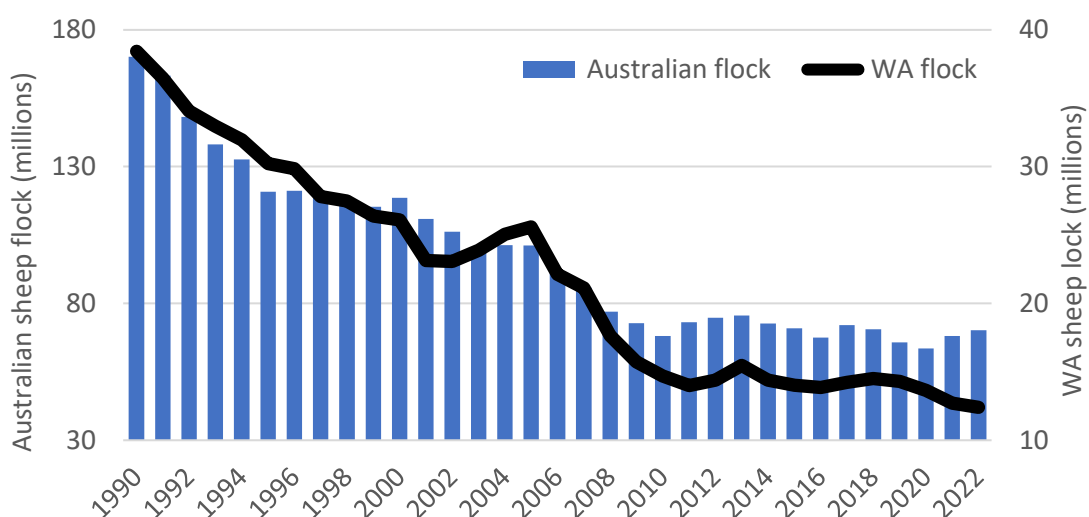
4 Current state of live sheep exports

4.1 Stabilisation of the Australian flock and lower levels of live sheep exports

In the last section attention was drawn to the liquidation of the Australian sheep flock following removal of the wool reserve price scheme.

The Australian sheep flock has now stabilised around 2010 values and the Western Australian flock, the major source of supply for Australian live sheep exports, although continuing to trend down, is doing this at a slower rate than prior to 2010 (see Chart 3).

Chart 3: Australian and Western Australia sheep flock 1990 - 2020

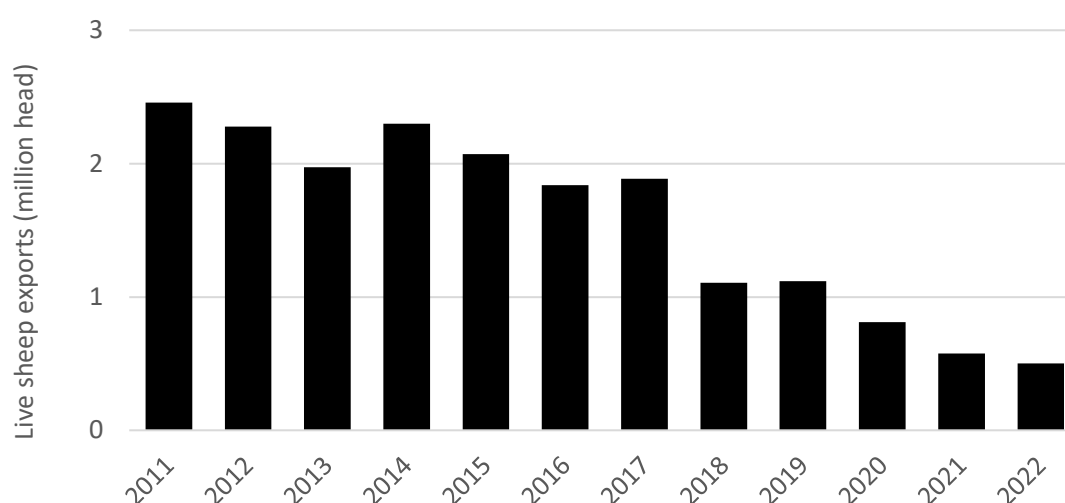


Source: Australian Bureau of Statistics

The stabilisation of the flock, and consequent lower sheep availability, and a number of other factors (discussed later in this Section), have contributed to a decline in live sheep exports (see Chart 4).

- In the period 2011 to 2017 these exports varied between 1.8 and 2.5 million head (compared to average exports of 4.4 million head between 2001 and 2010).
- In the period 2018 to 2022 live sheep exports varied between 0.5 and 1.1 million head.

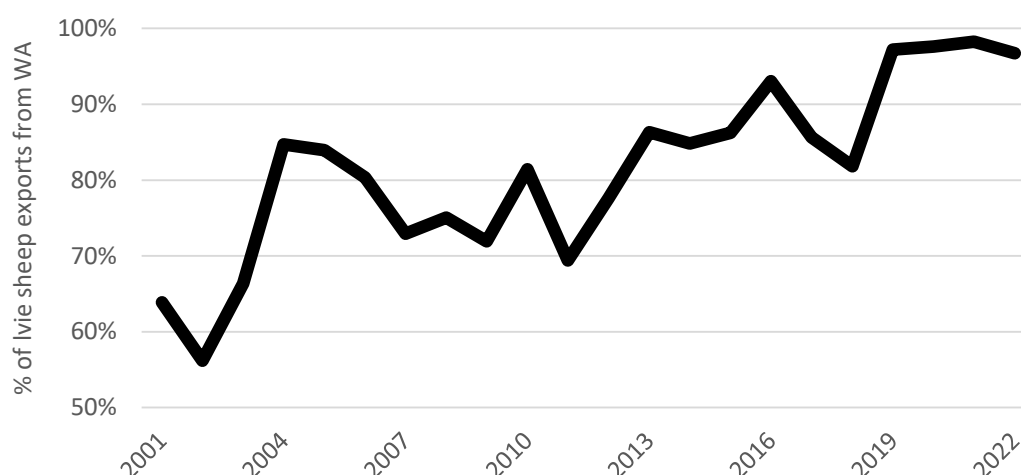
Chart 4: Australian live sheep exports 2011 to 2022



Sources: Australian Bureau of Statistics (pre 2015), Department of Agriculture, Fisheries and Forestry.

At the same time live sheep exports have declined, they have become more concentrated on Western Australia. Western Australia now accounts for almost all live sheep exports (see Chart 5).

Chart 5: Growing proportion of Australian live sheep exports shipped from Western Australia



Sources: Meat & Livestock Australia, 2011, National livestock export industry shipboard performance, Final Report Project W.LIV.0279, November, Sydney and Western Australian Department of Primary Industries and Regional Development, 2023, The Western Australian sheep and wool industries, January, <https://www.agric.wa.gov.au/sheep/western-australian-sheep-and-wool-industries>.

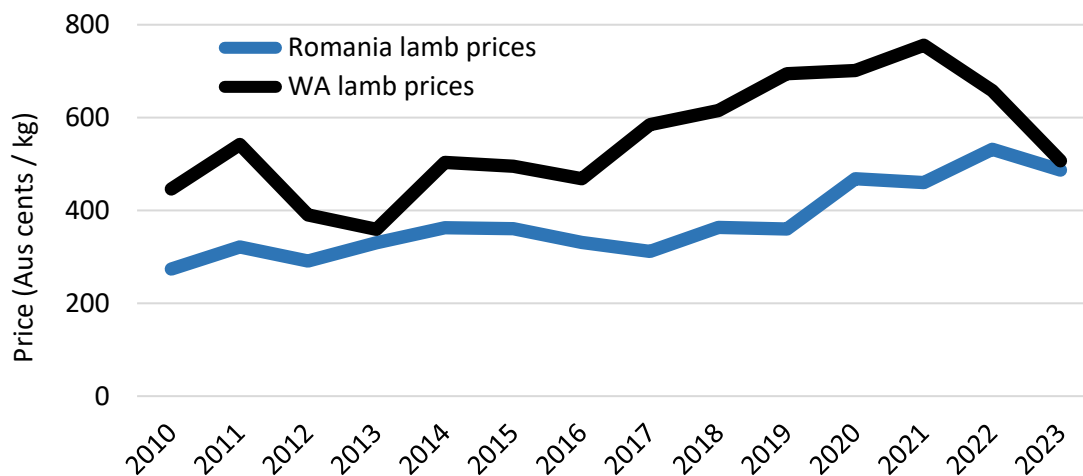
Factors contributing to the current lower levels of live sheep exports include the following:

- High sheep prices across Australia, especially against some major competitors.
 - Australian national sheep indicator prices increased more than five-fold between 2000 and 2022, including about a 40% increase from 2011 and 20% increase from 2017⁹, and this has suppressed demand for live sheep.

⁹ Merino lamb 16-22kg national saleyard indicator price from Meat & Livestock Australia – see Meat & Livestock Australia, undated, Australia – saleyard sheep and lamb indicators – national (calendar year), [MIDAS - Reports \(mla.com.au\)](https://www.mla.com.au/midas-reports).

- Australia's major competitors for supply of live sheep are from the European Union (Romania, Spain, and Portugal) and North Africa (Sudan and Somalia).
- Across the past few years Australian sheep and lamb prices have been relatively high compared to European sheep and lambs (refer to Chart 6 which compares Australian prices for lambs with those from Romania), although in the recent months the competitiveness of Australian sheep has improved.
 - Australian sheep and lambs are preferred in the Middle East due to their superior performance, but if the price gap is large, alternative sheep will be sourced, such as from Romania.

Chart 6: Western Australian and Romanian lamb prices

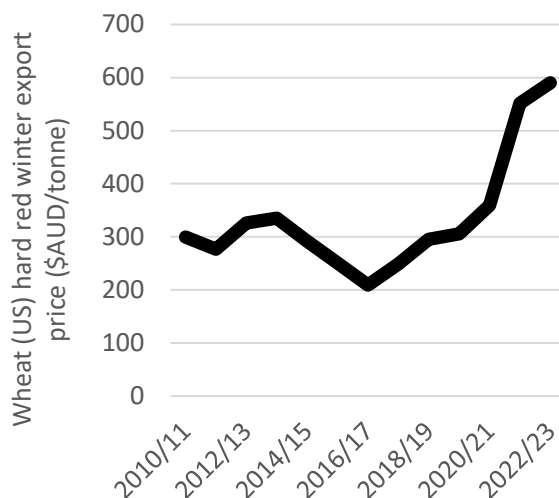


Sources: Meat & Livestock Australia and EU Commission

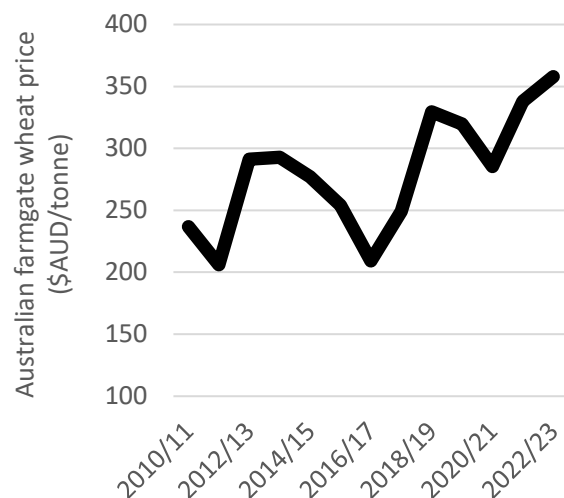
- High grain prices (see Chart 7).
 - Australian farmgate wheat prices have increased by more than 50% since 2010/11.
 - Increased grain prices cause producers to adjust production decisions away from sheep towards grain.

Chart 7: Record or near record international and Australian wheat prices

(A) US wheat price (Gulf export price)



(B) Australian wheat price (farmgate)



Sources: United States Department of Agriculture, Mercado

- Excellent seasonal conditions.
 - Favourable seasonal condition have caused lower availability of sheep across Australia as flock rebuilding occurs.
 - Seasonal conditions have also resulted in record levels of sheep movements from Western Australia to the eastern states, particularly in 2019/20 and 2020/21.
 - During the last 5 years, driven by excellent seasons in eastern Australia, and a need to rebuild flocks, interstate transfers of sheep from Western Australia to the east have averaged almost 0.7 million head per year, peaking at more than 1.3 million head per year in 2019/20 and 2020/21, compared to an average of only 150,000 in the 5 years prior (see Box 1).
 - Furthermore, favourable seasonal conditions have allowed sheep and lambs to be finished off to weights demanded by processors and encouraged planting of grains¹⁰.
- Increased regulatory intervention in the live sheep trade which has included:
 - Implementation of ESCAS in Middle East markets (in 2012).
 - An export license suspension (in 2018).
 - A prohibition on exporting to most ports in the Middle East between 1 June and 14 September (initially introduced in 2019).
 - Other regulatory changes including reductions in stocking densities and removal of double tier vessels.
- A decision by Qatar in 2021 to remove subsidies on Australian lamb imports.

Although some of the foregoing factors will be permanent in their impact, others will exist only in the short to medium term. For example, across Australia ABARES 5-year forecasts assume, not a continuation of the excellent seasons recently experienced, but El Nino conditions in Year 1 and at *“least two years in years 2 to 5 ... “revert[ing] to drought conditions with production outcomes consistent with decile 1 or 2 rainfall”¹¹*.

In addition to signs that some of the factors, which have acted to suppress the level of live sheep exports in recent years, are now waning, a likelihood exists of positive developments occurring. Saudi Arabia is by far the largest sheep importer in the Middle East region, accounting for about 50% of sheep imports, however it has not purchased Australian sheep for many years. There are genuine signs of this changing in the near future. New supply chains are now being established in Saudi Arabia and some have expressed a strong interest in securing Australian sheep (under ESCAS conditions). The tangible interest in Australian sheep by Saudi Arabian supply chains has been the subject of several news articles in both Australia and Saudi Arabia, with one article describing the resumption of trade as *“on the verge”* of occurring, likely early in 2024¹².

¹⁰ The 2021 season was one of the best for grain in Western Australia – see, for example, Beattie, S., 2022, Grain farmers look back on the 2021 season, Farm, 4th July.

¹¹ Dayal, K, and Miller, M., undated, Seasonal conditions: most likely climate scenarios to 2027-28, <https://www.agriculture.gov.au/abares/research-topics/agricultural-outlook/seasonal-conditions#most-likely-climate-scenarios-to-202728>.

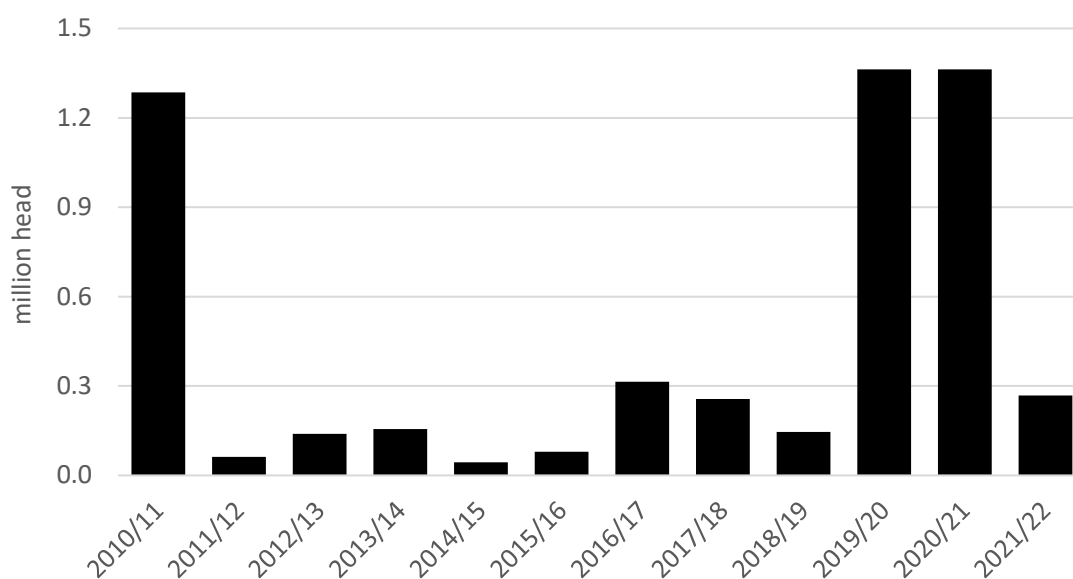
¹² For example, Al Khaleej Online, 2023, After a decade-long hiatus. Saudi Arabia prepares to resume imports of Australian sheep, 21st May, <https://alkhaleejonline.net/اقتصاد/بعد-وقف-دام-عقداً-السعودية-تستعد-لاستئناف-استيراد-أغنام-أستراليا>

Box 1: Interstate transfers of sheep from Western Australia

A feature of sheep demand in Western Australia over recent years, listed in Section 4, has been the strength of demand from interstate. This feature of Western Australia sheep demand is worthy of particular comment.

During the last five years interstate transfers of sheep from Western Australia have averaged almost 0.7 million head per year, and in 2019/20 and 2020/21 were more than 1.3 million head per year (see chart below).

Interstate transfers of sheep from Western Australia



Three comments can be made on the above chart.

- First, interstate transfers of sheep from Western Australia have been high in recent years (much higher than long term averages), driven by excellent seasons and the higher productivity of the sheep industry in eastern Australia. There is a strong likelihood that interstate transfers will fall in the short to medium term (indeed, they were much lower in 2021/22). With a fall in these transfers, in the absence of further policy interventions, live sheep exports from Western Australia are likely to increase.
- Second, the Western Australian flock effectively acts as a “*reservoir*” from which producers in eastern Australia can draw, on an “as needs” basis. The significant flock in Western Australia confers on the entire Australian sheep industry an important mechanism to cushion the impact of regular Australian droughts. It acts to reduce risks associated with the impact of droughts on Australian wool and sheepmeat production generally, allowing the eastern Australian flock to recover from drought more quickly than otherwise would be the case. In order to maintain the size of the “*reservoir*”, it is important that the Western Australian sheep industry is supported, including by preserving opportunities to access diversified sources of demand.
- Third, as noted by Chaudhri in the context of World Trade Organisation conformity (see Section 8.1), a relevant question for the Panel may be the relative welfare outcomes for shipment by sea to the Middle East compared to long distance road transport across Australia.

It is our view that it would be a mistake for the Panel to develop its recommendations based on the current level of exports – rather, the Panel should anticipate that in the normal course of events there will be a recovery in the level of exports. In this regard, the respected meat market research firm, Gira, forecasts the compound annual growth rate (CAGR) of live sheep imports into MENA countries for the 5 years 2022 to 2027 will be 8.2% per annum¹³. Similarly, but more conservatively, the latest MLA sheep industry projections forecast a 16% increase in live sheep exports to 2025¹⁴. In the view of LiveCorp further increases should be anticipated beyond 2025 (and even before 2025), particularly if the Saudi Arabian interest materialises, there is a prevalence of drier than normal years or prices remain at, or decline from, their current competitive levels.

4.2 Live exports continue to form an important source for sheep demand

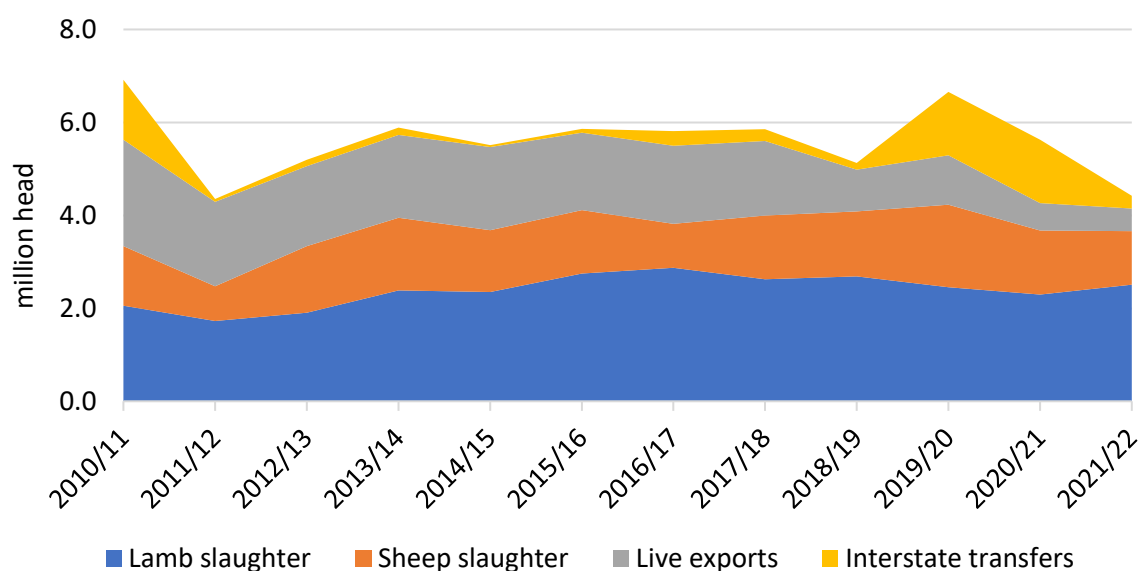
Despite being now at lower levels, live exports continue to form an important source of demand for sheep raised by Western Australia producers.

Chart 8 shows the composition of Western Australian sheep turn off since 2010/11 and Chart 9 shows the proportion of Western Australia sheep turnoff accounted for by live exports.

Note, from Chart 8 and Chart 9 that:

- Even at current low levels (i.e., in 2021/22) live exports account for more than 10% of total Western Australia sheep turnoff (including interstate transfers).
- Over the last 5 years live exports have accounted for 17% of Western Australia sheep turnoff and over the last 10 years live exports have accounted for 24% of turnoff.

Chart 8: Composition of Western Australia sheep turnoff

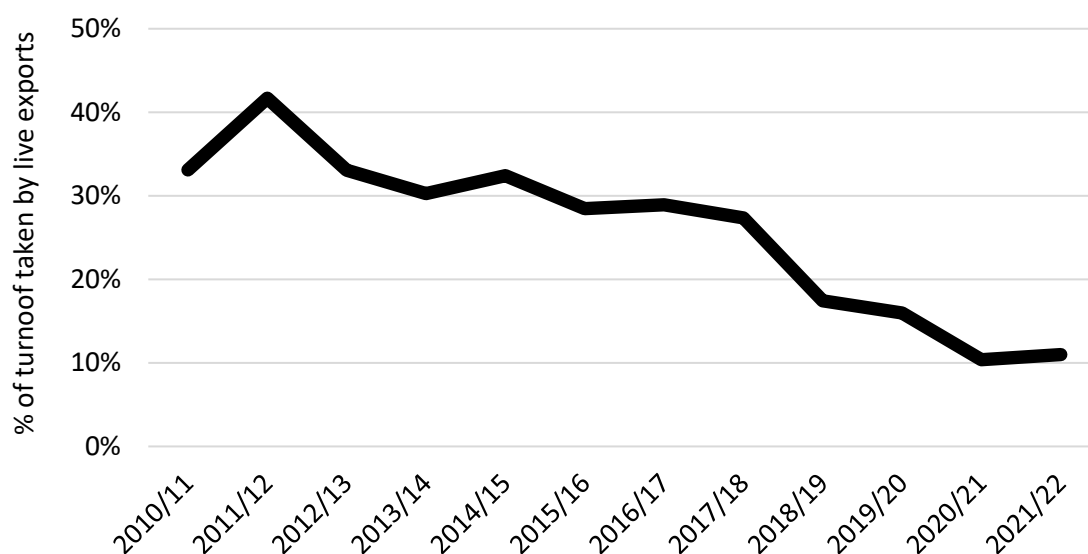


Source: Western Australian Department of Primary Industries and Regional Development, 2023, The Western Australian sheep and wool industries, January, <https://www.agric.wa.gov.au/sheep/western-australian-sheep-and-wool-industries>.

¹³ Gira, 2022, Gira Meat Club 2022/23: World Meat Market Outlook, 47th edition, December.

¹⁴ Meat & Livestock Australia, 2023, Industry projections 2023: Australian sheep, February, https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/sheep-projections/february-2023_mla-australian-sheep-industry-projections_080223.pdf.

Chart 9: Proportion of Western Australia sheep turnoff accounted for by live exports



- Source: Western Australian Department of Primary Industries and Regional Development, 2023, The Western Australian sheep and wool industries, January, <https://www.agric.wa.gov.au/sheep/western-australian-sheep-and-wool-industries>.

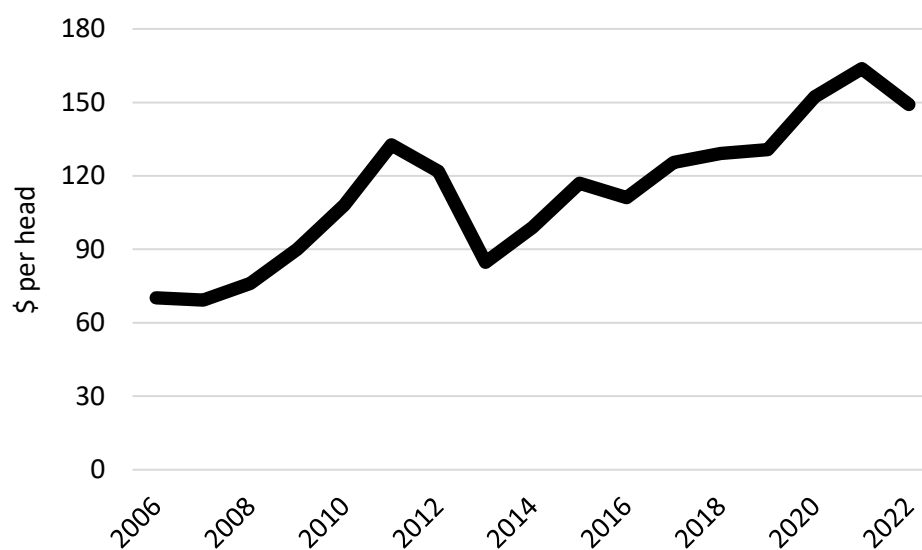
The relatively high proportion of Western Australia sheep turnoff that is directed to live exports should not be surprising. As Box 2 highlights, there is a complementarity between wheat / sheep production systems in Western Australia and live sheep exports, particularly in drier than normal years. Particularly note from Box 2 that live exporters tend to select sheep not favoured by processors. Typically, live exporters source unfinished male wool sheep (in forward store condition), while processors demand sheep at higher weights and with greater fat cover (and, for certain customers, with some meat sheep genetics). The fact that live exporters source unfinished sheep reflects two factors:

- These sheep are further fed in registered premises in Australia, during shipment to the Middle East and in feedlots in the Middle East.
- The customers of live exporters in the Middle East prefer lean product.

Concurrent with lower quantities of live sheep being exported, the unit value of live exports has increased, up 76% over the last 10 years (see Chart 10). A result of the increase in unit value is that, although the total value of live exports has dropped, the rate of decline has been less than the fall in number of head shipped (see Chart 11). In 2022 the total value of trade in live sheep by sea was \$76 million¹⁵.

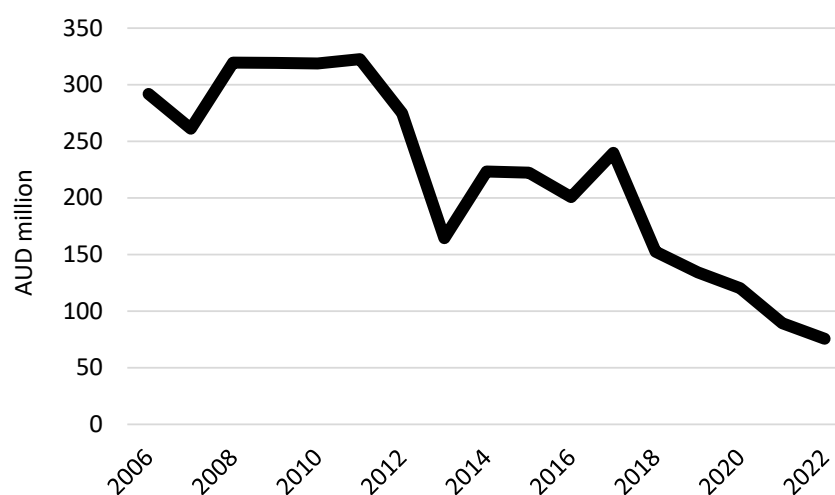
¹⁵ The total value of the live sheep trade by sea and air in 2022 was \$82 million which is the statistic shown on the LiveCorp website.

Chart 10: Unit value of live sheep exports by sea



Source: Australian Bureau of Statistics

Chart 11: Total value of live sheep exports by sea



Source: Australian Bureau of Statistics

Box 2: Live exports complement Western Australian sheep production systems, being especially important in less favourable seasons

A common farming enterprise in Western Australia is to combine the production of grains with raising sheep. Within such farming enterprises, live exports, as well as providing producers with an additional selling option for their sheep, allow greater flexibility in production decisions.

Mercado, in a report commissioned by LiveCorp in 2020, has described production systems in the Western Australian sheep-wheat zone in some detail¹⁶. Amongst other information, Mercado draw attention to the following:

- Sheep production in Western Australia is highly seasonal. Sheep are grazed on pastures which dry out over the summer and autumn period. The remaining stubbles and dry pastures are then grazed over the winter and spring for weed management and supplemented with feed grains when required.
- The Mediterranean climate in these regions is variable. Some seasons do not allow sheep and lambs to be economically finished to weights demanded by domestic processors.
- Producers of mixed sheep-grain enterprises are sensitive to economic conditions:
 - Switching out of livestock into grain in response to higher grain prices.
 - Retaining Merino wethers to older ages if wool prices are high.
 - Turning off more young wethers when lamb and mutton prices are strong, as this allows sheep farmers to run more ewes to increase meat production.
- The live export trade is a prime outlet for sheep once pasture quality declines in spring. It is also an outlet for lambs that cannot be brought up to the specifications required for domestic slaughter within a short selling window.

Crucially Mercado point out that the live sheep export trade plays a vital role in improving farm resilience. By conferring on producers the flexibility to sell animals at lower weights than demanded by domestic processors, it allows improved stocking density and pasture management decisions to be made.

Mercado note:

"The export of live sheep from Australia ... is a key element on which the Western Australian sheep industry is based, providing an orderly method to sell surplus wethers from a flock dominated by Merinos. In good seasons it is important, and in difficult seasons it is vital."

The flexibility provided by live exports not only allows sales revenue to be maximised, but also allows environmental benefits to be realised. The pasture component in crop rotation can be used successfully to control weeds, build nitrogen and improve soil conditions. Without live sheep exports there is a risk that producers will revert to monocultural systems. CBH have stated that they anticipate an uplift in grain production from sheep farmers moving solely into cropping if live exports are phased out. *"If there's a million hectares out there that are in livestock, there could be another 3mt (of grain) that comes into the system"*, Mr Macnamara from CBH recently told a WAFarmers Conference¹⁷.

¹⁶ Dagleish, M., Agar, O. and Herrmann, R., 2020, Impact of the live sheep export trade's self-imposed moratorium and regulatory changes, Mercado, January, <https://livecorp.com.au/report/oLS7Gv9fkcu11703tJB5H>.

¹⁷ Swift, B., 2023, CBH Group chief executive says additional grain from sheep farmers is "part of the plan", Farm Weekly, 4 April.

5 Economic contribution made by live sheep exports

LiveCorp recently commissioned ACIL-Allen to examine the economic contribution of the live sheep export trade to Western Australian producers and to the economy generally¹⁸.

The ACIL-Allen report is one of several reports that have been completed into the live export trade over the last few years. Other notable contributions in this area include a 2018 report by the Centre for International Economics (CIE)¹⁹ and three reports completed by Mercado in 2019 and 2020²⁰.

- The CIE report investigated the impacts of closure of the trade and estimated the resultant falls in Western Australian saleyard sheep / lamb prices to be approximately 30-50%. Due to changes in the trade since this report was completed, it will not be further referenced in this submission.
- The Mercado reports investigated the role and economic contribution of live sheep exports on producers and industries servicing the trade – and included a number of case studies. The Mercado reports can be considered as complementary to the ACIL-Allen work, using alternate methodology and taking a slightly different focus.

Below, the results outlined in the Mercado reports, and the more recent ACIL-Allen study, are used to describe employment generated by the live sheep trade and the impact of the live sheep trade on producer returns. Full versions of both sets of reports are attached to this submission.

5.1 Businesses reliant on, and employment generated by, the live sheep trade

In 2019 and 2020 LiveCorp commissioned Mercado to undertake analyses into the economic importance, including the employment importance, of the live sheep trade.

Some relevant conclusions reached by Mercado, in terms of categories of businesses who rely on the live sheep trade, and employment generated, are to be found below. The employment estimates of Mercado are also compared to estimates made by ACIL-Allen.

5.1.1 Categories of businesses with a reliance on the live trade as identified by Mercado

Mercado identified seven main categories of businesses with a significant reliance on the live sheep trade. A brief description of the interconnection between each category of business and the live sheep trade is to be found below. The dot points below, as well as containing material drawn directly from the Mercado reports, occasionally include some contextual material drawn from Meat & Livestock Australia²¹.

¹⁸ ACIL-Allen, 2023, Performance and value of the live sheep export trade, Final report to LiveCorp and Meat & Livestock Australia, June.

¹⁹ Centre for International Economics, 2018, Contribution of live exports to Woolgrower's Incomes- an update, Canberra, Australia.

²⁰ Dalgleish, M. and Agar, O., 2019, Value analysis of the Australian live sheep export trade, Mercado, September, <https://livecorp.com.au/report/5oWDdq13eh1FB43aJK287a>; Dalgleish, M., Agar, O. and Herrmann, R., 2020, Impact of the live sheep export trade's self-imposed moratorium and regulatory changes, Mercado, January, <https://livecorp.com.au/report/oLS7Gv9fkcU11703tJB5H>; Agar, O., Dalgleish, M., and Herrmann, R., 2020, Analysis of domestic fundamentals influencing the national sheep flock, Mercado, August, <https://livecorp.com.au/report/5E7NaJxDZV6BzTag3mJe2s>.

²¹ Meat & Livestock Australia, 2023, Factbook of Australian live sheep and sheepmeat exports, Sydney, May.

5.1.1.1 Western Australian sheep producers

- Most Western Australian farms are mixed sheep/cropping enterprises, with the average farm (including cropping properties), running 2,261 sheep - these sheep being mainly of the Merino breed focussed on wool output (Western Australia has the highest proportion of Merino sheep than any Australian State)²².
- For Western Australian farmers with sheep, the live export trade is one of their most important risk management tools. The highly seasonal nature of production in key regions of Western Australia where sheep are grazed, means that many farmers rely on the live export trade as their 'relief valve' when conditions are poor.
- In seasons of low rainfall in autumn or persisting dry, producers will turn-off wethers to manage their stocking density based on the limited available feed and/or water.
- Light Merino wethers (lamb wethers or adults) are typically not in a condition demanded by local processors but are well suited to the live export market. Lack of pastures in more marginal areas can inhibit wethers from gaining enough weight to be sold to processors.
- Effectively live sheep exports, by providing competition for sheep and lambs, particularly those of lower weight, promotes farm profitability by allowing improved optimisation of the grain / sheep mix²³.
- Although not highlighted by Mercado, Meat & Livestock Australia have noted that Western Australia has less processing capacity than the eastern states, thereby limiting sales channels for producers and, by implication, increasing the value of all available channels. Meat & Livestock Australia have also observed that adult sheep and lambs (especially heavy and trade weight lambs, typically directed into processing) commonly sell at a discount to similar lambs in the eastern states²⁴.
- Evidence of the significance of live exports to the entire Western Australian sheep industry is to be found in a recent Meat & Livestock Australia survey. Whereas the sentiment of producers nationally was positive, in Western Australia the sentiment had dropped dramatically, by 90 points, to -48 points (meaning that more producers felt pessimistic, than positive, about the future of the sheepmeat industry). The drop in sentiment was attributed by Meat & Livestock Australia as *"primarily due to concerns around the future of sheep live export"*²⁵.

5.1.1.2 Western Australian livestock road transport operators

- Compared to other participants in the value chain, livestock road transport operators in Western Australia are highly dependent on the live export trade. In road transport businesses surveyed by Mercado typical proportions of revenue from live exports were significant (not uncommonly in the range of 25-50%).
- On average, the sale of sheep from farm to the live export trade requires 3.5 movements. In comparison, sheep sold to a Western Australian abattoir would be moved just 1.5 times.
- The movement of livestock on road requires specialist skills and bespoke vehicles, facilities and loading equipment. Stock trucks are not designed to carry any bulk loads other than livestock which restricts the transportation work available to these operators.

²² Meat & Livestock Australia, 2023, op cit.

²³ Although not noted by Mercado, there are also some production operations in Western Australia which specialise in supplying the live sheep trade.

²⁴ Meat & Livestock Australia, 2023, Factbook of Australian live sheep and sheepmeat exports, Sydney, May.

²⁵ Meat & Livestock Australia, 2023, Sheep producers intentions survey, May, https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/sheepmeat-survey/spis---03-may-2023---final-report.pdf?utm_campaign=421675_Producer%20sentiment%20in%20the%20sheepmeat%20sector%20declines%3A%20Sheep%20Producer%20Intentions%20Survey&utm_medium=email&utm_source=Meat%20%26%20Livestock%20Australia&utm_i=4PKB,91D7,L64Y9,11387,1. See also Meat & Livestock Australia, 2023, Producer sentiment in the sheepmeat sector declines: Sheep Producer Intentions Survey, 9 June, Media Release.

- As a result of the 3½ month live sheep export prohibition already introduced, Mercado report that some single truck operators experienced a business collapse. Other operators reported a significant flow on effect to their suppliers in regional towns as a result of having trucks sidelined.

5.1.1.3 Shearing services

- Shearing services are another important part of the live export supply chain, with the requirement for all sheep to be shorn before export.
- Roles in a shearing team are diverse and include shearers, wool classers, wool pressers, rouseabouts and may also include a cook.
- Retention of staff is already challenging for shearing managers, and will be made more difficult with a cessation of demand from the live trade.
- Shearing services do not rely on the purchase of many technical inputs or other services for their operation. However, Mercado note that there is a large flow-on effect from sheering operations to regional communities.

5.1.1.4 Agents and saleyards

- The agent's role is to find the best marketing option for his/her customers' stock and, for a significant number, the live export trade is the best option.
- The agent's salary is a commission from the farmer based on prices received for stock sold. A reduction in the number of buyers, diminished saleyard competition and fewer marketing options, brought about by a move to prohibit live sheep exports, will all contribute to lower stock prices received and in turn, lower returns to the agent.
- Agents reported that it would be a challenge to find alternative buyers for light stock. Even sheep of a condition suitable for local processing were not guaranteed a sale at the time of the Mercado report, with many abattoirs facing capacity constraints at peak times.

5.1.1.5 Fodder manufacturers and growers

- Live sheep shipments act as a significant source of demand for feed and grain products in Western Australia. During the sea journey, sheep are fed on a pellet typically consisting of 50% hay or straw, 30% grain barley, 10% lupins and the balance of bulk roughage and urea. Chaff is also supplied for bedding on voyages.
- There are a number of feed manufacture businesses based in regional Western Australia that supply feed products to exporters. The proportion of product sold to domestic markets versus live export varies from business to business. For some manufacturers, that have focused their business on supplying to live export, more than 90% of their revenue comes from the trade.
- Fodder manufacturers are an important source of employment in Western Australia, providing work for manufacturing staff directly, and contract bailers and straw suppliers. Mercado report that fodder manufacturers employ an estimated 100 staff directly, as well as contract balers, bale stackers, engineers, mechanics and grain, hay and straw suppliers.

5.1.1.6 Contract balers and stackers

- In regions that supply straw and hay to fodder manufacturers, a significant proportion of the work for contract balers and stackers is derived from the livestock export trade.
- The source of demand for straw and hay is not only from fodder manufacturers that produce feed for use onboard a vessel, but also from registered premises that hold shipping wethers for the live trade. Mercado report that the reliance by hay and fodder contractors on the livestock export trade can be up to 95%.

- Any change in demand for contract balers and stackers flows down the chain to reduce the volumes of straw and hay purchased from growers – fodder growers are, therefore, affected.
- A large number of other participants will also be impacted by the reduced workload of contract balers and stackers, including rural merchandise stores (which supply string for baling), fuel suppliers, local mechanics and transport operators.

5.1.1.7 Veterinarians

- Veterinarians involved in the live sheep export are specialised to practice at one of a number of possible points in the supply chain. These include (a) on-farm animal health services, (b) Australian Government Accredited Veterinarians (AAVs) involved in the preparation of animals prior to a voyage, (c) AAVs employed onboard vessels, and (d) other roles such as research or Government.
- The level of reliance of AAVs on the live sheep export trade is dependent on their point of practice and stock type experience. Mercado state that on average, AAVs in Western Australia rely on the live sheep export trade for 25-50% of their income. Many onboard AAVs also operate as onboard stock handlers when required.
- Cessation of the live sheep trade would not only remove work opportunities for veterinarians directly involved in the trade, but would also reduce expenditure with veterinary supply retailers.

5.1.1.8 Associated down chain participants

- In addition to the above seven business categories, containing some members with a significant reliance on the live sheep trade, Mercado note there are other diverse businesses that are employed or contracted by exporters and importers to fulfil each live sheep shipment. They include registered premises staff, sheep buyers, shipping services, stevedores, stockmen, quality control specialists, ship owners and port authorities.

5.1.2 Employment generated by the live sheep trade

Both the series of reports produced by Mercado in 2019/2020 and the more recent report by ACIL-Allen contain estimates of the impact of the live sheep trade on employment, but the focus of these estimates, and methodology used, is quite different.

The methodology used by Mercado was to, first, estimate the employment impact of the live sheep trade on-farm and, then, to apply a multiplier to this to calculate total employment generated (i.e. direct on-farm employment plus employment in downstream and upstream industries).

Using 2018 data Mercado calculated the on-farm direct full time equivalent (FTE) employment from the live sheep trade to be 1,037 jobs.

The multiplier used by Mercado for indirect employment was 2.32. In one of its reports, Mercado listed eight different multiplier values, as estimated across various economic studies, and selected a Red Meat Advisory Council (RMAC) / Meat & Livestock Australia (MLA) multiplier estimate that was approximately the mid-point of all studies²⁶. Using the 2.32 multiplier, indirect employment generated by live sheep exports was calculated at 2,406 FTEs and total employment at 3,443 (i.e. 1,037 + 2,406).

²⁶ Red Meat Advisory Council, 2018, State of the industry 2018 report, Meat & Livestock Australia, North Sydney. The employment figures included in the 2018 RMAC report, on which the Mercado multiplier estimate was derived, reflected work undertaken by Ernst & Young, in part using IBIS World data. The RMAC/MLA/Ernst & Young multiplier estimate was slightly below the average of multipliers across all studies listed by Mercado.

The ACIL-Allen study used live export volumes for 2017/18 to 2021/22, National Accounts Input-Output data and additional industry level data from ABS, WA Department of Primary Industries and Regional Development (DPIRD) and ABARES. Employment estimates calculated by ACIL-Allen were only those upstream of farm gate (i.e. ACIL-Allen did not quantify the impact of live exports in generating employment on farm or downstream of the farm or in associated businesses).

ACIL-Allen estimated that direct employment generated by live sheep exports upstream of the farm was 88 FTEs, with a total employment generation upstream of the farm of 240 FTEs.

5.2 Producer income generated by the live sheep trade

The ACIL-Allen study also used real options analysis to calculate the impact on producer revenues of a cessation of the live sheep trade.

Once price effects are taken into consideration, ACIL-Allen concluded that the value of the producer's option to deliver sheep to live export is \$21.84 per wether in the Merino production. Expressed in relative terms, ACIL-Allen estimated that, if live exports ceased, the value of male sheep in Western Australia would drop about 19%.

ACIL-Allen, however, recognised that their analysis had spanned a period of relatively good seasonal conditions and high demand for Western Australian sheep. The authors of the report noted that if the loss of live exports were to occur *"during a period of high supply and low demand, the price response would likely be more pronounced ... potentially as much as \$37.44 (32.9%)"*²⁷. ACIL-Allen observe that the \$37.44 estimation *"suggests that the impact of the surge in supply [from a cessation of live exports] on prices and overall profitability could be significant under the given market conditions"*²⁸.

Further details can be found in the copy of the ACIL-Allen report attached to this submission.

6 Impact on overseas customers and supply chains

As highlighted in Sections 2 and 3, Australia has been a long time supplier of live sheep to the Middle East, with the trade extending beyond 50 years.

Recently there have been five major customer countries in the Middle East for Australia's live sheep exports. Ranked in terms of number of head exported these are: Kuwait, Israel, UAE, Oman and Jordan. In 2022 these 5 countries accounted for 92% of Australia's total live sheep exports²⁹.

All these countries are highly dependent on imports for food security.

One of the four dimensions of food security is physical access to food of which net trade is a component³⁰. The World Bank has ranked countries across the globe as either (i) net food exporters or into (ii) high, medium or low dependency on food imports to meet domestic food needs. The

²⁷ ACIL-Allen, 2023, op. cit., p32.

²⁸ Ibid, pp.32-33.

²⁹ Up until recently Qatar has also been a major customer of Australian live sheep, but a change in subsidy arrangements has resulted in a drop in demand from Qatar.

³⁰ There are four major dimensions of food security: physical availability, including net trade; economic and physical access to food; food utilization, determining nutritional status; and stability of the other three dimensions over time -see World Bank, undated, What is food security, <https://www.worldbank.org/en/topic/agriculture/brief/food-security-update/what-is-food-security#:~:text=Sufficient%20energy%20and%20nutrient%20intake,the%20nutritional%20status%20of%20individuals>.

measure used by the World Bank for dependency on food imports was net food imports as a percentage of domestic food supply.

All Middle East customer countries of Australia were ranked by the World Bank as “*highly dependent*” on food imports. Australia, in contrast, was identified as a net food exporter (abundant physical access to food)³¹.

Relying on imports to meet the food needs of a country creates a different mindset amongst Governments and the general populace – a mindset that may not be fully appreciated in Australia.

A consideration for the Panel is how to allay the natural food security and trade reliability concerns of Middle East Governments arising from any decision by the Australian Government to cease trade in live sheep (i.e., to discontinue a portion of current Middle East imported food supply).

The impact of a cessation of the live sheep trade, however, extends beyond considerations related to food insecurity. For deeply held cultural and religious reasons supply of live sheep is extremely important to Middle Eastern societies.

Bill Farmer noted in his 2011 review: “... *food security concerns, a preference for freshly slaughtered meat, infrastructure constraints and religious and cultural factors all play a role in driving demand for Australian livestock exports*”³².

ABARES has noted that the preference for fresh meat in Middle East markets stems primarily from religious and cultural factors³³. Halal and kosher traditions place strict requirements on how an animal must be slaughtered, and on treatment before and after slaughter. While there is a valuable export trade from Australia in sheepmeat, which is slaughtered and prepared in line with religious requirements, there is still a preference within Middle Eastern countries to slaughter animals under the auspices of local religious officials, in order to maintain control over the process.

Sheep across the Middle East, from a cultural and culinary perspective, are also seen as symbols of hospitality, generosity, and kindness³⁴. Sheep are especially important during festival periods, whether these be religious festivals or special occasions such as a wedding or birth of a child. On such occasions it is common for part of the meat from an animal to be given to the poor.

Members of the Kuwaiti community maintain that viewing the process of converting an animal into meat “*teach[es] .. children about what they’re eating and to thank God for it, so they understand and show respect to what they consume*”³⁵. Other regional governments have created abattoirs where members of the general public can take animals to be slaughtered, and view the process, while maintaining food safety and hygiene.

Some members of the Australian community may consider a switch by Middle Eastern consumers from live sheep to chilled or frozen sheepmeat to be a simple and desirable conversion. For reasons

³¹ Malpass, D., 2022, A new global food crisis is building, <https://blogs.worldbank.org/voices/new-global-food-crisis-building>.

³² Farmer, W., 2011, Independent review of Australia’s livestock export trade, Commonwealth of Australia, August, 140pp, <https://www.agriculture.gov.au/biosecurity-trade/export/controlled-goods/live-animals/livestock/regulatory-framework/acts-regulations-orders-standards/review-live-export-trade>.

³³ Drum, F. and Gunning-Trant, C., 2008, “Live animal exports: a profile of the Australian industry”, *ABARE Research Report 08.1*, Australian Government Department of Agriculture, Fisheries and Forestry, Canberra.

³⁴ ACIL-Allen op cit.

³⁵ Ibid, p.39. The statement was attributed to the CEO of the Kuwait Livestock Transport and Trading Company which is an arm of the Kuwaiti Government. Although the statement pertains to Kuwait, it applies widely to Arabs of the Muslim faith.

specified above, however, for many Middle Eastern consumers such a conversion is neither simple nor desirable.

Others in the Australian community, while recognising the cultural and religious needs for Middle East consumers to have locally processed product (rather than chilled or frozen sheepmeat), nevertheless argue that the live animals currently purchased from Australia, could be sourced from elsewhere. However, this viewpoint ignores two important facts.

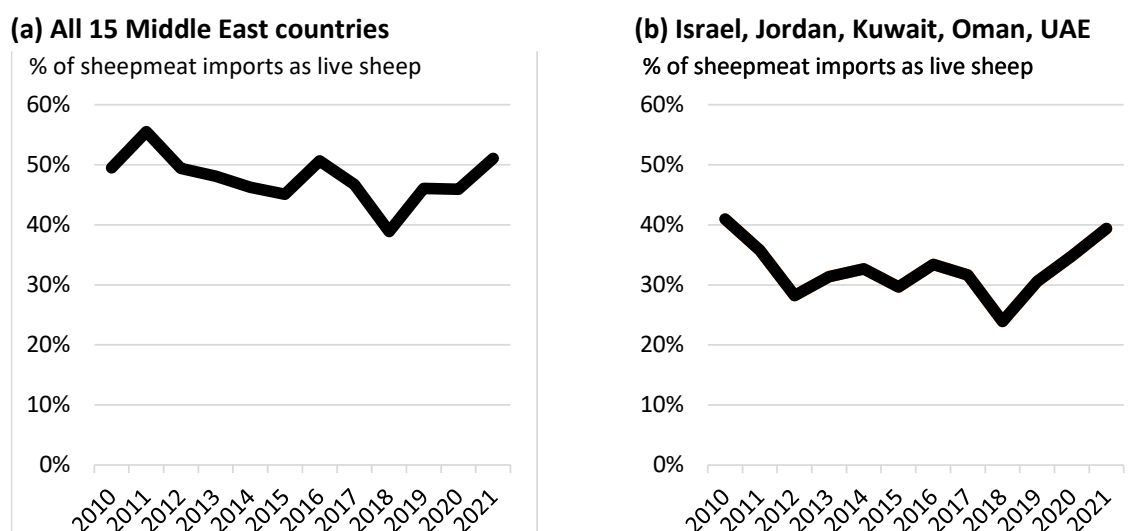
- First, Australian exporters must ensure high standards of animal welfare are applied to their animals even if slaughtering occurs overseas. Other countries do not impose such conditions. Consequently, global animal welfare standards will fall if Australian export of live animals is prevented.
- Second, although Middle Eastern markets are open to sheep from countries other than Australia, some customers in these markets have a significant preference for Australian sheep due to Australia's disease-free status or the quality / price point of meat obtained from Australian animals. These customers want to buy sheep from Australia, not elsewhere.

Some Middle Eastern businesses are tailored towards importing live product, particularly from Australia, and would be damaged by a cessation of this trade. Several of these businesses have made substantial investments in the trade, both overseas and in Australia, on the basis of past Australian Government commitments and an anticipated continued role for live exports.

The role played by live sheep imports, including from Australia, in meeting the cultural and religious needs of many Middle Eastern countries for live sheep is evident in publicly available trade statistics.

As can be seen from Chart 12(a), across the 15 countries comprising the Middle East around 50% of sheepmeat imports are in live form (excluding live and sheepmeat trade between the countries themselves). For Australia's major customer markets in the Middle East, 30-40% of sheepmeat imports are in live form – see Chart 12(b). As has been noted, from a religious, cultural and cuisine perspective, sheepmeat for the Middle East is a sensitive trade. For this sensitive trade across the Middle East generally, and for Australia's customers, there is a heavy reliance on live exports.

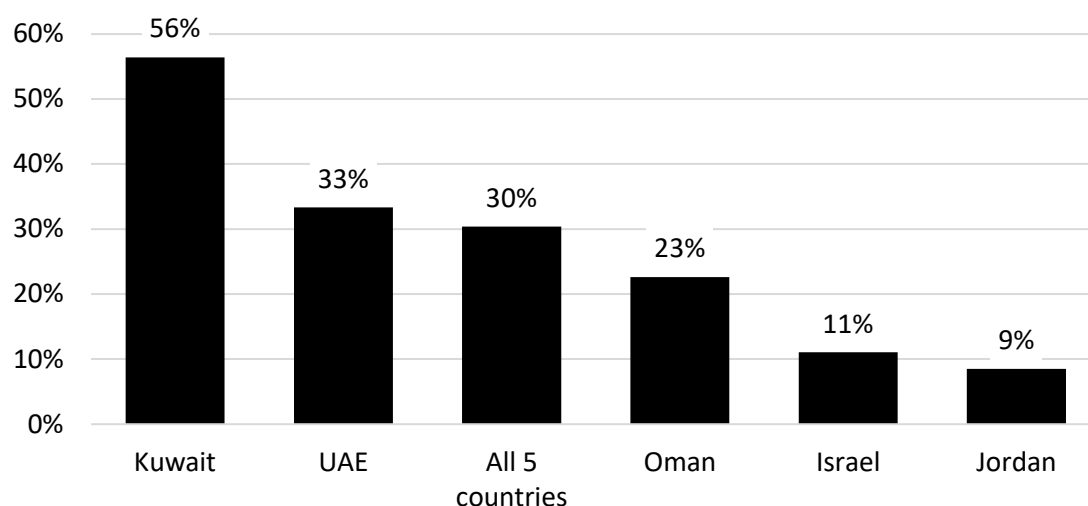
Chart 12: Share of sheepmeat in the Middle East imported in live form³⁶



³⁶ The conclusions from this chart are slightly different from those drawn by Meat & Livestock Australia. Meat & Livestock Australia have observed that "The share of live imports in MENA's total sheepmeat consumption has been gradually falling

Furthermore, Australia plays an important part in supplying live product for this trade. For our customer markets of Israel, Jordan, Kuwait, Oman, United Arab Emirates, once trade between the countries themselves has been excluded, during the 5 years 2017 to 2021 (representing the latest available import statistics from the United Nation's Food and Agricultural Organisation - FAO), the share of live sheep imports supplied by Australia has been about 30% of all live sheep imports (see Chart 13).

Chart 13: Share of Australian live sheep imports, compared to global imports*, for selected countries for 2017 to 2021*



* Source: FAOStat. Trade in live sheep between the selected countries has been excluded from the calculations.

For all of the above 5 countries included in Chart 13 Australia is amongst the top 3 sources for live sheep imports (see Chart 14).

Chart 14: Ranking of gross top 3 sources for imported live sheep by selected Middle East country*

Ranking	Israel	Jordan	Kuwait	Oman	UAE
1 st	Portugal	Romania	Australia	Somalia	Australia
2 nd	Australia	Spain	Jordan	Australia	Somalia
3 rd	Romania	Australia	Iran	Sudan	India

* Source: FAOStat, latest 5 calendar years of data

7 Impact on cattle producers

Section 5 drew the attention of the Panel to research showing the impact of a cessation of live sheep exports on sheep producers and on other industries supplying the live sheep export industry.

from around 50% a decade ago in 2011, to around 40% in 2021 – see Meat & Livestock Australia, 2023, op cit. There are a number of differences, however, between the Meat & Livestock Australia analysis and that shown in Chart 12.

- The primary difference is that the Meat & Livestock Australia analysis includes additional countries in North Africa - Algeria, Libya, Morocco, Tunisia and Egypt.
- Also, the analyses use different data sources (Meat & Livestock Australia used GIRA data, Chart 12 uses Food and Agricultural Organisation (FAO) data).
- In Chart 12 different live sheep weights are used, depending on the supplying country, whereas the GIRA data uses one average carcass weight.
- In Chart 12 trade in live sheep and sheepmeat between Middle East countries has been excluded. The exclusion has been undertaken to highlight the dependence of the region (as a whole) on external supplies. The Meat & Livestock Australia analysis did not exclude intra-regional trade.

Additionally, Section 6 drew the attention of the Panel to research showing the impact of a cessation of live sheep exports on customers.

Apart from the groups potentially impacted by a cessation of live sheep exports addressed in Sections 5 and 6, a further group potentially impacted is cattle producers, especially those supplying the live trade. There are two main avenues for cattle producers to be impacted by a cessation of live sheep exports. These are addressed below.

7.1 Impact on the economics of live cattle exports and on producers supplying these cattle

Producers supplying cattle for the live trade to the Middle East have the potential to be directly impacted by a prohibition on sheep exports. This is because many cattle exported to the Middle East are shipped on voyages that also contain sheep. If sheep are excluded from these voyages, the economics of carrying only cattle will be questionable.

The only Western Australian port used to ship cattle to the Middle East is Fremantle. Over the last 5 years of all cattle shipped from Fremantle, 45% were to MENA, 52% to Asia and 3% to other destinations³⁷. In contrast, shipments of cattle from the other Western Australian ports of Geraldton, Broome, Port Headland and Wyndham were all to Asia. Cattle shipped from Fremantle to the Middle East are quite different from cattle shipped to Asian destinations. They are different in genetic composition, raised by different producer groups and drawn from significantly different geographical areas. In assessing impact, it is therefore inaccurate to use statistics which amalgamate these different exports.

Over the past 5 years there have been 76 cattle voyages to the Middle East using Fremantle as the sole load port. Information on these voyages is contained in Table 1.

Table 1: Cattle voyages from Fremantle to the Middle East 2018-2022*

	Cattle only voyages	Joint cattle / sheep voyages	Totals
Number of voyages	11	65	76
% of voyages	14%	86%	100%
Total cattle exported	65,325	164,839	230,164
% of cattle exported	28%	72%	100%
Average cattle per voyage	5,939	2,536	N/A
Average sheep per voyage	0	46,785	N/A

* To ensure that cattle are drawn from Western Australia the data shown is restricted to Fremantle as a single load port. In addition to these voyages there were another 9 voyages that used Fremantle as one of multiple load ports for shipments to the Middle East, 5 of these voyages being joint cattle/sheep voyages. Source: Department of Agriculture, Fisheries and Forestry reports to Parliament <https://www.agriculture.gov.au/biosecurity-trade/export/controlled-goods/live-animals/live-animal-export-statistics/reports-to-parliament>.

Note from Table 1 that over the past 5 years:

- 86% of cattle loaded at Fremantle for the Middle East were shipped on voyages that also carried sheep.
- On average these joint cattle / sheep voyages from Fremantle to the Middle East carried 2,536 cattle and 46,785 sheep (i.e., the bulk of livestock carried - in terms of number of head - were sheep).

³⁷ Statistics were obtained from livestock information data found at [All Livestock Exports - DAFF \(agriculture.gov.au\)](https://www.agriculture.gov.au/biosecurity-trade/export/controlled-goods/live-animals/live-animal-export-statistics/reports-to-parliament).

- In total 164,839 cattle were carried on these voyages – these represent cattle sales that could be jeopardised by a prohibition on sheep shipments.

Table 2 shows more detail on the destination within the Middle East of the joint cattle/sheep voyages included in Table 1.

Table 2: Market destinations for joint cattle / sheep voyages from Fremantle to the Middle East 2018-2022 (sole load-port only voyages)

Market destination	Number of voyages	Total cattle exported	Average numbers per voyage	
			Cattle	Sheep
Arabian Gulf	38	14,777	389	61,633
Israel/Jordan	26	147,054	5,656	24,268
Turkey	1	3,008	3,008	68,039
Totals	65	164,839		

Source: As per Table 1.

Points to note from Table 2, including the underlying data, are:

- For voyages to the Arabian Gulf there were no cattle only voyages – cattle were only shipped when sheep were also shipped.
 - The vast majority of animals (>99%) onboard these joint sheep / cattle voyages to the Gulf were sheep.
 - It will be uneconomic to consign cattle to Gulf markets if the export of sheep is prohibited.
 - Over the past 5 years there were 14,777 cattle sent out of Fremantle to the Arabian Gulf – these sales will likely be lost if the sheep trade were closed.
- For voyages to Israel and Jordan over the last 5 years:
 - Over 70% of voyages to Israel/Jordan from Fremantle carried both cattle and sheep.
 - The average number of cattle carried on voyages to Israel/Jordan from Fremantle was 5,656 (note this average includes cattle only voyages) and the average number of sheep was 24,268.
 - A total of 147,054 cattle were shipped out of Fremantle for Israel/Jordan on voyages where sheep were also shipped. It is understood that total cattle sales to Israel/Jordan are likely to drop if sheep exports are prohibited.

Western Australian cattle exporter T&T Rural Contracting co-owner Tam Michalek, amongst others has highlighted the economic relationship between exporting live cattle and live sheep. Ms Michalek has recently stated:

"Cattle go on sheep boats a lot ... but it is the sheep that sell the boats. The sheep are the main cargo that go to the Middle East, but they provide the space for the cattle."

7.2 Impact on customer attitudes to live cattle exports

A further important, but indirect, impact on cattle producers stems from potential customer reaction to any Australian Government move to prohibit live sheep exports.

Customers currently purchasing Australian cattle may view a move to prohibit Australian sheep exports as also placing at increased risk future trade in Australian cattle. A natural reaction to these

concerns would be to diversify demand away from Australia to alternative suppliers. Recent press articles suggest this process has already commenced, with Indonesia reportedly about to grant access to a wider set of live cattle suppliers³⁸.

The Australian Government has provided assurances that no intention exists to prevent live cattle exports³⁹.

However, it is noted that after the implementation of the Exporter Supply Chain Assurance System the following statements were made which applied both to cattle and sheep exports (the latter now facing a trade prohibition):

"The reforms give certainty to the community who made it clear they want better welfare standards, and certainty to industry and livestock producers who want an industry with a long term future," Minister Ludwig said.

*"Importantly, if animal welfare issues do arise in overseas markets in the future, the Australian Government will have the ability to address these issues **without closing entire markets. This is important for delivering global food security**" (our emphasis).*

A consideration for the Panel is how to counter any erosion of Australia's perceived reliability as a food supplier in the minds of importing customers.

8 Potential for damage to Australia's reputation and WTO implications

Another consideration for the Panel is how to frame recommendations to avoid possible World Trade Organisation (WTO) challenges. If recommendations are not framed appropriately the potential also exists for a prohibition on sheep exports to undermine Australia's long-standing advocacy for trade liberalisation in agricultural products.

8.1 WTO implications of a prohibition on sheep exports

WTO rules that require no additional quantitative restrictions being imposed on imports, also extend to exports. In particular, Article XI:1 of the GATT 1994 prohibits members from introducing or maintaining any form of export prohibition or restriction other than duties, taxes or other charges.

There are a number of exceptions to the prohibition of members imposing export restrictions, including those contained in the "General Exceptions" of Article XX of GATT 1994.

For a GATT-inconsistent measure to be justified under Article XX, a member must perform a two-tier analysis proving⁴⁰:

³⁸ For example, Connors, E. and Santi, N., 2023, Indonesia rebuffs Australia, turns to Brazil for live cattle imports, Australian Financial Review, 5th May, <https://www.afr.com/world/asia/indonesia-rebuffs-australia-turns-to-brazil-for-live-cattle-imports-20230505-p5d5v6>. Although the article attributes the foreshadowed change in access arrangements to high Australian cattle prices, undoubtedly a range of factors are bearing on the change. Moves to reduce reliance on Australia for cattle supplies have existed since the 2011 trade shutdown. Any further food related trade shutdowns may serve to accelerate these moves.

³⁹ Amongst other places these assurances are included on the Department's "Phase out of live sheep exports by sea" web page. Noted on this page is that *"The phase out does not apply to other livestock export industries, such as live cattle exports, nor does it apply to live sheep exports by air"*.

⁴⁰ See WTO Secretariate, undated, WTO rules and environmental policies: GATT exceptions, https://www.wto.org/english/tratop_e/envir_e/envt_rules_exceptions_e.htm.

- First, that the measure falls under at least one of the exceptions (e.g. paragraphs (b) to (g), two of the ten exemptions under Article XX) and,
- Second, that the measure satisfies the requirements of the introductory paragraph of Article XX (the “chapeau”). To satisfy the chapeau the measure must not be applied in a manner which would constitute “*a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail*”, and is not “*a disguised restriction on international trade*”.

Two exceptions specified in Article XX to the general prohibition on countries introducing additional export (or import) restrictions are specified in paragraphs (b) and (g). A measure involving an additional export restriction may nevertheless be WTO compliant if it is:

- To protect human, animal or plant life or health - Article XX(b); or
- For the protection of public morals – Article XX(a).

That is, using the exceptions in Article XX, a prohibition on live sheep exports by Australia may be justifiable under WTO rules provided it is necessary to either protect “*animal ... life or health*” or for the “*protection of public morals*”.

8.1.1 Article XX(b) animal life or health exemption.

Several questions exist over whether the Article XX(b) “*animal ... life or health*” exceptions can be applied to justify a prohibition on live sheep exports by Australia.

First, as a 2014 RSPCA paper points out⁴¹, there is uncertainty as to whether the term “animal health” includes issues of animal welfare. The RSPCA paper highlights that the exception was originally intended to protect the health of a nation’s animals from disease.

Second, given the original intent was to protect the health of a nation’s animals from disease (i.e. in regards to biosecurity for imports), there is uncertainty over the applicability of this exception to exports.

Third, reliable, objective, verifiable evidence would need to be presented to substantiate the animal health risk⁴². This evidence could include statistics that animal welfare risks for animals exported are substantially worse than for animals in domestic production and transport systems. As Chaudhri points out, film footage from a television program may not satisfy the requirement for reliable, objective, verifiable evidence⁴³.

Fourth, the prohibition must be necessary to avoid any identified welfare risk. The WTO Appellate Body has stated that the word “*necessary*” in this context should be interpreted as closer in meaning to “*indispensable*” than “*making a contribution to*”⁴⁴. To meet the test of a trade prohibition being necessary, the WTO member must show that no reasonably available alternative exists to meet the identified animal welfare risk. A Member “*is bound to use, among the measures reasonably*

⁴¹ RSPCA, 2014, WTO rules and animal welfare, Information Paper 06/2014, June, <https://kb.rspca.org.au/wp-content/uploads/2019/03/World-Trade-Organisation-RSPCA-Information-Paper-June-2014.pdf>.

⁴² Chaudhri, R., 2014, Animal welfare and the WTO: The legality and implications of live export restrictions under international trade law, Federal Law Review, Vol. 42, No.2, pp.279-308.

⁴³ Ibid, p.288.

⁴⁴ Appellate Body Report, 2011, Korea - Measures Affecting Imports of Fresh, Chilled and Frozen Beef, WT/DS169/AB/R, https://www.wto.org/english/tratop_e/dispu_e/161-169abr_e.pdf.

available to it, that which entails the least degree of inconsistency [with GATT rules]⁴⁵. As Chaudhri points out⁴⁶:

- A complete ban will have the most difficulty in satisfying the alternatives analysis, since it is “by [its] design, as trade-restrictive as can be”.
- “Arguably, no genuine alternative [would exist] to a complete ban if the transportation of live animals itself is considered harmful to animal health. In this regard, the continued inter-state transportation of livestock may present Australia with difficulties in making such an argument, particularly if the harms inherent in transportation cannot be isolated to the long haul sea voyages associated with international trade”. It is to be noted that evidence on animal welfare outcomes for sheep transported by road in Australia is limited. However, the very limited data available (on mortalities only) shows that on a per unit time basis sheep mortalities for live exports are lower than by road.

8.1.2 Article XX(a) necessary to protect public morals.

In the previous section it was noted that, for several reasons, a high degree of uncertainty exists over the use of Article XX(b) to justify a prohibition on sheep exports. In part these reasons pertain (a) to the extra territorial context of the animal welfare concerns underlying the prohibition and (b) whether animal welfare is captured under the animal health provisions of Article XX(b).

Several authors⁴⁷ have stated that stronger arguments may be available to justify animal welfare related trade restrictions under Article XX(a).

The first specific WTO ruling on the relevance of public morals to measures for the protection of animal welfare is contained in *EC – Seal products, DS400/401*⁴⁸. This dispute involved a ban imposed by the European Union on the importation of seal products due to concerns about the cruelty of the seal hunt. Canada and Norway sought WTO adjudication on the matter in 2009.

Both the Panel and Appellate Body when ruling on this dispute agreed that there was significant public concern in European Union Member States about the welfare of seals to justify the measures on moral grounds⁴⁹. However, for reasons relating to inconsistencies in the way the measure was implemented, the Appellate Body ruled against the European Union in the dispute. Subsequently the European Union changed the way the measures were implemented to achieve conformity with WTO provisions⁵⁰.

⁴⁵ Chaudhri, R., op cit., p.291.

⁴⁶ Ibid, p.292.

⁴⁷ See, for example, Chaudhri, R., 2014, op cit.; RSPCA, 2014, op cit.; and Kahn, S., 2020, *Revue Scientifique et Technique - International Office of Epizootics*, Vol. 39 No. 1, pp.69-79.

⁴⁸ World Trade Organisation, 2013, *European Communities – Measures Prohibiting the Importation and Marketing of Seal Products*, Reports of the Panel, Disputes WT/DS400/R and WT/DS401/R, <https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/WT/DS/400R.pdf&Open=True>; and World Trade Organisation Appellate Body, 2014, *European Communities – Measures Prohibiting the Importation and Marketing of Seal Products*, Reports of the Appellate Body, Disputes WT/DS400/R and WT/DS401/R, <https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/WT/DS/400ABR.pdf&Open=True>.

⁴⁹ See Kahn, S., 2020, op cit., p.73; World Trade Organisation, 2013; and World Trade Organisation Appellate Body, 2014.

⁵⁰ See European Union, 2015, *European Communities – Measures Prohibiting the Importation and Marketing Of Seal Products*, Addendum, Status Report by the European Union, October, <https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/WT/DS/400-16A7.pdf&Open=True> and Council of the European Union, 2015, “Seal products trade: the EU ban adapted to WTO rules”, Press Release, October, <https://www.consilium.europa.eu/en/press/press-releases/2015/10/01/seal-products/>.

In the case of a live sheep export prohibition, to justifiably apply the exception provided under Article XX(a) of the WTO demonstration would be needed that:

- Extra-territorial treatment of animals was an issue of significant public concern in Australia.
- An export prohibition was necessary to meet standards of animal welfare demanded by the public.

With respect to the first of these dot points, relevant information is to be found in the live export community sentiment surveys conducted by CSIRO spin-off Voconiq⁵¹. The Voconiq surveys, conducted since 2019, represent the largest, most authoritative and comprehensive source of data on Australian attitudes toward the livestock export industry. Key results from the latest survey (with some comparisons to results from previous surveys) are:

- When asked whether “*live exports should be stopped regardless of the impact on farmers*”, 29% of participants agreed, and 42% disagreed in 2023.
- In 2023, 64% agreed that the industry supports the diet and nutrition to people overseas – increasing substantially from 55% in 2019.
- Agreement that “*conditions for animals on live export ships are not in line with Australian animal welfare standards*” decreased by 14.7%, from 53.7% in 2019 to 39% in 2023.
- On the question “*the live export industry is prepared to change its practices in response to community concerns*”, 37% agreed in 2023 compared to 24% who disagreed.
- Six questions asked about livestock export generally were adapted to examine attitudes toward the export of sheep, specifically. The results show there was no significant difference in the two sets of answers.

As noted in the second dot point, for Article XX(a) to apply to a sheep export prohibition by Australia it also needs to be demonstrated that a prohibition is *necessary* to meet standards of animal welfare demanded by the public. This may be a harder test to meet. In China - Publications⁵², the Appellate Body found that despite a trade restrictive measure being related to a public moral, it was nevertheless unnecessary, as less restrictive measures were available. Much of the discussion contained in Section 8.1.1, related to the use of Article XX(b), is therefore also applicable to the use of Article XX(a).

A further hurdle for a sheep export prohibition to be WTO compliant is that the requirements of the Article XX chapeau must be satisfied i.e., that the prohibition must not constitute “*a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail*”, and is not “*a disguised restriction on international trade*”.

Under the WTO, the meaning attached to discrimination is broad and includes indirect discrimination. An export prohibition is almost certain to be discriminatory since it will inevitably affect different countries to different degrees (e.g. depending on the reliance on live sheep imports). To avoid *arbitrary or unjustifiable discrimination*, the Article XX exceptions must be applied in a

⁵¹ Vociniq, 2023, Live exports and the Australian community 2019-2023: a national program of community sentiment research, Voconiq Australia, May.

⁵² World Trade Organisation Appellate Body, 2009, China — Measures Affecting Trading Rights and Distribution Services for Certain Publications and Audiovisual Entertainment Products, Report of the Appellate Body, Dispute WT/DS363, <https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=Q:/WT/DS/363ABR.pdf&Open=True>.

consistent fashion to other trading member States and the domestic market and, based on Panel and Appellate Body rulings, a number of other measures must be followed⁵³.

- The trade restriction must not involve “*a single, rigid and unbending requirement*”⁵⁴? Chaudhri states that arbitrary discrimination will exist in circumstances where a trade restriction involves “*a single, rigid and unbending requirement*”.
- Serious negotiations must be entered into with affected WTO member states on how to protect public morals in the least trade restrictive manner possible. Chaudhri states that, based on Panel and Appellate Body rulings, a failure to engage in serious, across-the-board negotiations with affected member states, before implementing a trade restriction represents unjustifiable discrimination. Such negotiations, Chaudhri argues, are an important element of fairness and non-discrimination. A logical application of this would be that such serious negotiation should precede any policy decision to prohibit sheep exports.
- Trade restrictions must be implemented in a manner consistent with domestic market requirements so as not to violate WTO national treatment rules. In this regard Chaudhri notes that “*there may be problems with the inter-state transportation of animals if the entire international trade is banned*”⁵⁵.
- The trade restriction must be implemented in a manner that avoids direct or indirect discrimination between WTO member states. In this context the narrow breadth of a sheep trade prohibition may pose problems (applying only to one species).

When considering the above and other WTO implications, Chaudhri concludes that “*it is reasonably clear that a complete ban on live export will not satisfy the chapeau because it indirectly discriminates between importing countries*”. A challenge for the Panel is how to implement a sheep export prohibition in a manner that does not contravene Australia’s WTO obligations.

As part of the Panel’s report, in the view of LiveCorp, it will be important to assess the WTO risks, including the degree of risk, associated with each implementation option.

8.2 Potential to undermine Australia’s advocacy for agricultural trade liberalisation

A further challenge for the Panel is to determine how a sheep export prohibition can be implemented so as not to undermine Australia’s long standing advocacy for agricultural trade liberalisation, including resisting the erection (by others) of non-tariff barriers (NTBs) to trade.

Australia has long opposed the use of non-tariff barriers (NTBs) by countries that import agricultural products. A prohibition on live sheep exports, however, if not thoroughly justified, could be regarded as an export NTB. The Panel should consider how this justification would be provided.

An NTB is defined on the Department of Foreign Affairs and Trade (DFAT) website as “*any kind of ‘red tape’ or trade rules that unjustifiably restrict the flow of goods and services*” (our emphasis) and includes trade measures that are:

⁵³ The following points are largely based on Chaudhri, 2014, op cit.

⁵⁴ World Trade Organisation Appellate Body, 1998, United States - Import Prohibition of Certain Shrimp and Shrimp Products, Report of the Appellate Body, Dispute WT/DS58, <https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=Q:/WT/DS/58ABR.pdf&Open=True>, p.72.

⁵⁵ Chaudhri, 2014, op cit., p.300.

- *“unclear or unevenly applied;*
- *exceed what is necessary to meet their stated objective;*
- *not based on science”* (our emphasis)⁵⁶.

Some might argue that the phase-out of live sheep exports is necessary to achieve a Government objective of high standards of animal welfare applying across animal production and distribution systems.

If this justification is to be used, in order to avoid being included under the DFAT definition of an NTB, demonstration is required that (a) low standards of animal welfare exist with live sheep exports, relative to those applying in domestic animal production and transport systems (otherwise the measure will involve *“unclear or uneven..”* application and not *“based on science”* and (b) these standards cannot be raised through other, less trade restrictive, measures (i.e., a prohibition on exports does not *“exceed what is necessary”*).

If not thoroughly justified and implemented correctly, the export prohibition being contemplated on animal welfare grounds has the potential to open up a Pandora’s box of measures that can be applied by others against Australia.

The conditions and animal production measures used in Australia are very different to those used in some overseas countries (e.g., the European Union). Several overseas countries have long argued that the same animal welfare requirements that they apply domestically should also be imposed on Australian animals used to produce meat which they import. To this point in time Australia has largely resisted these policies being imposed. Depending on implementation and justification for a sheep export prohibition, Australia’s arguments in this regard, and our ability to resist, may be substantially depleted.

9 Animal welfare outcomes for live sheep exports

Relevant to the considerations raised in the previous Section is the animal welfare outcomes recently achieved by live sheep exporters. This Section furnishes the Panel with relevant animal welfare outcome information.

9.1 Live export mortality rates over time

Of the range of indicators required to assess welfare, mortalities can be regarded as the paramount indicator. There are four primary reasons for concluding that mortalities represent the primary welfare indicator:

- First, the welfare consequence of a mortality is absolute. Once a mortality occurs welfare is extinguished. For other indicators welfare may be impaired, to varying degrees, either temporarily or permanently, but not extinguished. As Ferguson et al have noted *“mortality is clearly the ultimate measure of an animal’s welfare (or lack thereof)”*⁵⁷.

⁵⁶ Department of Foreign Affairs and Trade, undated, “Addressing non-tariff trade barriers”, <https://www.dfat.gov.au/trade/for-australian-business/addressing-non-tariff-trade-barriers>.

⁵⁷ Ferguson, D., Fisher, A., White, B., Casey, R. and Mayer, R., 2008, Review of the livestock export heat stress risk assessment model (HotStuff), Final Report Projects W.LIV.0262–W.LIV.0265, Meat & Livestock Australia, North Sydney.

- Second, mortalities are correlated with a wide range of disease, health and welfare issues. Because of this correlation mortalities can act as a convenient indicator for a wide range of issues. Other welfare indicators, by comparison, may have narrower implications.
- Third, mortalities are unmistakable and can be readily collected by unskilled personnel. Other welfare indicators are open to significantly greater measurement error, involve greater interpretation and can comprise several different elements, including qualitative components.
- Finally, mortalities represent a widely accepted welfare measure. In contrast, agreement has yet to be achieved on a set of indicators that should be used in assessing animal welfare more broadly. Not only do mortalities represent the most widely accepted animal welfare indicator, but for live exports the Government has defined triggers, in terms of mortality numbers, that delineate acceptable from unacceptable performance. As the Technical Advisory Committee (TAC), which reviewed the Australian Standards for Export of Livestock (ASEL), noted in their final report⁵⁸:

“Measures of welfare are complex, requiring multiple measurements over time, and vary with many factors including livestock class and preparation and environmental context. These measures have not yet been clearly identified and described for on-farm assessment, nor adequately validated to determine thresholds to act as triggers for action. Thus the need to continue with notifiable mortality rates per consignments remains in the short term”.

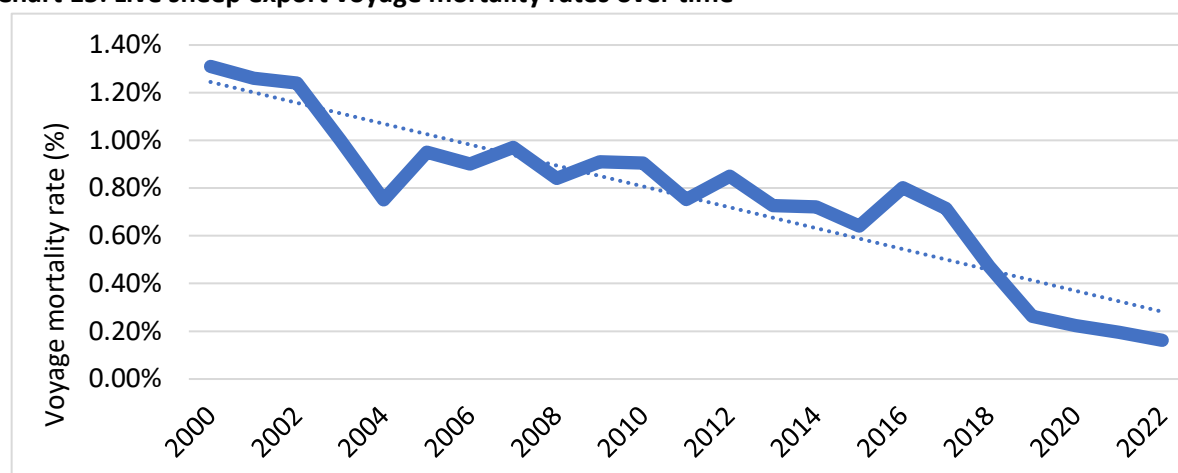
Two main indicators of mortalities for live export voyages exist: voyage mortality rates and daily mortality rates. Both these measures can be calculated over time.

9.1.1 Live sheep export voyage mortality rates over time

The mean voyage mortality rate for species s in year y (\overline{VMR}_{sy}) is calculated as $\sum_v M_{syv} / \sum_v L_{syv}$, where M_{syv} is the number of mortalities for species s in year y on voyage v and L_{syv} is the number of animals loaded of species s in year y on voyage v .

Voyage mortality rates by year since 2000 for sheep are shown in Chart 15.

Chart 15: Live sheep export voyage mortality rates over time



Sources: Up to and including 2020, data is from Department of Agriculture, Fisheries & Forestry (DAFF), Reports to Parliament, <https://www.agriculture.gov.au/biosecurity-trade/export/controlled-goods/live-animals/live-animal-export-statistics/reports-to-parliament>. For 2021 & 2022 data is from LivexCollect database.

⁵⁸ ASEL Review Technical Advisory Committee 2018, *Review of the Australian Standards for the Export of Livestock: Sea Transport—final report*, Department of Agriculture and Water Resources, Canberra, December, p37.

Major points to note from Chart 15 are:

- The average voyage mortality rate for sheep in 2022 is 0.16%, a record low level.
- The average voyage mortality rate in 2022 compares to average voyage mortality rates of 0.22% in 2020, 0.64% in 2015 and 0.90% in 2010 – that is, average sheep voyage mortality rates are now about one-sixth of the levels they were in 2010.

9.1.2 Live sheep export daily mortality rates over time

Voyage mortality rates have historically been used as the measure of live export mortality performance by both Government and the industry. However, voyage mortality rates are influenced by voyage duration: other things being equal, the longer the voyage, the higher will be the voyage mortality rate. Daily mortality rates may be considered a complementary measure of mortality performance as they remove the influence of voyage duration.

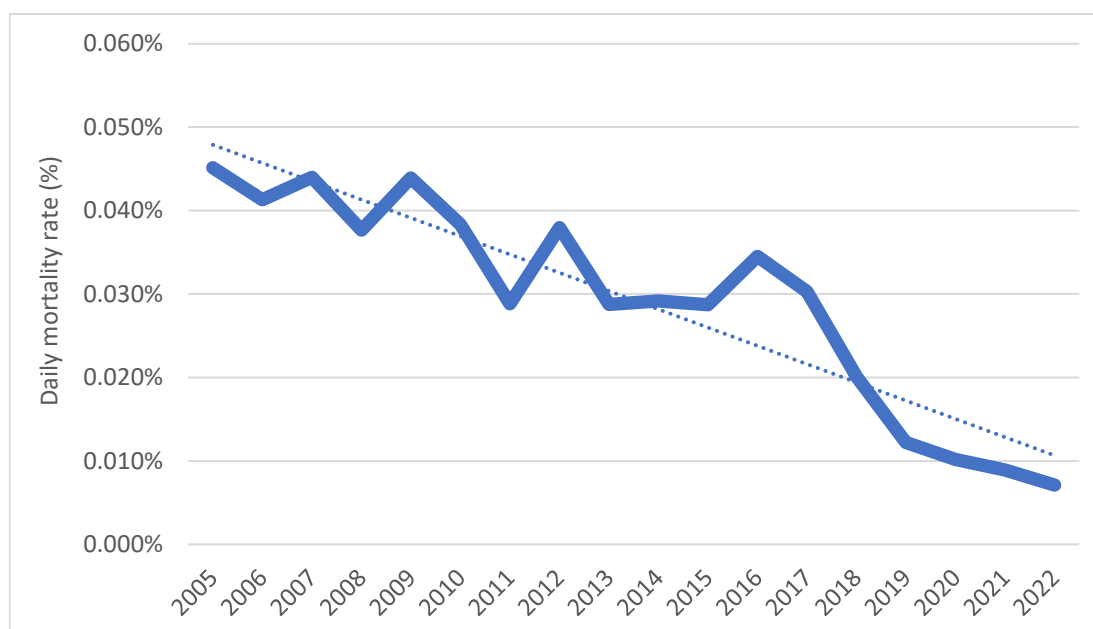
Average daily mortality rates for species s in year y are calculated as:

$$\overline{DMR}_{sy} = \sum_v \left((M_{syv} / L_{syv}) / D_{yv} * L_{syv} / \sum_v L_{syv} \right)$$

That is, the daily mortality rate for species s on voyage v is calculated by dividing the voyage mortality rate, (M_{sv}/L_{sv}) by the duration of the voyage (D_v) . To obtain an average daily mortality rate across all voyages the individual voyage daily mortality rates for species s are then weighted by the number of animals loaded of that species on each voyage divided by the total number of animals loaded of that species across all voyages.

Average daily mortality rates for live sheep voyages since 2005 are shown in Chart 16.

Chart 16: Live sheep export daily mortality rates over time



Sources: As for Chart 15.

Major points to note from Chart 16 are:

- The average daily mortality rate for sheep in 2022 was 0.007%, the lowest on record.

- The average daily mortality rate in 2022 compares to average daily mortality rates of 0.010% in 2020, 0.029% in 2015 and 0.038% in 2010 – that is, average sheep daily mortality rates are less than one-fifth of the levels they were in 2010.
- Over time average daily sheep mortality rates have displayed a strong downward trend.

9.2 Mortalities in Australian live exports Vs other areas of livestock raising and supply

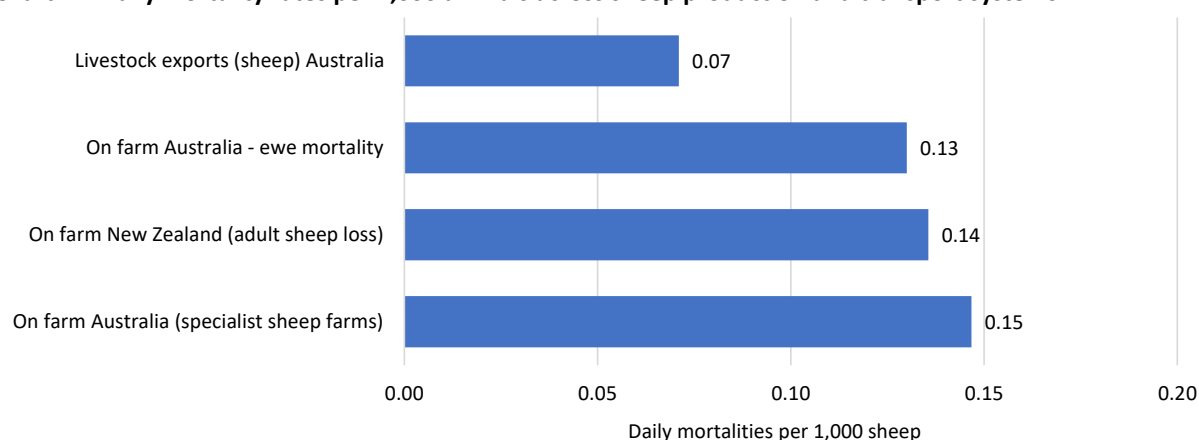
In this section DMRs across the sheep supply chain are presented. Some comparisons are also made with the cattle supply chain. This information is contained in Table 3 and Chart 17.

Table 3: Daily mortality rates across sheep and cattle production and transport systems*

Production / transport system	DMR (%)	DMR (per 1,000 animals)
Road transport of bobby calves - NZ	0.175%	1.75
Road transport cattle North America (>400km)	0.017%	0.17
On farm Australia (specialist sheep farms)	0.015%	0.15
On farm Australia – ewe mortality	0.013%	0.13
On farm New Zealand (adult sheep loss)	0.014%	0.14
On-farm Australia (beef cattle deaths)	0.010%	0.07
On-farm European Union (Ireland) cattle	0.010%	0.10
Livestock exports (sheep) Australia	0.009%	0.09
Livestock exports (cattle) Australia	0.007%	0.07

*Sources of information used in this table are referenced in Appendix A.

Chart 17: Daily mortality rates per 1,000 animals across sheep production and transport systems



Features of the information contained in Table 3 and Chart 17 are that:

- Daily mortality rates across most production and transport systems are extremely low and relatively uniform.
- Of the wide set of production and transport systems shown, live exports have broadly equivalent or better daily mortalities.

Very limited information is available on sheep mortalities when being transported by road. What information is available shows that on a per unit time basis sheep mortalities for live exports are no higher than by road.

9.3 Non-mortality related animal welfare outcomes

Since November 2020 a comprehensive set of animal welfare outcome data has been collected onboard live export vessels.

Almost 2½ years of data now exists for these more comprehensive measures.

LiveCorp has recently examined this data (which is also available to the Department). This examination indicated that animal welfare outcomes onboard vessels were satisfactory or better. It also concluded that results for these more comprehensive measures across cattle and sheep are broadly equivalent.

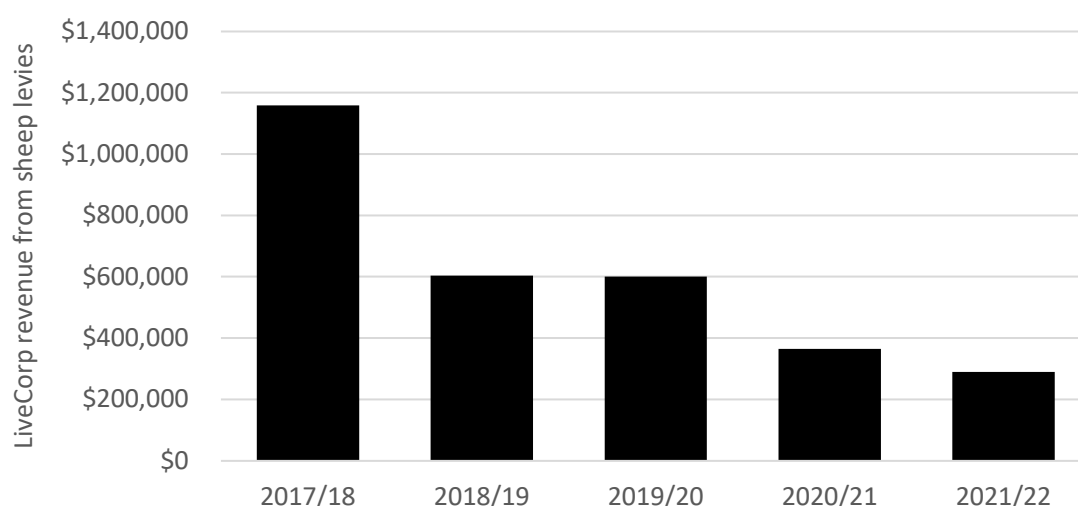
10 Impact of a cessation of live sheep exports on LiveCorp

As well as impact on commercial sheep industry participants, and cattle industry participants, any cessation of the live sheep trade will have an impact on LiveCorp itself.

10.1 Impact on LiveCorp revenue

LiveCorp's levy revenue from live sheep exports over the last 5 years has averaged \$604,000, or about 15% of LiveCorp's total levy income (see Chart 18).

Chart 18: Total LiveCorp revenue from export sheep levies



Some levy revenues are matched, then matched again (by producers and then by Government in the form of matching R&D contributions). As a result, any loss of LiveCorp levy income has a much greater impact on program and overhead expenditure than on revenue.

The drop in expenditure is likely to be of an extent to require fundamental adjustments to LiveCorp operations, which LiveCorp could further clarify with the panel as required.

10.2 Impact on live export programs

Programs partially or fully supported by LiveCorp sheep export levy income have spillover effects far beyond Australian sheep that are exported live.

The majority of these levy revenues are allocated to supporting Australian livestock in overseas markets or to R&D, with a focus in both categories of expenditure on securing high standards of animal welfare.

In the Middle East work undertaken to support Australian live sheep exports includes:

- Providing technical advice on abattoir and feedlot design to improve animal and human welfare.

Over many years the joint MLA/LiveCorp Live Export Program (LEP) has developed particular expertise in abattoir and feedlot design to maximise animal welfare, as well as worker occupational health and safety. The infrastructure / design improvements result in better slaughter and handling practices, including low stress movement of livestock.

Amongst other items, advice has been provided on the design of unloading platforms, laneway design, pen configuration and shade structures, lighting, flooring, type and positioning of equipment, etc.

The extent of provision of technical advice has varied by year according to needs, but in some years has entailed almost 100 days of high level expertise.

- Advice to overseas Government officials on regulation of animal welfare

LEP staff liaise regularly with Government officials in overseas markets, providing information on animal welfare issues, including regulation, and latest research results.

In order to spread welfare knowledge, LEP staff have also been actively involved in regional animal welfare conferences / workshops, with attendees representing a mix of Government and commercial players.

- Development and application of SOPs / Work Instructions

The LEP have provided assistance with the development and application of SOPs / work Instructions for abattoirs and feedlots covering aspects such as livestock handling, , handling and restraint of animals, slaughter procedures, including emergency slaughter and stunning, handling escaped animals and monitoring water quality. These SOPs and Work Instructions, and associated training, were key components of the LEPs support to the industry as it rolled out ESCAS and built commitment to the specified welfare standards globally.

- Training

LEP staff have conducted training across the regions including extension of the standard SOP and WI training packages, with recent programs being co-designed with stakeholders to assist within individual company development or strategic industry development (including “*train the trainer*” activities). Training has been delivered by qualified staff and consultants with a selection of the following topics covered:

- animal health and welfare
- low-stress animal handling
- induction, feedlot and silage management
- slaughter theory and technique
- butcher training with advanced knowledge on meat cuts and packaging

- knife sharpening
- techniques to identify risks
- value adding, meat quality, meat safety and hygiene
- ESCAS.
- Festival periods

The LEP has provided technical advice to support exporters/importers ensure welfare standards are maintained at ESCAS sites during festival periods. This has involved preparation of reports which identify welfare risks and contain recommendations on how these may be mitigated.
- Research across the supply chain, including in overseas markets

Major areas where research has been conducted relevant to live sheep exports includes:

 - Increasing the scientific understanding of factors contributing to inanition and salmonella and their mitigation.
 - Backgrounding and feedlotting strategies to address inanition.
 - Development and commercialisation of a salmonella vaccine.
 - Understanding the factors contributing to heat stress in sheep, associated both with the voyage to the Middle East and feedlotting in the region.
 - Tips and tools for dealing with heat management in the summer months.
 - Interventions to alter the onboard environment on sheep carrying vessels such as dehumidification.
 - Environmental monitoring technology trial on-board and in-market.
 - Testing the effects of different shade structures in feedlots and other interventions involving these use of fans and ground wetting.
 - Identification of a comprehensive set of animal welfare indicators for use with exported sheep.
 - Automated sheep counting.

In all of the areas listed above, although securing high standards of animal welfare for Australian sheep was the focus, invariably local sheep and sheep from other exporting countries also benefit. This has been recognised in Australian Government reviews of live exports. For instance, the 2015 Review of ESCAS noted in the Executive Summary:

“ESCAS has increased awareness of the importance of animal welfare for livestock handling in Australia’s export markets. This has benefited not only Australian animals but also those sourced from other countries. These improvements have been driven by investments in training and

infrastructure from the Australian Government, industry and industry-funded research and development corporations”.

If live sheep exports are to be phased out, LiveCorp (and MLA) would not be in receipt of levies to fund the type of work listed above.

Without this work, and the strict regulations that apply to Australian sheep, a consequence of any phase out of Australian live sheep exports will be a diminution in global animal welfare outcomes.

11 Conclusion

Possibly the most important set of questions facing the Independent Panel is related to “*Impact and Adjustment*” (to use terms used in the Consultation Paper) flowing from a phase out of live sheep exports.

For the impact to be assessed of a phase out of live sheep exports, on producers and businesses generally, particularly those in Western Australia, a point of comparison needs to be established.

The appropriate point of comparison (the *counterfactual* case) should be based on live sheep export levels that would have occurred without further regulatory intervention (i.e., without a prohibition on the trade). This is appropriate because those investing in the live trade (or supplying the live trade) necessarily take a long-term view. Investment in assets such as livestock vessels and farms require a long-term perspective to be adopted.

Attention has been drawn in this submission that, due to a combination of permanent and transitory reasons, live sheep exports are now at a low ebb. Transitory reasons include high Australian sheep prices relative to those of competitors, extraordinarily good seasons across Australia, record or near record grain prices and record levels of interstate transfers between Western Australia and the eastern states.

Several of these transitory factors, which have suppressed live exports, are now changing - and there are clear signs of raised levels of overseas customer interest. Consequently, over the short to medium term, without further regulatory intervention, Australian live sheep exports could be expected to increase.

In our view it is important that the Panel not develop recommendations based on the current level of exports, but rather based on the recovery of these exports that would be expected to occur in the normal course of events.

Highlighted in this submission have been the many local businesses that, to a lesser or greater extent, are dependent on live sheep exports. These include road transport operators, shearing services, agents and saleyards, contract bailers and stackers, veterinarians and registered premise operators. Apart from live sheep exporters, shippers and importers themselves, producer businesses are likely to suffer in total most economic loss from any phase out of the trade.

In LiveCorp’s view, any assessment of the economic loss for producers from a phase out of the live sheep trade should not only take into account loss of direct revenue from live export sales, but also the loss of ability to mitigate risk. In the view of LiveCorp the benefits from live sheep exports arising from risk mitigation could possibly be as great, or greater, in magnitude as the direct revenue benefits. This risk reduction aspect of live sheep exports has not been explicitly accounted for in any economic study conducted thus far, including in the ACIL-Allen work referenced elsewhere in this submission.

The risk reduction role fulfilled by live sheep exports arises from many sources. Amongst these are:

- Allowing Western Australian producers to better address the risk of bad seasons through providing an outlet for stock that fail to make weight and condition levels demanded by meat processors – many of these animals, subject to significant price discounting by processors, are ideally suited to live export.
- Allowing eastern Australian producers to better control risk of drought by creating a larger reservoir of sheep in Western Australia which can be drawn upon to more quickly replenish flocks after the breaking of a drought. Without live exports representing a regular source of demand for Western Australian sheep, the Western Australian flock will decline, as has already been predicted by CBH Group.
- Reducing environmental risks through encouraging the use of mixed farming, rather than monocultural systems.
- Through a more diversified demand base, better controlling risk during times of crisis, as was evident from the issues surrounding the abandonment of the wool reserve price scheme and which might occur in the future with a disease outbreak in Australia (when Middle Eastern markets for both sheep meat and live sheep may become very valuable).

In our view it is critical that any recommendations of the Panel take into account the benefits stemming from live sheep exports in terms of managing risks.

Pointed out in this submission is that not only will sheep producers be adversely affected by a cessation in live sheep exports, but also cattle producers, especially those supplying the live cattle trade. The sharing of vessel space between live sheep and cattle exports makes this highly likely, as does the reaction of customers currently purchasing Australian live cattle.

In framing its recommendations the Panel also needs to consider that some customers of Australian live sheep will undergo substantial economic loss as a result of a cessation of live sheep exports. This loss not only relates to Australia's trade customers incurring costs, through devaluation of investments and other mechanisms, amounting to many millions, but also to losses experienced by end consumers in the Middle East. For deeply held cultural and religious reasons some Middle Eastern consumers have a strong preference for locally processed meat (involving the importation of live animals), particularly at traditionally important events such as births, weddings, religious festivals, etc.

There may be a temptation by some to direct overseas consumers to purchase imported frozen or chilled meat products instead of live or to assume that such switching involves no consumer loss. Such a view ignores the cultural and religious convictions of these consumers.

A further complicating factor is that nations most affected by any trade shut down are those in the Middle East, nations that, according to the World Bank, are amongst the most food insecure in the world, being heavily reliant on food imports. For the culturally/religiously important live sheep imports, Australia supplies one-third of the collective needs of Kuwait, Israel, Oman, UAE and Jordan. Because of this a live sheep trade shut down, more than many other trade policy measures, has the potential to face sensitivities.

A sheep export prohibition also has the potential to undergo challenge in the WTO and to undermine Australia's long-standing advocacy of agricultural trade barriers and resisting the

proliferation of NTBs. In the view of LiveCorp it is imperative that the Panel's implementation recommendations ensure that risks of a successful WTO challenge to the measures are negligible and that Australia's trade liberalisation advocacy is not undermined.

LiveCorp is aware that this submission has been confined to analytically providing the Panel with information on issues to be addressed - and that identification of any solutions of issues raised has been absent from this submission. In a staged process, however, appropriate scoping of issues to be addressed must precede the definition of solutions.

Within its constitutional objectives, LiveCorp stands ready to assist the Panel in the critically important tasks that confront it.

Appendix A: Sources of Information Referred to in Table 3 and Chart 17

The table below lists sources of information against data items contained in Table 3 and Chart 17.

Data item	Information source
Road transport of bobby calves - NZ	Ministry for Primary Industries, 2020, "Mortality rates in young calves in the 2018 and 2019 spring calving seasons", <i>MPI Information Paper No: 2020/03</i> , July, https://www.mpi.govt.nz/dmsdocument/41025-Mortality-rates-young-calves-spring-calving-seasons-2018-and-2019-Report . The publication states that on average, calves were transported a little over 5 hours. Conservatively a duration of 5.5 hours has been used to calculate DMRs.
Road transport cattle North America (>400km)	Gonzalez, L., Schwartzkopf-Genswein, K., Bryan, M., Silasi, R. and Brown, F., 2012, "Relationships between transport conditions and welfare outcomes during commercial long haul transport of cattle in North America", <i>Journal of Animal Science</i> , Vol 90., pp.3640-51 and Gonzalez, L., Schwartzkopf-Genswein, K., Bryan, M., Silasi, R. and Brown, F., 2012, Benchmarking study of industry practices during commercial long haul transport of cattle in Alberta, Canada, <i>Journal of Animal Science</i> , Vol 90, pp3606-17.
On farm Australia (specialist sheep farms)	Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), 2022, <i>Financial performance of livestock farms</i> , Financial performance of livestock farms 2019–20 to 2021–22 (XSLX), https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fdaff.ent.sirsidynix.net.au%2Fclient%2Fen_AU%2Fsearch%2Fasset%2F1033623%2F1&wdOrigin=BROWSELINK . Average sheep losses for the years 2018/19 to 2020/21, inclusive, was used. It is widely known that the ABARES data does not include deaths of young lambs (which are likely to be considerable) amongst "sheep losses" – in the ABARES data these deaths are reflected in lower lambing rates. See Shiels, D., Loughrey, J., Dwyer, C., Hanrahan, K., Mee, J.F., Keady, T., 2022, "A survey of farm management practices relating to the risk factors, prevalence, and causes of lamb mortality in Ireland. <i>Animals</i> , Vol. 12, No. 30 for a discussion of the issue of young lamb deaths across a range of countries.
On farm Australia – ewe mortality	Doyle, R., 2018, Assessing and addressing on-farm sheep welfare, Final Report Project B.AWW.0237, Meat & Livestock Australia, Sydney, January, https://www.mla.com.au/contentassets/561bfedc68b64acfae2b4314760133bd/b.aww.0237_final_report.pdf .
On farm New Zealand (adult sheep loss)	Beef and Lamb New Zealand, 2021, <i>Benchmark your farm</i> , https://beeflambnz.com/data-tools/benchmark-your-farm . Weighted averages for the south island have been used for 2019/20.
On-farm Australia (beef cattle deaths)	Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), 2022, <i>Financial performance of livestock farms</i> , Financial performance of livestock farms 2019–20 to 2021–22 (XSLX), https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fdaff.ent.sirsidynix.net.au%2Fclient%2Fen_AU%2Fsearch%2Fasset%2F1033623%2F1&wdOrigin=BROWSELINK . Average cattle losses for the years 2018/19 to 2020/21, inclusive, was used. It is widely known that the ABARES data does not include calf deaths (which are likely to be considerable) amongst "cattle losses" – in the ABARES data calf deaths are reflected in lower branding rates.
On-farm European Union (Ireland)	Irish Department of Agriculture, Food and the Marine, 2020, <i>AIM Bovine Statistics Report: 2020</i> , 137392_12ca7bbf-f873-41e7-88fe-68b206f58f4a.pdf
Livestock exports (sheep) Australia	LivexCollect data for 2022.
Livestock exports (cattle) Australia	LivexCollect data for 2022.



VALUE ANALYSIS OF THE AUSTRALIAN LIVE SHEEP EXPORT TRADE

September 2019

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This report was commissioned by LiveCorp and Meat & Livestock Australia

AUTHORS:

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Data sources: ABS, ABARES, MLA, DAWR, LiveCorp, World Bank, WITS, Mecardo

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The live sheep export trade contributes a vital element to regional economies

KEY FINDINGS

The collapse of the wool reserve price scheme in the early 1990s precipitated a reduction in the Australian sheep flock as farmers transitioned away from Merino sheep toward cropping. The Australian sheep flock declined by over 100 million head during the 1990 to 2010 period. In line with a contracting Merino flock, the annual live sheep export volumes exiting Australia declined from 6.8 million head in 2001 to 1.9 million head in 2013.

Since 2010, the Australian sheep flock (excluding lambs under a year of age) has stabilised at around 50 million head and for the last five years live sheep export volumes have fluctuated around 2 million head per annum. In 2018, the cessation of the live sheep trade during the northern hemisphere summer saw annual volumes shrink toward 1.1 million head.

- Western Australian sheep farmers are heavily reliant on the live sheep export trade with over 82% of the national trade volume exiting the port of Fremantle over the last five years. Within Western Australia, the live sheep trade represents nearly 30% of their annual sheep and lamb turnoff. As well as providing a selling alternative for surplus sheep, the access to live export becomes critical for Western Australian farmers when the season deteriorates.
- Within the south eastern region of Australia, South Australia is considered the hot spot for live sheep export flows. Live sheep export volumes exiting this state represent over 5% of their annual sheep and lamb turnoff, compared to 0.3% for Victoria and 0.1% for the remaining states.
- On-farm direct employment on a full time equivalent basis related to the live sheep export trade is calculated to be 1,037 employees nationally. Across the entire live sheep export supply chain, full time equivalent employment is estimated at 3,443 workers.
- Value chain analysis indicates that 44-49% of revenue earned from the live sheep export trade is retained on-farm and is estimated to have averaged \$100 million per annum over the last five years. Some participants in the supply chain that receive a relatively low share of the total value chain report that a high proportion of their revenue is attributable to the trade. This is particularly true for fodder livestock agents, handlers and buyers, veterinarians and quality control service providers.
- Many participants in the value chain in Western Australia derive a higher proportion of their business revenue from the live sheep trade than their counterparts in the south eastern states. For example, veterinarians in Western Australia that are involved in the live sheep trade report that 25-50% of their income is generated from activities pertaining to the live sheep trade. In contrast, veterinarians from the south eastern states indicate that their proportion of revenue from live export related business is less than 5% of their overall income.

PROJECT SCOPE

Mecardo has been engaged by LiveCorp to undertake an analysis of the Australian live sheep export trade. The objective of this project was to determine the value of the industry to regional zones across the country. This report is the first of a three-stage project which will deliver the following:

1. Identify and outline the economic benefit that flows from the live sheep export trade to participants in the Australian supply chain.
2. An economic analysis of the industry's self-imposed three-month moratorium and the regulatory changes introduced in 2019.
3. An analysis of a range of farm level decision-making options (domestic fundamentals) influencing national sheep flock numbers, with a primary focus on Western Australia.

METHODOLOGY

QUANTITATIVE ASSESSMENT

An estimate of live sheep export related on-farm employment levels, on a full time equivalent (FTE) basis, was calculated from ABARES AAGIS annual survey data from thirty-two pastoral zones across Australia.

A red meat and livestock industry employment multiplier, which was derived from the Red Meat Advisory Council's State of the Industry 2018 report, was used to determine the total employment figures across the entire live sheep export industry supply chain within Australia.

Employment multipliers are used to assess the impact of an industry on a region by measuring the amount of direct, indirect and induced employment that is supported by that industry. Generally, direct jobs are those that related specifically to the industry being assessed, while indirect jobs relate to employment within supporting industries. Induced employment refers to those jobs that are the result of the direct/indirect industry workforce spending within the community.

For the purpose of this report, and the associated surveys undertaken, direct jobs were determined to be on-farm employment relating to the live sheep export trade. Indirect employment refers to any relevant off-farm employment that was the result of exposure to the live sheep trade and included participants within the Australian value chain such as livestock agents, fodder suppliers, transport operators, veterinarians, wharf staff, quarantine, export company employees, onboard shipping staff, shearers, etc. Induced employment levels were not assessed as part of this report, nor included in the accompanying surveys.

A review of employment multipliers from a selection of agricultural reports and surveys demonstrates that there can be some variation in the measure, depending upon what constitutes direct and indirect employment, or whether induced employment was included in the measurement.

Employment Multipliers in Agriculture	Multiplier
Live Export Sheep Survey - Mecardo, 2019	6.56
Food Fibre & Forestry Facts - National Farmers Federation, 2017	5.26
Value Analysis of the Australian Live Cattle Trade - Mecardo, 2018	4.83
Live Export Cattle Survey - Mecardo, 2018	4.76
State of the Industry Report - Red Meat Advisory Council, 2018*	3.32
Live Export Report - Hassall & Assoc, 2004	2.60
Agriculture Workforce Insights - ABARES, 2018	2.04
Live Export Report - Clark, Morrison et al, 2007	1.90

*production on farm jobs vs total employment

(production on farm jobs don't include meat processing and retailing/wholesale employees)

SURVEYS

In order to capture current information on the live sheep export supply chain, the value to regional communities and the reliance on the industry at a regional level, two surveys were designed by Mecardo and completed by 203 industry participants within the supply chain.

Survey 1- 'The value of the live sheep trade to supply chain participants' asked all participants of the live sheep export supply chain to identify the role of their business and estimate the total percentage of their revenue derived from the live sheep trade. This data provides an indication of each participant's reliance on the trade.

Survey 2- 'The value of the live sheep export trade to regional Australia' was completed by sheep farmers and exporters, and collected data on their operation for the 2018/19 season and associated costs. This data was weighted and analysed to produce indicative live sheep export value chains for Western Australia and South Eastern regions.

Desktop research and analysis using public data and previous literature was also utilised in the preparation of this report to validate the findings.



AUSTRALIA'S SHEEP MARKETS

During the 2014-2018 period, Australian live sheep export volumes have represented approximately 6% of annual sheep and lamb turnoff, on average. The Western Australian sheep and wool industry is heavily dependent upon the live sheep export trade with the bulk of the flow exiting through the port of Fremantle. As well as providing a selling alternative for surplus sheep to Western Australian sheep farmers, the access to live export becomes critical when seasons deteriorate.

WA sheep farmers use the live export trade to reduce their sheep numbers, with the sale of wethers the relief valve to allow the better management on pasture and breeding flock in a drought. This option provides a stock reduction model while allowing the retention of ewes, thereby allowing WA sheep farmers to position for a flock rebuild when seasons improve.

Most live sheep exported from Australia are transported to the Middle East, with 60% of the trade going to Kuwait and Qatar over the last five years.

LIVE SHEEP EXPORT STATS 2014-2018 avg

1.8 million

Head of sheep exported annually

\$220 million

Export value

\$100 million

Revenue retained by sheep farmers

18

Export destination countries

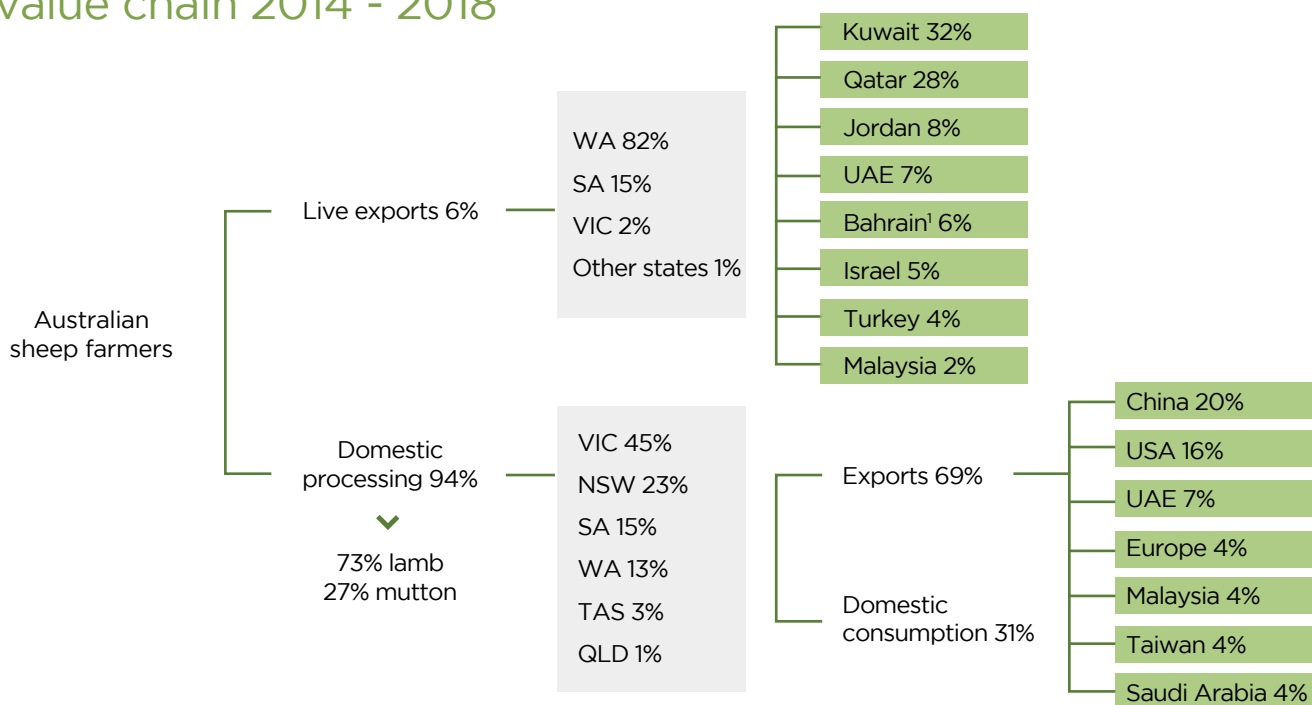
6.5%

of sheep industry value

3,443

Full time equivalent employment

Trade flows through the sheep value chain 2014 - 2018

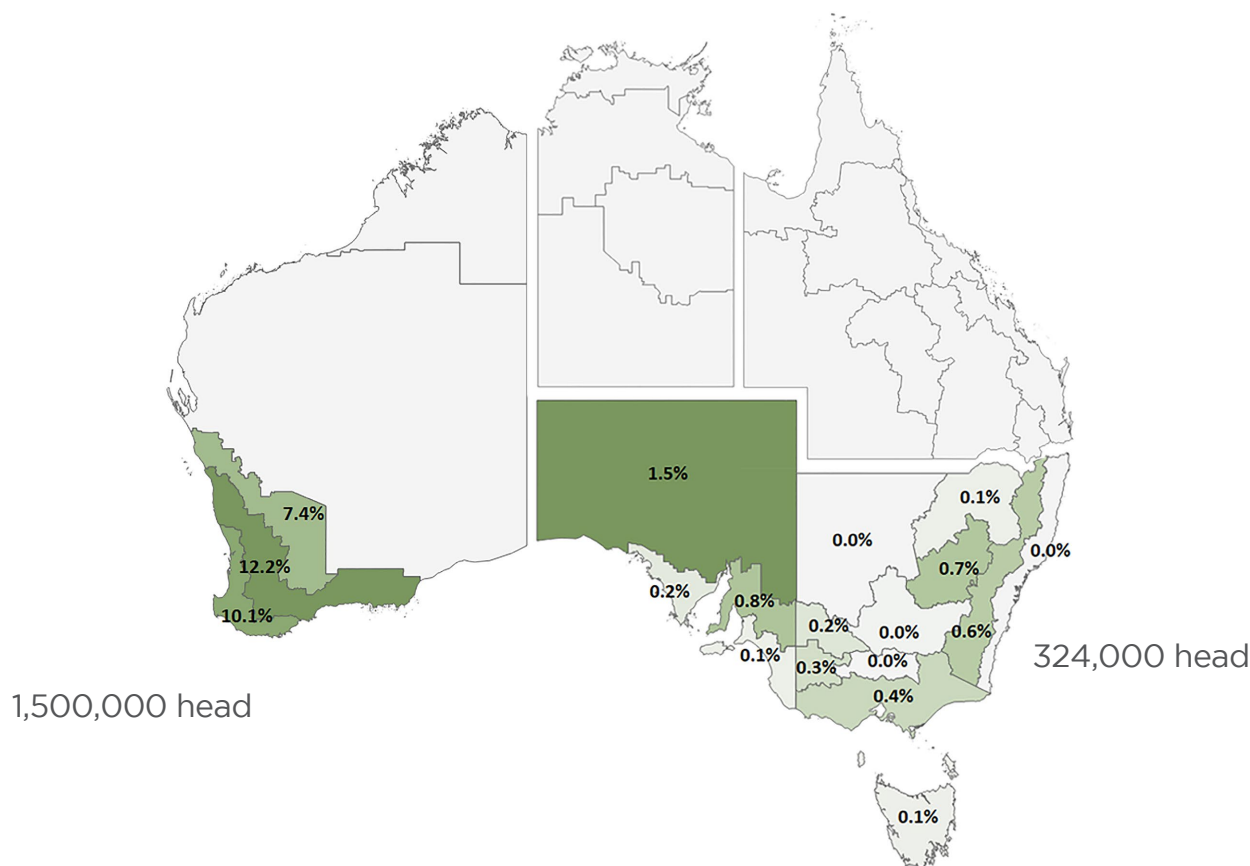


Key live sheep export zones:

1. WA: Central and South Wheat Belt
2. WA: South West Coast
3. WA: North and East Wheat Belt
4. SA North Pastoral

1. Bahrain stopped taking live sheep from Australia in 2015

These regional representations show the average percentage of sheep sold to live export as a proportion of total sheep sales within each zone over the 2014 to 2018 period. The colour shades identify the key source zones for live sheep within Western Australia and the combined south eastern region, which encompasses New South Wales, Victoria, South Australia and Tasmania.



WESTERN AUSTRALIA

82.4% of Australia's live sheep exit the country through the port of Fremantle at 1.5 million head per annum averaged over the last five years. WA has the highest proportion of live sheep export volumes as a percentage of total sheep and lamb turnover at an average of 27.7% over the 2014-2018 period. The Central and Southern Wheat Belt has the largest proportion of live sheep sales in terms of total sales values at 12.2%.

The South West Coast and North East Wheat Belt are also highly dependent on live sheep export, at 10.1% and 7.4% of total sales respectively for those regions, according to the ABARES AAGIS survey. The Pilbara and Central Pastoral and the Kimberly are not considered significant sheep production regions, therefore, ABARES AAGIS data is not available for these zones.

NEW SOUTH WALES, VICTORIA, SOUTH AUSTRALIA & TASMANIA

In the South Eastern region of the country, the ports of Port Adelaide and Portland send approximately 279,000 and 39,000 head of sheep offshore each season, respectively. When combined, this constitutes 17.2% of the national live export trade. Only 1.9% of the sheep sold to live export within the south eastern region exit from ports other than Port Adelaide or Portland and consist of around 6,200 head per annum. Most live export sheep from zones within New South Wales exit the country via Portland or Port Adelaide.

In terms of annual sheep and lamb turnover, the south eastern region live export trade volumes over the last five years was 1.2% of total turnover. South Australia is the hot spot for live sheep exports sales within the south eastern region, with live sheep export volumes representing 5.6% of their total turnover, compared to 0.3% for Victoria and 0.1% for the remaining states. Sales to live export make approximately 1.5% of total sales in the SA Northern pastoral zone, according to the ABARES AAGIS data.

N.B. The percentage of sales reported as live export in the ABARES AAGIS survey may be understated as survey data is collected at the producer level. Sales conducted at the saleyard listed as farm to farm, farm to saleyard or transported interstate may be listed by the vendor as a domestic sale but still exit the country via live export channels during a secondary transfer of ownership.



LIVE EXPORT AND THE AUSTRALIAN FLOCK

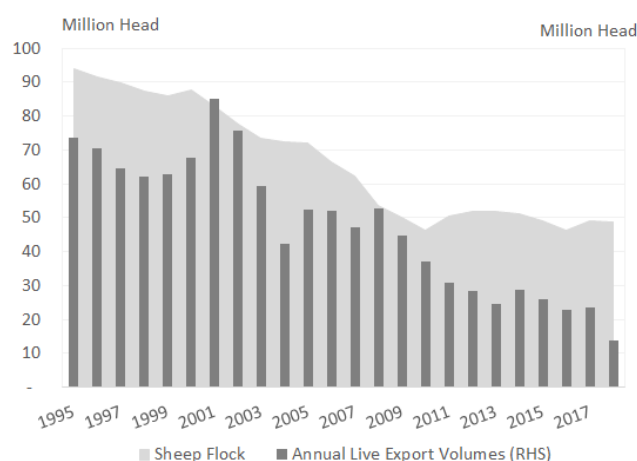
The Australian sheep flock has been in decline since the early 1990s, post the collapse of the wool reserve price scheme and the transition away from sheep toward cropping. In line with a reducing Merino flock, the annual live sheep export volume contracted from 6.8 million head in 2001 to 1.9 million head in 2013.

In the last decade, the sheep flock has stabilised at around 50 million head while live export volumes have fluctuated near 2 million head over the past five years. In 2018, the moratorium on the live sheep trade during the northern hemisphere summer saw annual live trade flows reduce to 1.1 million head.

Analysis of the annual percentage change in the sheep flock versus live export flows demonstrates that increasing live export volumes often precedes a reduction in the sheep flock. This occurs as farmers take advantage of live export channels during periods of higher than normal turnoff. During the 2000 to 2010 period, the NSW sheep flock declined 44%. ABARES AAGIS survey data shows that the annual percentage of sheep sales to live export as a proportion of total sales in NSW during this period was more than four and a half times higher than in the 2014-2018 period.

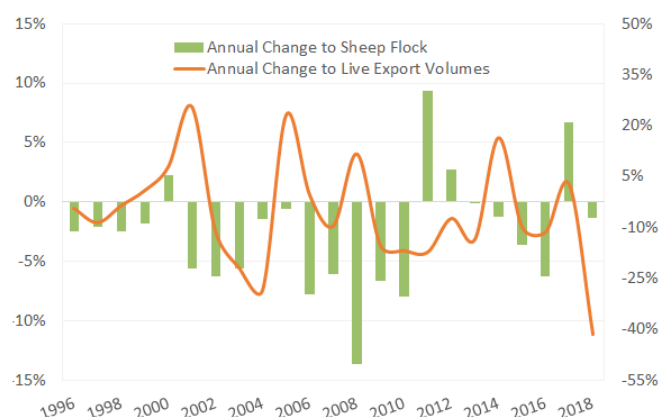
Elevated live sheep export sales as a proportion of total sales were noted across the south eastern region from 2000 to 2005, averaging 3% compared to just 0.3% in the 2014-2018 period.

Live sheep export volumes versus flock¹



1. Sheep flock (doesn't include lambs under 1 year of age)

Change in live sheep export volumes versus flock



SIGNIFICANCE OF THE LIVE SHEEP EXPORT TRADE TO EMPLOYMENT

During the strong live sheep export period from 2000 to 2005, on-farm labour units allocated to full-time equivalent (FTE) employment in the south eastern region increased to a peak of 2,649 direct on-farm jobs by 2005. By 2018, a reduction in live export volumes and a reduced proportion of live export sheep sales as a percentage of total sales throughout the south eastern region saw on-farm employment estimates decline by 90% to 239 FTE jobs.

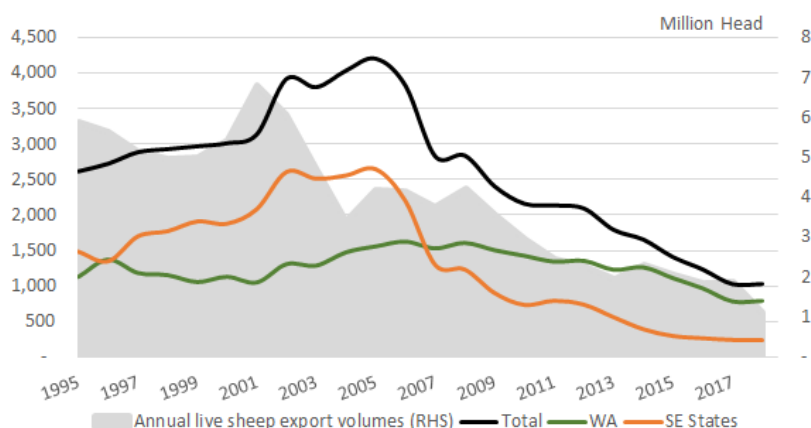
A similar pattern is noted for direct on-farm employment figures for Western Australia, albeit with a lesser magnitude decline. On-farm direct FTE employment relating to the live sheep trade in Western Australia fell 50% from 1,627 in 2005 to 798 in 2018.

1,037
on farm workers

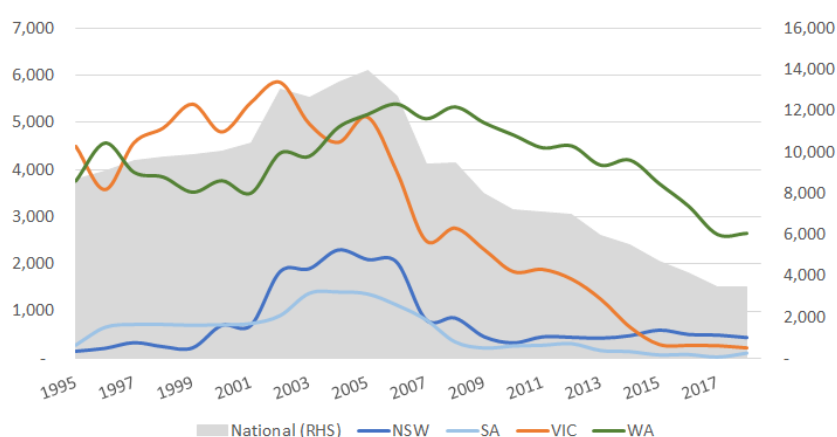
3,443
total employment

Across Australia, on-farm direct FTE employment from the live sheep export trade was calculated at 1,037 jobs in 2018. By applying the Red Meat Advisory Council (RMAC) employment multiplier¹ to the on-farm employment figure, a total employment level can be estimated for the supply chain. On a national level across the live sheep export supply chain the total number of FTE employment is estimated to be 3,443 workers, with 77% attributed to the Western Australian supply chain.

On-farm FTE employment versus
live sheep export volumes



Total FTE employment of the
live sheep export industry



1. A multiplier of 3.32 was used to convert from direct on-farm employment to total employment figures representing both direct and indirect employment across the value chain for the live sheep export trade. This employment multiplier is derived from red meat industry employment statistics contained in the [RMAC/MLA State of the Industry 2018 report](#), which reports 132,100 on-farm jobs to 438,100 total jobs in the sector.



Who is part of the live sheep export value chain?

Farmers, livestock agents, shearers and wool agents, fodder growers and manufacturers, transport operators, consultants, quarantine staff, quality control officers, veterinarians, port operators, rural merchandise, sheep buyers, stevedores, exporters, ship owners and rural finance services.



LIVE SHEEP VALUE CHAIN

Indicative value chains for the live sheep export industry in Australia to arrival at port destination were analysed to understand and quantify where the value of revenue is retained across the supply chain. The estimated costs of various components of the live export value chain have been weighted and calculated as a proportion of total value chain costs on a per head basis for Western Australia and the south eastern region (NSW, VIC, SA and TAS).

The value chain analysis shows that the majority of revenue from live sheep export is retained by the producer, ranging 44-49%. This equates to an estimated \$100 million of revenue retained by Australian sheep farmers. Shipping operators retain the second largest share at 18% and fodder suppliers take the third largest share at 12%.

Other value chain participants, such as livestock agents, shearers, veterinarians, port workers and transport operators take a much smaller slice of the value chain. However, in some key regions, particularly in Western Australia's Central and South Wheat Belt, for some of these participants located in more remote areas their relatively small piece of the value chain can still represent a significant proportion of their overall annual revenue.

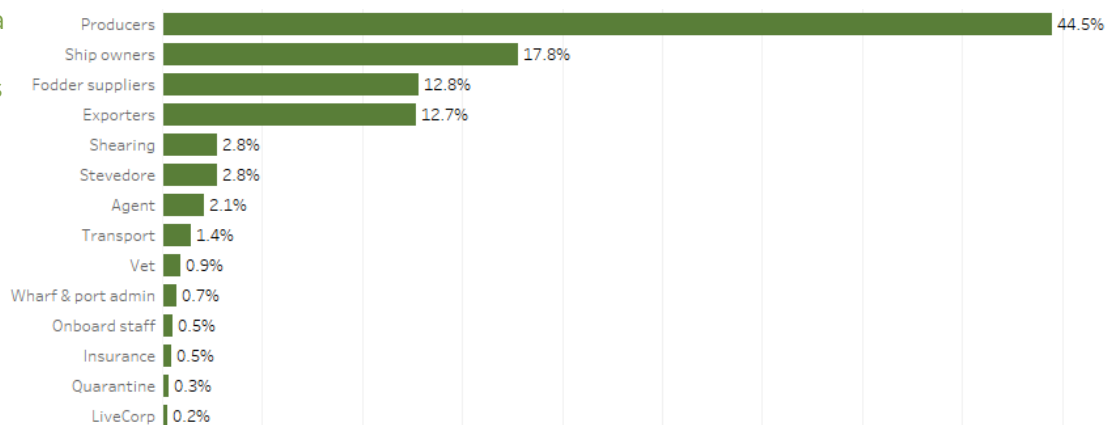
44-49%

of value chain revenue retained by Australian sheep farmers

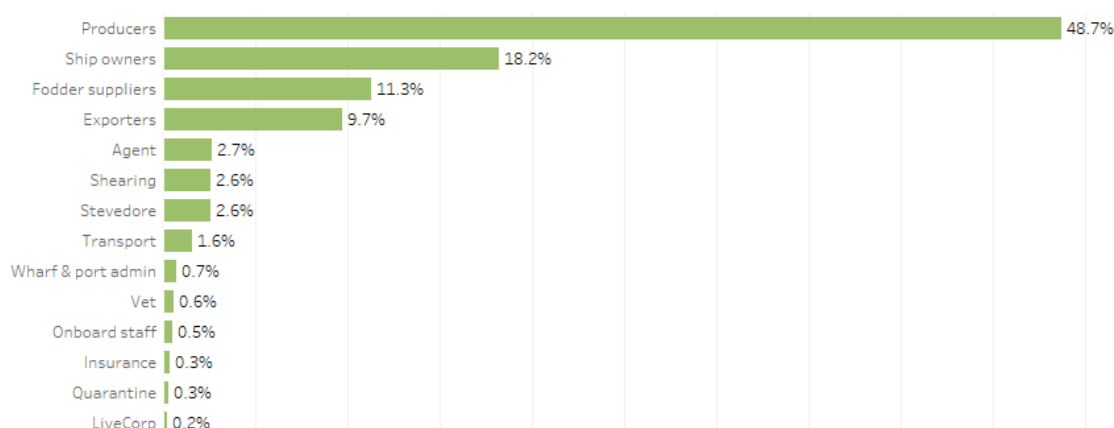
"The absolute value of the live trade will keep our family and workers, surrounding sheep farmers, local businesses and livestock agencies right across the board in jobs. Live trade is a necessity to being able to sell stock outside of Australia so that the local markets are not overwhelmed and the high prices are maintained"

- Sheep farmer, WA Central and South Wheat Belt

Western Australia live export value chain participants by proportion of revenue



South eastern region sheep live export value chain participants by proportion of revenue



**In WA, the live sheep
trade underpins the
operation of many
businesses**





HOW MUCH DO PARTICIPANTS RELY ON THE TRADE?

Results from the survey¹ show that Western Australian participants in the live sheep export value chain derive a higher proportion of their business revenue from the live sheep export industry compared to participants from the remaining states.

In Western Australia, the live sheep export trade underpins the operation and profitability of many businesses. In south eastern regions, diversity of industries and marketing opportunities means participants are less reliant on the live sheep industry, while for some in Western Australia, there are no viable alternative avenues of revenue.

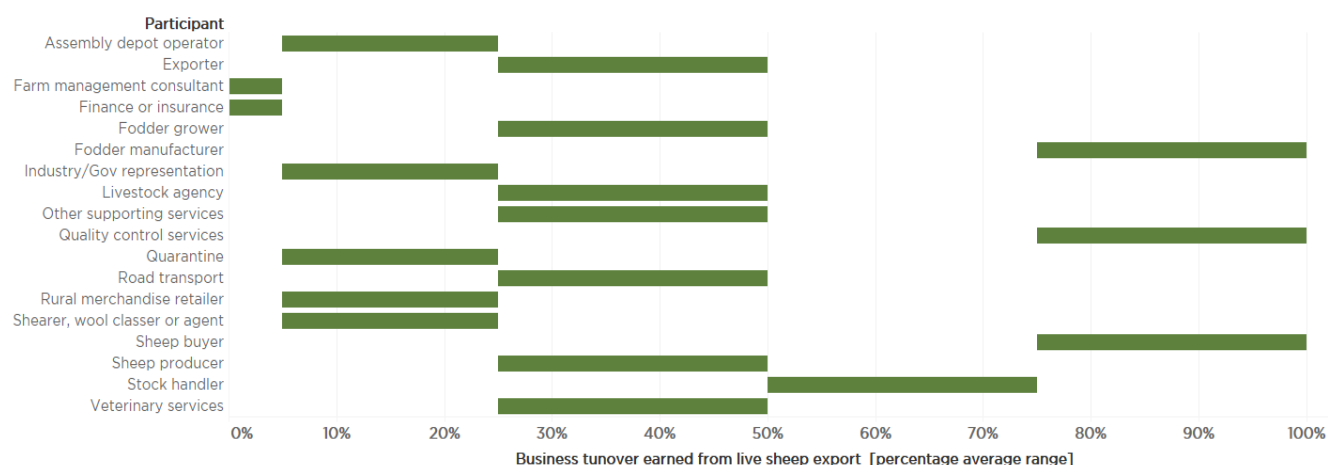
For example, veterinarians that are part of the live sheep export value chain in Western Australia derive an estimated 25-50% of their business revenue from activities related to the live sheep export trade, while in the south eastern region, it is <5% of revenue.

In Western Australia, fodder manufacturers, quality control service providers and sheep buyers are most reliant on the live sheep export industry, deriving 75–100% of their business turnover from the trade.

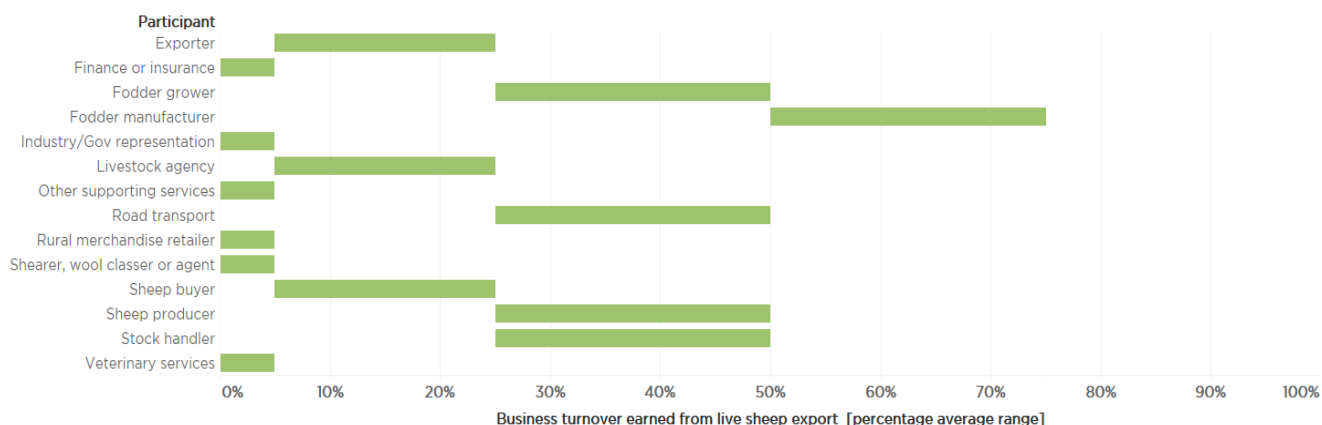
Fodder manufacturers are also most reliant on the live sheep export industry of all the participants in the south eastern region, although they derive a smaller proportion of their revenue from the live sheep trade at 50–75%.

Participants in the west that make up a relatively small proportion of the value chain, report that a high percentage of their annual revenue is reliant upon the live sheep export trade. These participants include livestock agents, handlers and buyers, veterinarians and quality control service providers.

Western Australia value chain participants' reliance on live sheep exports indicated as a percentage of business turnover.



South eastern region value chain participants' reliance on live sheep exports indicated as a percentage of business turnover.



1. Survey sample size of 139. Note, the survey captured reliance on the live sheep export trade, thus exporters that also export live cattle have a combined reliance of 100% on live exports.

ABOUT MECARDO

Mecardo (A Ruralco Business) is an independent, specialist agricultural strategy and marketing advisory business.

Mecardo is recognised throughout the Australian rural sector for innovative thinking, data driven analysis and consultation and the capacity to design “disruptive technology and thinking” that challenges the status quo.

Supply chain management and collaborative marketing and implementation are areas of experience gained over a long time of analysing and understanding markets and applying this knowledge to the farming and agribusiness sector.

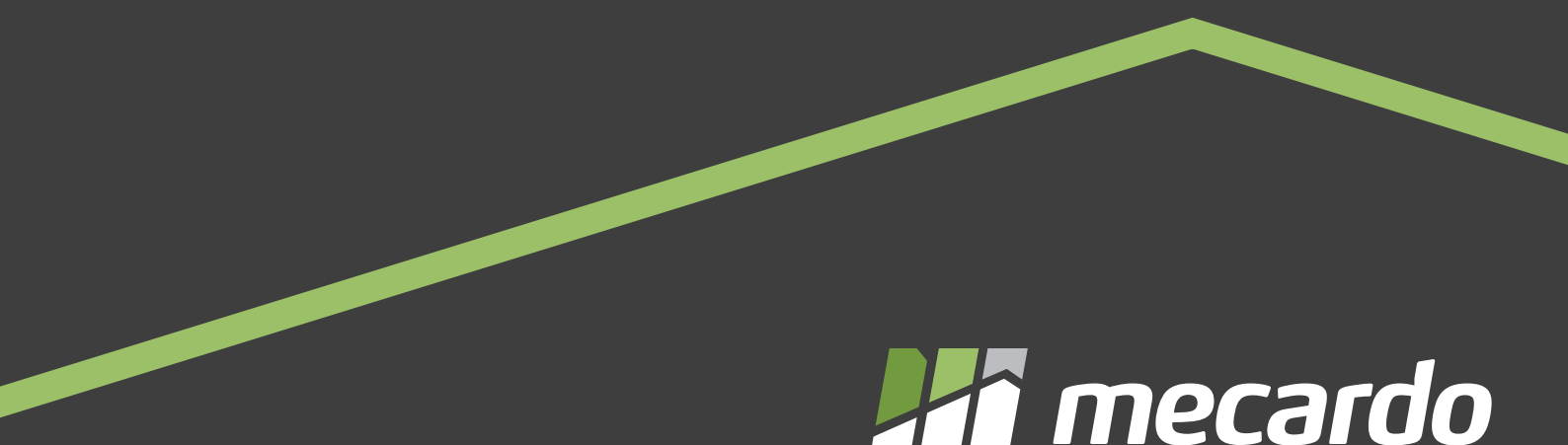
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**IMPACT OF THE LIVE SHEEP EXPORT
TRADE'S SELF-IMPOSED MORATORIUM
AND REGULATORY CHANGES**

January 2020

WWW.MECARDO.COM.AU







This report was commissioned by LiveCorp and Meat & Livestock Australia

Authors:

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Data sources: ABS, ABARES, MLA, DAWR, LiveCorp, Mecardo

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Businesses are feeling the pressure of recent changes and the risk exists that some will be casualties.

EXECUTIVE SUMMARY

The export of live sheep from Australia is a mature industry and has contributed considerable value to the Australian economy.

It is a key element on which the Western Australian sheep industry is based, providing an orderly method to sell surplus wethers from a flock dominated by Merinos. In good seasons it is important, and in difficult seasons it is vital. It is a necessary process in controlling livestock numbers, using pasture in a sustainable manner, managing farm businesses efficiently and providing additional resilience to the farming enterprise.

It is not however, a single enterprise system.

The industry is made up of a range of large and small contributors, all impacted by two periods of disruption to the trade during the northern hemisphere summer, and some who will move on from participating as a result. The majority of value from the live sheep export trade flows directly to producers, who will adjust their operations in response to changes.

Greater impact will flow to livestock carriers, shearers and feed suppliers & manufacturers. While they may be considered 'just' service providers, they provide key inputs and the industry is important to their financial outcomes. Many of these businesses are feeling the pressure of recent changes and the risk exists that some will be casualties - which will place added pressure on the whole industry in the future.

The impact of the industry's 'self-regulation' and changes imposed by the regulator is impressive, with quantifiable reductions in mortality over the past 18 months. Community expectation is that continuous improvement is maintained; the procedures in place give confidence that this will be the case.

While many industries undoubtedly evolve in response to changed conditions, the isolation of the WA sheep industry and its reliance on live export makes it unique. Without a sustainable live export industry the WA sheep flock is under threat.

PROJECT SCOPE

Mecardo has been engaged by LiveCorp and Meat & Livestock Australia (MLA) to undertake an analysis of the Australian live sheep export trade. The objective of this project is to determine the value of the industry to regional zones across the country. This is the second of a three-stage project which will deliver the following:

1. Identify and outline the economic benefit that flows from the live sheep export trade to participants in the Australian supply chain.
2. An economic analysis of the impact from the industry's self-imposed three-month moratorium and the regulatory changes introduced in 2018.
3. An analysis of a range of farm level decision-making options (domestic fundamentals) influencing national sheep flock numbers, with a primary focus on Western Australia.

This report delivers:

- Analysis of sheep delivery success rates and the impact that regulatory changes have had on sheep mortality and welfare.
- An assessment of the impact to the live sheep export industry of the suspension to the trade in 2018 and the moratorium during 2019, in terms of foregone revenue.
- The impact of the key regulatory changes and the moratorium across the live sheep export supply chain within WA.

METHODOLOGY

To prepare this report, Mecardo consulted with a wide variety of participants in the live sheep export value chain in Western Australia, with a combination of face to face and phone conversations.

The aim was to gain insights into how the suspension of live sheep exports in place during the northern hemisphere summer in 2018 and the moratorium in 2019 have impacted businesses in the value chain. The interviews also sought to determine the associated opportunity costs for participants and how the changes flowed down the value chain and into regional communities. The information gained was consolidated into participant groups and individual participants were selected as case studies.

Further to the consultative process, Mecardo undertook modelling based on the historic relationship between the volume of live export consignments of sheep and the national flock, WA flock, national sheep and lamb slaughter levels, and WA sheep and lamb slaughter levels. This allowed us to calculate what the monthly flows may have been if the shipping suspension in 2018 and the moratorium in 2019 had not been imposed. The gap between modelled and actual live sheep export flows enabled a calculation of the total cost to the industry in lost revenue due to the reduction of the trade during these periods.



OVERVIEW OF DEVELOPMENTS IN THE LIVE SHEEP EXPORT INDUSTRY

The operation of the live sheep export trade was temporarily halted in late June 2018 following the airing of distressing footage on television, and the licence of a key livestock exporter was cancelled.

Following an urgent review of the trade, the Federal Department of Agriculture implemented regulatory changes¹ which required exporters to have a heat stress management plan for each voyage to/through the Middle East and introduced the following conditions to improve welfare outcomes:

- a reduction in the reportable mortality threshold from 2% to 1%
- allometric stocking densities requiring 11–39% more space per sheep depending on the weight/type of sheep
- independent verification of air turnover within pens
- 10% extra space for horned rams
- all vessels to be fitted with automated watering systems
- additional bedding
- a requirement for independent observers to travel on board livestock export vessels

No sheep were exported from Australia to the Middle East until approvals were made by the department in September 2018.

The following year, a moratorium on live sheep exports to the Middle East was self-imposed by Australian livestock exporters as part of a number of wider ranging industry reforms, including the Australian Livestock Exporters' Council (ALEC) Code of Conduct.² The moratorium, in effect from 1 June until 30 August, aims to remove the heat risk challenges associated with shipments in the northern hemisphere summer period until the industry develops new technology and solutions that ensure high standards of welfare.

The 2019 moratorium was enforced through regulation, and in August 2019 the department announced an extension by a further three weeks to 22 September³ due to ongoing concerns about the likelihood of heat stress events during the northern hemisphere summer shoulder period.

Further to the industry and government-imposed regulatory changes and shipping practices, individual participants in the supply chain have established new measures and guiding principles to improve sheep welfare. As an example, in the past sheep were fully shorn prior to export, whereas now exporters prefer to leave the “socks” to protect against shearing cuts below the knee.

¹ Department of Agriculture and Water Resources (2018), Export advisory notice- Legislation amendments for the export of sheep by sea, Available at <https://www.agriculture.gov.au/export/controlled-goods/live-animals/advisory-notices/2018/2018-06>

² Australian Livestock Exporters' Council (2019) Sheep moratorium part of industry re-set. Available at: <https://auslivestockexport.com/news/10-news/122-sheep-moratorium-part-of-industry-re-set>

³ Department of Agriculture (2019), Export advisory notice- Export of sheep by sea to the Middle East during September and October 2019. Available at: <https://www.agriculture.gov.au/export/controlled-goods/live-animals/advisory-notices/2019/2019-08>

ECONOMIC IMPACT TO THE LIVE SHEEP EXPORT INDUSTRY OF THE SHIPPING SUSPENSION IN 2018 AND THE MORATORIUM DURING 2019

Multifactorial regression modelling of annual live sheep export volumes and the relationship between the live export trade, flock size and slaughter, both nationally and within Western Australia, was used to estimate monthly live export sheep volumes if the industry was not subject to the 2018 suspension and the 2019 moratorium.

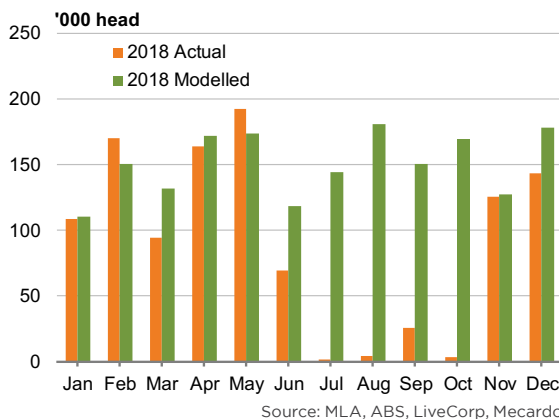
Figure 1 highlights the actual monthly live sheep consignments compared to the modelled estimates, assuming an open trading environment for the 2018 season. During the June to October period, average monthly trade volumes were 86.3% lower than the modelled outcomes with actual average flows of 20,896 head per month compared to modelled flows of 153,191 head per month.

The reduction in the trade during the June to October period in 2018 is estimated to have cost the industry \$83.6 million in lost revenue nationally. Value chain analysis of the live sheep export trade shows that approximately 45% of the revenue earned via the trade is returned to sheep farmers, which would equate to \$37.6 million of lost sales revenue to the farm gate from the live sheep export trade.

During this time farmers may have turned off stock for domestic slaughter but this would have been at prices below what they could have achieved via the live export avenue, particularly in WA.

A 2018 CIE report⁴ investigating the benefit the live sheep export trade brings to saleyard prices determined that an absence of the live sheep trade results in a 30-50% approximate reduction in prices at the saleyard in WA.

Figure 1. Live sheep exports 2018 (actual versus modelled)



⁴ The Centre for International Economics (2018) *Contribution of live exports to Woolgrower's Incomes- an update*. Canberra, Australia. It is important to note that the price declines stated in the CIE report assumed a total closure of the industry, not a three month moratorium. However, saleyard price responses in WA following the unexpected extension of the moratorium period in August 2019 saw falls of 15%-30% across lamb and sheep categories.

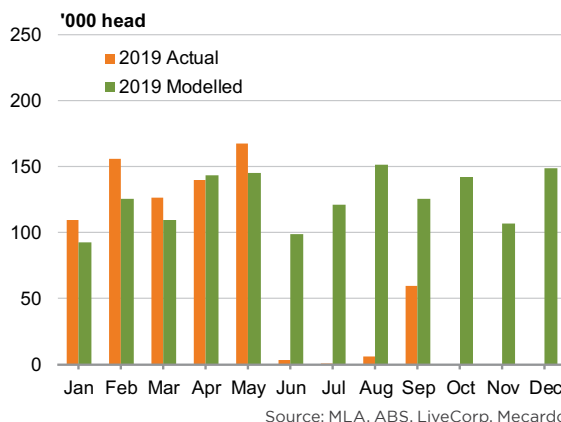


Given the proportion of sheep for live export sourced in WA, this would equate to loss of revenue to the farm gate in WA of between \$9.3 and \$15.4 million during the 2018 season ⁵.

Analysis of the modelled export flows for the 2019 season compared to the actual flows during the moratorium during June to mid-September shows that actual average monthly flows of 17,293 head are 86.1% lower than modelled flows of 124,453 head (Figure 2).

The moratorium during the 2019 season is estimated to have cost the industry \$65.8 million in foregone revenue nationally. This would equate to a shortfall of \$29.6 million in farm revenue earned via the live sheep export trade. Assuming a 30-50% lower saleyard price for stock turned off to the domestic sector in WA this would mean a loss to farmers between \$7.3 and \$12.1 million for the 2019 season ⁵.

Figure 2. Live sheep exports 2019 (actual versus modelled)



IMPACT OF THE MORATORIUM ON PARTICIPANTS IN THE VALUE CHAIN IN WESTERN AUSTRALIA

Western Australian sheep industry

The sheep industry in Western Australia is primarily self-replacing flocks, largely Merino, with crossbred and prime lamb flocks making up the minority. Sheep production is very complementary to grain production in WA and, as a result, mixed sheep and grain enterprises are common.

⁵ Calculation of lost revenue to WA producers as follows: 2018 - \$83.6 m forgone by industry nationally, 45% forgone by producers equates to \$37.6 m, WA producers reflective of 82% of national trade equates to \$30.8 m forgone by WA farmers, but 50%-70% estimated to be recouped by selling into domestic market equates to a loss of \$9.3 - \$15.4 m. 2019 - \$65.8 m forgone by industry nationally, 45% forgone by producers equates to \$29.6 m, WA producers reflective of 82% of national trade equates to \$24.3 m forgone by WA farmers, but 50%-70% estimated to be recouped by selling into domestic market equates to a loss of \$7.3 - \$12.1 m.

In 2017-18, 43% of sheep enterprise farms in the wheat-sheep zone were mixed enterprise, with the remaining classified as specialist sheep farms.^{6,7}

The wheat-sheep zone has highly seasonal production. Sheep are grazed on pastures which dry out over the summer and autumn period. The remaining stubbles and dry pastures are then grazed over the winter and spring for weed management and supplemented with feed grains when required.

The dry, Mediterranean climate in these regions and the lack of reliable improved pastures for sheep finishing makes them more suited to Merino sheep production than prime lamb production.⁸ The production of shipping wethers fits well with the highly seasonal nature of production and they are favoured for their less intensive management and labour requirement compared to alternate systems.

Strong demand for Australian sheepmeat and rising prices have driven considerable growth in prime lamb production. While the lamb composition of the flock in WA has increased, prime lamb production is not suited to marginal rainfall areas, or for crop dominant mixed enterprises. The Merino industry remains pivotal to the WA sheep flock.

In the wheat-sheep zone, wethers are typically turned off at 7 months to 1.5 years of age, after they are first shorn. However, when wool prices are strong, it may be economical to retain wethers until they are older than 2 years for increased wool production. Strong lamb and mutton prices sway the equation back in favour of turning off young wethers, as this allows sheep farmers to run more ewes to increase meat production.⁹

Value chain participants

Participants in the live sheep export supply chain range in their exposure. While some individuals may have little exposure to the live sheep trade and therefore have seen minimal to no impact of the moratorium on their business, others that have heavily invested in supply or services for the live sheep export market experienced more negative consequences. Consultation with individuals and businesses in different segments of the supply chain in various regions built a picture of average impacts.

For the purposes of this research, key live sheep export supply regions in Western Australia are defined as the Central Eastern Wheatbelt, Wheatbelt South, and Upper Great Southern. This area includes but is not limited to the towns of Hyden, Wickepin, Narrogin, Williams, Wagin and Katanning. Strong transport linkages exist in these regions to move sheep to live export markets.

⁶ Specialist sheep farms: a sheep farmer who earns more than 50% of receipts from the sale of sheep, lambs or wool.

⁷ Data source: ABARES Australian Agricultural and Grazing Industries Survey, Accessed November 2019. Available at: <http://apps.agriculture.gov.au/mla/>

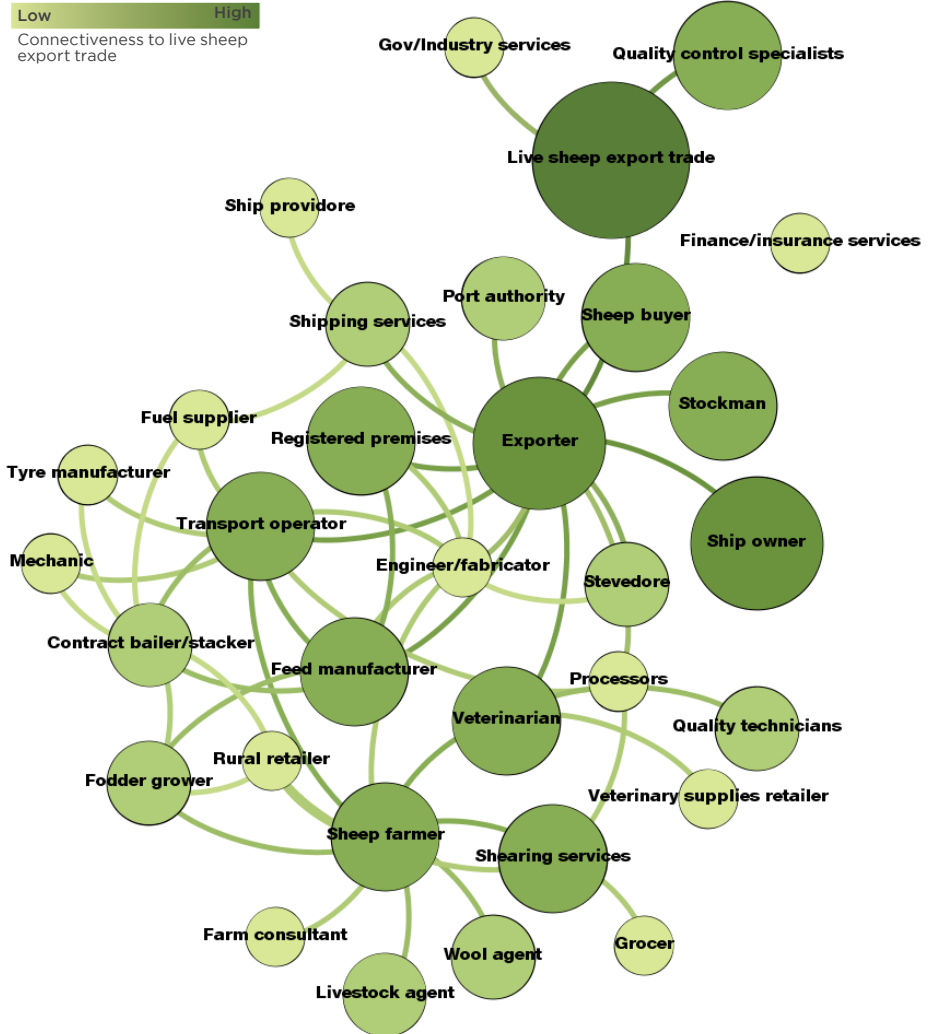
⁸ Keogh M, Henry, M, Day, N (2016) *Enhancing the competitiveness of the Australian livestock export industry*. Research report by the Australian Farm Institute. Surry Hills, Australia. August 2016.

⁹ Hassall & Associates Pty Ltd (2006) *The Structure and dynamics of Australia's sheep population*. NSW, Australia.



The live sheep export network diagram visually demonstrates the interconnectivity of the value chain. It identifies the linkages between participants and the flow of value through the industry. The size and colour of the participant indicates their closeness and reliance on the live sheep trade for business revenue.¹⁰

Figure 3. Live sheep export value chain network diagram



¹⁰The network diagram has focused on the participants and linkages identified by consultation with industry. Further participants and value flows exist down the live sheep export value chain. Finance/ insurance services connect with all participants

Sheep farmers

The live sheep export trade is a crucial marketing channel for many sheep farmers in Western Australia. The trade has become entrenched in the supply chain structures and systems, and as such, sheep production businesses have designed their operations to supply to this market, based on environmental and economic drivers. Economic impacts of the moratorium to individual sheep farmers vary significantly depending on their region, production system and level of exposure to the trade.

The live export trade is the prime outlet for young and aged Merino wethers once pasture quality declines in spring. It is also an outlet for lambs that cannot be brought up to the specifications required for domestic slaughter within their short selling window.¹¹

Lack of pastures in more marginal regions typically inhibits wethers from gaining enough weight to meet the specifications for sale to domestic processors.¹² However, while most cannot be grown out to a condition suitable for local processing markets, they are well suited to live export markets. While some aged wethers enter the domestic mutton market, the live export trade supports demand for a sheep type that is not preferred for domestic processing.

The live sheep export trade has a crucial role in improving farm resilience. The flexibility to sell into the live export market at any time through the year enables farmers to be more productive. It gives them the confidence to run

optimum stocking densities, hold onto stock for longer during difficult seasons and manage pasture more effectively.

The moratorium on the live sheep trade removes an important risk management tool from the arsenal of sheep farmers. Given the high seasonality in sheep regions of WA, farmers rely on access to this market in poor seasons. With the moratorium announced well in advance in 2019, many sheep farmers planned to turn-off wethers to the live trade in February to April, before the moratorium period and before they had any sound insight to rainfall and pasture availability. In an average season, bringing forward this decision will have minimal economic or operational impact. However, due to the narrowed selling window for live export, sheep farming businesses are left more exposed to production risk.

In an above average season, farmers that have turned-off stock prior to the moratorium may have excess feed and lose out on potential wool production.

In poor seasons of low or late rainfall in autumn or persisting dry, farmers will turn-off more stock to manage their stocking density based on the available feed and water. This ensures that there is enough feed for the new season lambs. Under normal market conditions, the live export trade is the only marketing option to sell surplus wethers that cannot meet processing specifications.

In this scenario, with the moratorium in place from June through August, farmers have a number of options to manage lower feed availability.

¹¹ Kingwell, R. et al (2011) *The economic importance to Western Australia of live animal exports*. DAFWA. Government of Western Australia.

¹² Certain well-bred lines of wethers can gain the weight for sale to domestic processing markets under good conditions.



BINDI MURRAY – SHEEP FARMER

Farming is becoming an increasingly risky business in Australia. According to Bindi Murray, a third generation farmer from Woodaniling in Western Australia, the live sheep export moratorium eliminates her most valuable risk management tool at a particularly vulnerable time in the season. Access to the live export trade has enabled Bindi to build a more resilient system and run a more productive operation. In her region, production is *“too seasonal to rely on domestic processing capacity alone”*.

The live export trade is an assurance that she can access a market to turn-off stock at any point; therefore she is able to take on greater risk. For Bindi, this risk comes in the form of higher flock size, and the benefit is a more productive and profitable operation and in turn more jobs and trade in her local towns. It has also enabled her to trial and implement new innovations in her farming system with confidence.

1. Carry wethers through until the trade resumes by supplementary feeding on a light ration.
2. Sell down breeding stock.
3. Sell wethers to east coast markets as stores.

The opportunity cost associated with each of these alternatives is on average less than the value that would typically be received by selling wethers to the live export trade. Hence, farm gate returns would be lower.

In 2018 and 2019, the next best alternative for many farmers when the live export trade halted was to send their light wethers to the eastern markets. There have been few instances in history when the transport of sheep from WA to eastern markets has been feasible. In 2018 and 2019, the drought in eastern Australia and tight supply saw strong demand, and hence strong prices in eastern markets. This acted as a relief valve for WA farmers that were left needing to sell their wethers without access to the live export trade during the shipping standstills. The concern among sheep farmers is that this option will not always be economically viable.

The live export market provides a stable price floor in the sheep market. Fewer buyers are present in WA sheep markets compared to eastern markets. Thus, competition is heavily reliant on the presence of buying activity for the live export trade to improve competitiveness and prices received for stock. During the shipping suspension in 2018, the normal price discount in WA compared to eastern markets, widened further due to lack of competition.

On resumption of the live sheep export trade, the spread between WA trade lambs and the Eastern States Trade Lamb Indicator returned to within the seasonal 70% range.¹³ This confirms modelling conducted by CIE that suggested removal of live export buying competition in WA would reduce returns at the farm gate.

The ability to turn-off stock quickly and with ease to the live export trade throughout the year also encourages on-farm innovation. A number of the farmers consulted reported that it has allowed them to consider using alternative flystrike management techniques (other than mulesing) with the knowledge that should the season become more susceptible to flystrike they can quickly offload stock not yet impacted by flystrike, without negatively impacting farm revenue.

Should the three-month moratorium continue at set dates into the future, sheep farmers will make adjustments to their operation to account for this regulation. One strategy that many farmers will implement is decreasing their exposure to production risk. By reducing the size of the flock the potential productivity of their business will decline but in return, so will the level of risk.

Road transport operators

Road transport is a highly interlinked part of the live export value chain, connecting a number of different supply chain participants. Livestock transport operators are relied on to move sheep

between farms, saleyards, feedlots, abattoirs, registered premises and ports. Bulk transport operators are also involved in the movement and supply of fodder bales from farm to feed manufacturers and on to port for livestock export vessels. The movement of livestock by road requires specialist skills in its operators and bespoke vehicles, crates and loading equipment. Stock trucks are not designed to carry any bulk loads other than livestock. Specialist transporters are present in each area where livestock and fodder are sourced as well as within close proximity of quarantine feedlots.¹⁴

Road transport operators in Western Australia are more highly dependent on the livestock export trade compared to many other participants in the value chain (averaging 25-50% of business revenue, with an upper range of 85%). According to the Australian Livestock Road Transport Association (ALRTA), sheep destined for live export are carried on average 3.5 times by the time they move from farm to the port at Fremantle. In comparison, sheep sold to the domestic processing market are carried just 1.5 times.

For the majority of livestock transport operators in key regions of WA, the moratorium has had severe consequences for their businesses. With farmers either holding onto stock or selling to domestic markets during the moratorium, transport operators experienced a significant reduction in demand for their services.¹⁵

¹³ Mecardo (2019) What a difference a shipment makes, Available at: <http://www.mecardo.com.au/commodities/sheep/analysis/what-a-difference-a-shipment-makes.aspx>

¹⁴ Hassall & Associates Pty Ltd (2004) *A quantitative and qualitative assessment of the value of the livestock export industry to the national economy*. Meat & Livestock Australia Limited, North Sydney, Australia.

¹⁵ Many of the abattoirs in WA and eastern states own their own transport assets so do not rely on independent transport businesses for delivery of purchased stock.



ANDY JACOB - LIVESTOCK TRANSPORT OPERATOR

The live sheep export moratorium was the final catalyst in Andy's decision to move his family and business out of regional Western Australia and to Victoria. The owner operator of a livestock transport business and previous president of the Rural and Livestock Transport Association (RLTA) relied on live exports for 80-85% of his work and income.

The live export shipping standstill in 2018 left Andy instantly out of work. Occasional long distance stock transport work kept some income flowing in but with fierce competition from an influx of other operators, his workload was severely reduced. The income received during this time was enough to prevent him going broke but not enough to ensure the sustainability of his business. Prior to the moratorium, Andy had invested \$400,000 in upgrading his fleet.

Livestock transport operators had few options to replace the work removed by the moratorium period. Road transport movements outside of the livestock export supply chain that could be serviced during this time include:

1. Short farm to farm or saleyard livestock movements
2. Farm/saleyard to abattoir movements
3. Bulk goods transport (only for operators with bulk transport equipment)

These alternatives are not as lucrative as the movements of sheep for the live export market. Higher trip volumes are needed to achieve a return on the investment in the equipment. Of course, the removal of livestock trade movements during the moratorium left a gap in available work in key regions. The remaining livestock movements had fierce competition from an influx of operators.

Some operators reported that their livestock carts sat idle for the three-month moratorium period in 2019. In these cases, operators still incurred economic costs for their non-income generating assets.

Some larger, multivehicle operators were able to supplement some of the lost income and work by expanding their bulk or liquid transport services.

However, the worst affected among those consulted were single truck livestock transport operators that experienced a collapse in their business model. With up to 85% of their work reduced during the moratorium, many operators experienced severe financial stress.

Furthermore, infrastructure and equipment to transport livestock have been heavily devalued in WA. A number of operators referred to their stock crate as a “dead asset”.

Like many communities in regional Australia, respect and support are key features of the rural transport ‘community’. During the moratorium, some farmers with their own transport equipment chose to outsource the work to local operators in the knowledge that operators were desperate for work. In the past, transport operators respected region-defined territories of nearby competitors, however, reports of intrusion and cases of price-cutting were observed in 2019.

Evidence of rationalisation in livestock transport operators as a direct result of the moratorium and instability of the live sheep trade already exists in WA. Livestock transport operators in key livestock export regions are most at risk and do not believe that they will have a financially sustainable business should the three-month moratorium continue into the future. Further and more widespread rationalisation will undoubtedly occur.

Transport operators rely on a range of local service providers in regional towns. Businesses such as mechanics, fuel suppliers, fabricators or engineers and tyre suppliers are all consequently affected by a reduction in truck movements.





DARREN SPENCER – SHEARING SERVICES MANAGER

While the consequences of the moratorium for shearing businesses are significant, Darren fears the impact that flows through to regional communities and the shearing industry most of all. His shearing operation runs up to seven teams, employing up to 40 workers shearing thousands of sheep, which supports other businesses in town. In a given month he spends approximately \$12,000 on groceries in regional shops to provide meals for the working teams. The moratorium in effect prevents this monthly expenditure. In a similar way, expenditure in regional communities is reduced when his team of 40 workers are without income.

Attracting new workers to the shearing industry has been a major focus for Darren in his role as President of the WA Shearing Industry Association. New programs have been implemented to improve standards in sheds and shearer welfare, and train new and young entrants. The introduction of the moratorium has been a major setback to their progress. Without the ability to offer regular contract work throughout the entire year, potential workers will be led to other more secure industries.

Shearing services

Shearing services are an important part of the supply chain, with a requirement that all sheep must be shorn before export. The roles in a shearing team include shearers, wool classers, wool pressers, rouseabouts and may also include a cook.

In Western Australia, shearing ewes and crutching lambs occurs between September and April to bypass the wet autumn and winter months and avoid the risks and negative implications associated. There is less risk involved in shearing wethers during the May to July period, as they can be moved into sheds under threat of rain. Shearing wethers intended for the live export trade to the Middle East fills in what would otherwise be a gap in the work calendar for service providers.

The impact of the moratorium for shearing service providers is a major distortion to the efficient distribution of their workload. In 2019, a full year's workload was effectively squashed into an 8 month period. Shearing services experienced limited demand from May to July and heightened demand in the already busy shoulder period of September to October as farmers held their wethers to shear with the rest of their ewe flocks once the live export trade resumed.

Without the requirement for shearing services for shipping wethers from May to July, providers will operate at a reduced capacity. Shearing of ewes and wether hoggets is the next best alternative for shearing providers during this period; however, no additional demand will be created as a

result of the moratorium. There is very limited opportunity to replace the work lost during this period.

As a consequence of the moratorium in 2019, shearing service providers in key live export regions could not supply work to their usual contracted shearing teams from May to July. A number of providers reported that they were forced to reduce their operation down to 1 team, working 3-4 days per week.

Retention of staff, an already challenging feat for managers, has been made more difficult due to this gap in available work. As with many other employers in regional WA, the shearing industry is faced with growing employment competition from a resurgent mining industry.


Shearing team managers spoke of the added financial strain from efforts to secure their workforce. In some cases, managers continued to pay contractors through the off-season (without them working), provided them with

accommodation or attempted to find them casual on-farm work in efforts to retain staff.

Concerns were also expressed for the social and mental health issues in regional communities, caused by the imbalance between demanding and strenuous work periods (shearers working long days and weekends in peak season) and periods of no work.

The physically demanding nature of shearing work means that staff are liable to high levels of stress during peak periods. In 2019, the added workload during the peak period increased the physical and mental strain on staff. Team managers observed adverse changes in the behaviour of their staff.

Shearing services do not rely on the purchase of many technical inputs or other services for their operation. However, it is important to realise that there is a large flow-on effect from their operation in regional communities.



“There is a noticeable (negative social) effect in regional towns when people are off work”



Fodder manufacturers

The live export trade is not only an important marketing destination for livestock in Western Australia but acts as a significant end customer of feed products. During the sea journey, sheep are fed on a pellet typically consisting of 50% hay or straw, 30% grain barley, 10% lupins and the balance of bulk roughage and urea. Straw is also supplied for bedding on voyages.

There are three feed manufacturers based in regional WA that supply feed products to livestock export businesses. The proportion of product sold to domestic or export markets¹⁶ versus livestock export varies from business to business. For some manufacturers that have focused their business on products to supply livestock export (sheep and cattle), more than 90% of their revenue comes from the trade. Other operators have diversified over time into alternate markets including domestic feedlots, other export markets or specialty domestic markets.

The moratorium on the live sheep trade significantly impacted the operations of fodder manufacturers that rely heavily on this market. Planning for fodder manufacture begins 12 months prior to sale; therefore the shipping suspension and moratorium experienced in 2018 and 2019 left fodder manufacturers with no capacity to prepare and adapt to the significantly lower demand for product. Even the three-week extension was problematic for manufacturers as livestock export fodder cannot be stored. For one business that supplies bedding for livestock export shipments, the three-week extension came in at a cost of \$45-60,000.

The dry conditions and limited feed availability in 2019 concealed the potential impact of the moratorium on fodder growers and manufacturers. Fortuitously, the reduced demand for straw and hay to the livestock export market was met with an increased demand for feed by farmers and lot feeders locally. This absorbed some of the surplus fodder products that were left as



a result of the reduced requirements from the livestock export market in 2019 and in turn, saved fodder manufacturers and suppliers from greater financial losses.

Procuring product is now one of the greatest challenges for fodder manufacturers given the uncertainty around the moratorium into the future.¹⁷ The reliability of shipments and therefore the reliability of their market for pellets and straw has been lost.

Fodder manufacturers are an important source of employment in regional WA, providing work for an estimated 100 staff directly, as well as contract balers, bale stackers, engineers, mechanics and straw and hay suppliers. Many of these down chain participants were negatively impacted by the reduced operation of feed manufacturers in 2018 and 2019.

One manufacturer reported that during the moratorium, they had to reduce their operational capacity to 65-70%. As a result, one-third of their casual staff were not required for this time. Consultation with business owners revealed they too face challenges in securing labour for their regional workforce, which is now exacerbated by the instability.

The uncertainty of the live sheep export market has many feed manufacturers considering alternative markets for their straw, hay and pellet products.

Alternative markets for fodder manufacturers in WA include:

1. East coast domestic markets¹⁸

2. Local feedlots and other small alternative markets

3. Northern cattle fodder markets (including live export)

4. High quality export markets

There is only a limited market for pellets and so the reduction of orders from the live sheep export trade would mean less business to be shared across the existing feed suppliers. Increased supply in the local fodder markets in WA will add competitive pressure to suppliers currently operating in these markets. This would likely see rationalisation. Fodder manufacturers, contractors and growers are fearful that the collapse of the live sheep export trade will see the WA fodder market saturated.

The export hay market has grown over the last four years, supplying feed to international dairy and beef herds. While some of the best hay making conditions are in WA, not all regions can produce the high quality hay required to supply export markets. Businesses that supply to export markets must compete at an international level. With this, comes added volatility. There may be opportunities for fodder manufacturers to diversify into supplying export markets if they have access to surplus high quality hay. Further investigation is needed to determine the viability.

¹⁶ Domestic fodder markets include registered premises, on farm and specialty fodder markets while export markets refers to the direct shipment of fodder to international markets.

¹⁷ Straw hay is collected in September for the following year's requirement.

¹⁸ Only viable when there is a deficit on the east coast and surplus in Western Australia



COREY WEGUELIN - CONTRACT BALER

For a rural town, \$1.5 million of expenditure is a significant contribution. This is the amount that one family-run contract baling business in the wheat-sheep zone of WA contributes to the local town in an average year.

However, as a flow-on effect of the moratorium, Corey expects the figure to be cut back to just \$500,000 for the 2019-20 season. Based in a region that produces low quality fodder, his main buyer is a nearby fodder manufacturer that supplies to the live sheep trade, and orders for baling have been halved this season. This impact flows down the value chain, with Corey making the following adjustments to his own spending and servicing requirements:

- 40,000 litres of fuel usually purchased a year, down to 15,000 litres in 2019-20
- Purchase of string at rural merchandise retailer reduced by half
- Less work to local mechanic for parts and services
- 15-25 farmers have also had hay/straw volumes cut back. Many farmers will burn what is not sold, leaving foregone revenue of up to \$150,000 each.

Contract balers and stackers

In regions that supply straw and hay to fodder manufacturers, a significant proportion of the work for contract balers and stackers is derived from the livestock export trade. The demand from the live sheep export trade is not only steered through feed manufacturers for voyages but also registered premises that hold shipping wethers for the live trade. The reliance by hay and fodder contractors on the livestock export trade ranges between 40% and 95%.

Due to the time lag between baling and usage, either as a raw product or in the manufacture of feed, the 2019 moratorium did not impact the procurement of hay and straw or the requirement for balers during the 2018-19 harvest. However, contractors experienced reduced demand for their services in the 2019-20 harvest, with their customers accounting for the moratorium continuing in 2020.

One contract baler, who supplies a major feed manufacturer, explained he was expecting order volumes to halve in 2019-20 compared to the previous season. Where in a busy year he relies on eight additional contractors to service the demand in his region for the fodder manufacturer, he did not engage any subcontractors this season.

Contract balers and mobile stackers may also service alternative straw and hay consumers; however, they are restricted to the quality of product in their region and location of the consumer. The cost of freight limits their opportunities to service alternative market segments.

The repercussions also extend to fodder growers. The reduced demand by the

livestock export trade flows down the chain to reduce the volumes of straw and hay purchased from growers.

In addition, there are a large number of participants that are impacted by the reduced workload of contract balers and stackers. These include rural merchandise stores which supply string for baling, fuel suppliers, local mechanics and transport operators.

Livestock agents

In Western Australia, the livestock export trade underpins 35% of the agency business. The primary role of a livestock agent is to find the marketing option for their customers' stock that will return the most value. The live export trade is an important market for agents, firstly as a sale channel for stock transactions and secondly for its contribution to sale competition as a buyer independent of the processing market.

The impact of the live sheep export moratorium on individual livestock agents is dependent on their region. In key supply regions, some agents noted that traditionally 30-40% of their revenue was reliant on the live sheep export trade, but with the moratorium this had dropped to 5%. However, agents located in regions that produce stock bred to supply processing markets experienced minimal impact.

The agent's salary is a commission from the farmer based on the prices received for the stock sold. Thus a reduction in the number of buyers, diminished saleyard competition and fewer marketing options all contribute to lower prices received

for stock and in turn, lower returns to the agent. Similarly to shearing service providers, in key live export regions livestock agents had to manage a condensed season in 2019 as farmers offloaded stock either before or after the moratorium.

While the economic implication of the moratorium is not as significant for livestock agents as for other participants in the supply chain, they have still experienced consequences.

Agents were challenged to find

“The moratorium has disrupted the marketing system that we’ve had in place for decades”

alternative buyers for light stock during the moratorium. Even sheep of a condition suitable for local processing were not guaranteed a sale, with many abattoirs fully booked at peak times. On average, WA has greater distances for sheep to travel to meatworks when compared to the eastern states. Along with the seasonality of supply, at times this places pressure on the ability to access ‘kill space’.¹⁹

The east coast store lamb market offered relief for agents and farmers trying to sell wethers in 2019; however as stated earlier in this report, agents acknowledge that this market will only be available during periods of recovery from drought or when strong seasonal differences exist between western and eastern states.

¹⁹ Herrmann, R., Dalgleish, M., Agar, O. & Horton, J. (2017) *Sheepmeat market structures and systems investigation. Meat & Livestock Australia Limited*. North Sydney, Australia.



Exporters

The impact of the moratorium on exporters is twofold. Firstly, there is the economic cost of carrying non-income producing assets through the moratorium period, coupled with the reputational cost of an inability to provide reliable supply to markets where we have a long history of trade and business relationships. Secondly, there is the cost borne by contract staff that are engaged directly by exporters (and occasionally importers) only when livestock export vessels are scheduled to operate. These include veterinarians, on-board stock handlers, sheep buyers and quality control staff.

In relation to economic costs, the exporters consulted noted a reduction in revenue of 10-25% during the suspension in the trade during 2018 and a 5-15% reduction in revenue during the 2019 moratorium period. It is important to note that for several exporters, reductions in live sheep export revenue were partially recouped by involvement in an expanded live cattle trade, lot feeding operations and/or involvement in shipping contract services or export of live sheep from ports outside of Australia. However, revenue that was recouped was not enough to cover the opportunity that would have been available had the live sheep export trade been open during part, or all, of this period. Furthermore, revenue declines do not take into account lost income from reduced stocking densities on vessels at other times of the year.

Some exporters were able to re-direct their business focus during the 2019 season as there was increased lead time in which to plan, compared to the 2018 suspension. Indeed, one exporter revealed that during the 2018 suspension a planned voyage was

cancelled on short notice which portrayed a negative image of Australia as a reliable provider of live animals and inflicted unrecoverable losses.

Some exporters have noted a change to their business structure due to the moratorium with a shift toward lot feeding for domestic and boxed/carcass export markets. This has meant less than 20% of their revenue stream is now attributable to the live sheep export trade. This has also coincided with a downsizing of assets and a reduction in FTE staff numbers and use of contractors by over 50% as the new structure is less labour intensive.

Veterinarians

Specialist veterinarians practise at a number of possible points in the live sheep export supply chain. They include on-farm practitioners, Australian Government Accredited Veterinarians (AAVs) involved in preparation of animals prior to voyage, and on-board AAVs during the voyage. The AAV accreditation allows veterinarians to work on both cattle and sheep shipments under contract with exporters.

The level of reliance of AAVs on the live sheep export trade is dependent on their point of practice and stock type experience. On average, AAVs in Western Australia rely on the live sheep export trade for 25-50% of their income. Their role in live export is specialised, hence there is little opportunity to supplement or substitute their contract work with other clients during the moratorium. Consultation revealed there are two primary options for AAVs in place of live sheep export work:

1. Cattle live export AAV or stockman
2. Shift away from livestock export to on-farm or small animal clinical practice.

On-board AAVs are more commonly multispecies, servicing both cattle and sheep voyages. Many also operate as on-board stock handlers when required. These contractors have the ability to shift to servicing live cattle export voyages during the moratorium, as some contractors did in 2019. This decision can come down to personal preference, with handling practices being more physically demanding for cattle compared to sheep.

The moratorium on the live sheep export trade reduced the amount of available work for AAVs during 2019. Greater competition to service cattle voyages was evident. However, the on-board AAVs consulted were able to source sufficient cattle voyage contract work or work in other sectors to avoid any significant loss to their regular income. There is no financial forfeiture associated with contracting services to cattle voyages compared to sheep voyages for AAVs.

There is generally less interchangeability between servicing sheep and cattle for AAVs that prepare and inspect stock prior to loading, even though they too hold the qualifications to practice on both species. For a number of pre-voyage AAVs that have invested in solely servicing sheep exports, as one might expect, the moratorium and shipping suspension had major negative economic implications. They were left without work and income for the entire period in 2018 and 2019. One pre-voyage AAV reported that they would not be able to sustain their business if the moratorium isn't reduced or lifted. The burden was not only financial but the negative mainstream social perceptions of their work and the added stress of unemployment were mentally tolling.

For pre-voyage AAVs with experience in cattle treatment, opportunities to service cattle export voyages may supplement their work on sheep voyages in order to retain income through the moratorium periods. It is noted that this may not be an appropriate option for all, as it does involve demanding travel commitments or out of state transfer. Consultation revealed that a number of AAVs have already diversified their income streams away from the livestock export sector.

Quality assurance technicians are also subcontracted by a number of AAVs to prepare and inspect sheep prior to loading for the voyage. These subcontractors were consequently also devoid of work during the trade halts. As a flow-on implication of any reduction in contract work for AAVs, expenditure with veterinary supplies retailers was proportionally reduced.

Associated down chain participants

Several diverse services in Australia are owned, employed or contracted by exporters and importers to fulfill each shipment. They include registered premises staff, sheep buyers, shipping services, stevedores, AAVs, stock handlers, quality control specialists, ship owners and port authorities.

Many of the individuals consulted for this research found no alternate revenue streams within their field of skills during the moratorium period. Sheep buyers, stock handlers, quality assurance technicians and quality control specialists were in many cases without work and income for 16 weeks in 2019. Assuming a full working year with 100% of their income generated through the live sheep export trade, this equates to a 30% potential reduction from their average yearly income.



Sheep buyers

Sheep buyers have had to cope with further economic consequences as a result of the newly changed regulations in shipping practices. Contracted by exporters, sheep buyers receive commission for the number of head of stock procured for their client. With the reduction in stocking density on vessels, the purchase quotas for sheep buyers has been reduced and as a result, so has their income potential. One sheep buyer estimated that their quotas per shipment were reduced by one third in 2019. This

buyer also calculated that their 2019 income would be 29-38% lower than average as a result of the moratorium and regulatory changes.

Sheep buyers are very limited in their capacity to diversify into new market segments without compromising their contract services to live sheep export clients. Competition rules restrict sheep buyers from purchasing stock of a similar type for multiple companies. Under these circumstances, a buyer that is regularly contracted by exporters cannot buy shipping type sheep for any other client

such as a processor or feedlot. This leaves trade lambs as the only market that buyers could potentially diversify into servicing.

Due to the small size of this market and regional production confines, there is little demand for sheep buying in this market. Some buyers in trade lamb regions may be able to supplement up to an estimated 15% of their income by buying for this market. This work would be spread across the year and is unlikely to fill the income gap caused by the live sheep export moratorium.

Shipping services

Port based shipping services such as stevedores and on-ship management services are engaged by a diverse range of industries. Participants reported that live sheep exports constitute 15-25% of their revenue in a normal year. However, due to the diversity of industries they service, there is more opportunity to offset the loss of live sheep shipments with other customers and markets compared to many other participant groups in the value chain.

During the moratorium period in 2019, shipping services businesses looked to service alternative shipments. An increase in live cattle shipments during this period in 2019 assisted in keeping revenue steady despite the loss of sheep shipments. Thus, these businesses felt little to no economic impact of the moratorium in 2019. Staffing requirements were, however, affected by the reduction in livestock shipments. For stevedores, loading a single livestock vessel is very labour intensive compared

to other non-livestock shipments. Up to 125 staff are involved in the process when livestock are involved.

These businesses will either access new markets or reduce staff levels if the moratorium continues in its current form.

Cattle farmers

The live sheep export trade also facilitates the trade of live cattle from Western Australia to Middle Eastern markets. From 2014 to 2018, on average 68,643 cattle were exported live from WA ports to Middle Eastern markets each year.²⁰ Of these cattle, 78% were transported on vessels that also carried live sheep. Most consignments from WA to the Middle East transport sheep as the majority and cattle as the small minority.

As an example, Israel is a key market for shorthorn bulls (200-400kg). Sheep consignments from WA to the Middle East provide market access for these specialty bulls as the demand is not substantive to fill a full consignment of cattle. There is no alternate market for bulls of this type and size, which meant these cattle had to be carried through until shipments resumed following the live sheep export suspension and moratorium periods.

This came at a disadvantage for cattle farmers that supply this market, as they acquired additional costs to feed and carry. Should the moratorium continue, these specialty cattle trading businesses will need to adapt their operation to either change their sale window or increase bull weight to access alternative markets.

²⁰ Data source: Department of Agriculture, Livestock mortalities for exports by sea. Accessed on: 14/11/2019. Available at: <https://www.agriculture.gov.au/export/controlled-goods/live-animals/live-animal-export-statistics/reports-to-parliament>

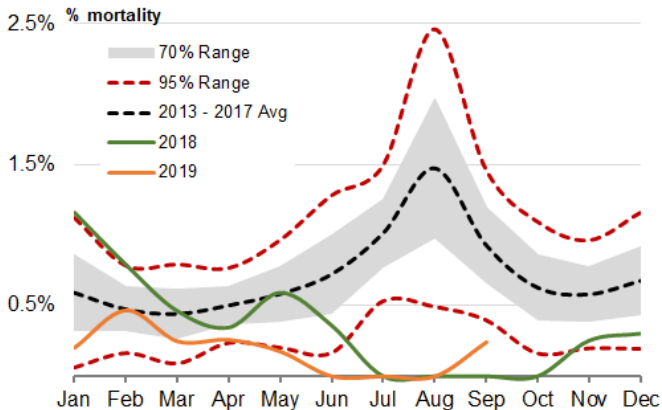


ANALYSIS OF SHEEP DELIVERY SUCCESS RATES

The implementation of changes to shipping practices during the 2018 season saw a significant reduction in live sheep export mortality rates, even accounting for the moratorium period during June to September 2018 when no live sheep export vessels were sent from Australia.

Furthermore, average monthly live sheep export mortality data demonstrates that levels have significantly reduced since the start of 2019, trending below the average seasonal pattern that occurred between the 2013 to 2017 seasons. Mortality levels in 2019 were also below the normal variation in mortality that could be expected for each month except February (Figure 4).

Figure 4. Live sheep exports mortality – seasonal



Source: DAWR, Mecardo

Figure 4. highlights the average monthly trend in mortality for the 2013 to 2017 seasons, the normal range (grey shaded zone), which represents one standard deviation above/below the average and is also represented by the low and high columns on Table 1. Furthermore, an extreme boundary is shown (upper and lower red broken lines), which represent two standard deviations above/below the average and is represented by the extremely low and extremely high columns on Table 1.

Focusing on the mortality data for live sheep exports during the 2019 season (January to September), we can see that mortality levels were 54% below the historical seasonal average and have been beyond the extremely low threshold during May and September (Table 1).

Table 1. Live sheep mortality rates

Monthly mortality statistics (2013 to 2017)						
	Average	Extremely Low	Low	High	Extremely high	2019 season
Jan	0.59%	0.06%	0.33%	0.86%	1.12%	0.20%
Feb	0.47%	0.16%	0.32%	0.63%	0.78%	0.47%
Mar	0.44%	0.09%	0.27%	0.62%	0.79%	0.25%
Apr	0.50%	0.24%	0.37%	0.64%	0.77%	0.26%
May	0.58%	0.20%	0.39%	0.78%	0.97%	0.18%
Jun	0.72%	0.16%	0.44%	1.00%	1.28%	
Jul	1.01%	0.53%	0.77%	1.26%	1.50%	
Aug	1.48%	0.49%	0.98%	1.97%	2.46%	
Sep	0.93%	0.40%	0.66%	1.20%	1.46%	0.24%
Oct	0.63%	0.16%	0.39%	0.86%	1.10%	
Nov	0.58%	0.20%	0.39%	0.77%	0.96%	
Dec	0.68%	0.19%	0.43%	0.92%	1.16%	

Source: DAWR, Mecardo

Mortality data trends for 2019 suggest that current heat stress management plans and the changes implemented as a result of the McCarthy review in 2018, as well as management practices introduced by exporters, have improved welfare outcomes and significantly reduced the risk of heat stress incidents.

Traditionally, the northern hemisphere summer period can see mortality peak due to a higher incidence of heat stress events. However, during the 2018 season, the trade was suspended during this time, resulting in no recorded mortalities from July to October.

Figure 4 shows that the usual peak in mortality occurs during the northern hemisphere summer period. With the extension to the moratorium, in 2019 no shipments occurred during the most high-risk period.

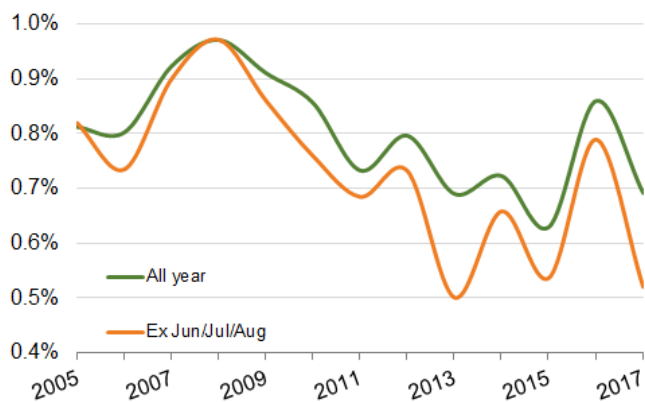
Analysis undertaken by Mecardo on the historic live sheep export mortality data between 2005 and 2017 demonstrates how a three-month moratorium would have impacted the trend in mortality. The three-month moratorium scenario has been assessed for consignments exiting Australia between the June to August period.²¹

Figure 5 illustrates the annual average trend in mortality rates, showing the actual historic trend with the trade operating unhindered all year (green line). Overlaid on the chart is the trend with the June to August moratorium period excluded (orange line). Clearly, there is a reduction in mortality rates when the three-month moratorium exists.

²¹ June to August is the current moratorium period proposed by industry.



Figure 5. Live sheep export mortality trends

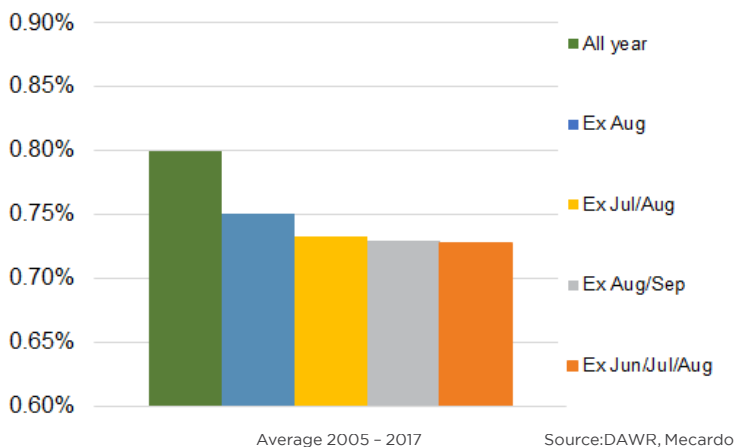


Source: DAWR, Mecardo

To quantify the magnitude of the reduced mortality rates under the proposed moratorium, and to assess the effectiveness of various moratorium periods, scenario analysis was undertaken on the average long-term mortality figures (Figure 6). The following scenarios were back tested to determine the potential impact on mortality rates:

1. One-month moratorium in August
2. Two-month moratorium July to August
3. Two-month moratorium August to September
4. Three-month moratorium June to August

Figure 6. Live sheep average mortality with moratorium scenarios



During the 2005 to 2017 period when the live sheep export trade operated without a moratorium, the long-term average mortality rate was 0.80%. This equates to 400 sheep per shipment of 50,000 head.

Enforcing a moratorium only during August would see the long-term mortality rate decline to 0.75%, equalling 375 sheep out of a total of 50,000. Under the scenario of a two-month moratorium from July to August or August to September, the mortality rate would be reduced to 0.73% or 365 sheep.

The current moratorium period proposed by industry is from 1 June to 31 August. A three-month moratorium during this time would also result in a long-term mortality rate of 0.73%, or 365 sheep per voyage of 50,000 head. No significant difference exists between a two-month or three-month moratorium during these dates in terms of mortality rates per shipment.

In terms of sheep survival, the difference between a one-month moratorium and a three-month moratorium is estimated at 10 sheep per shipment of 50,000.

It should be noted that if there continues to be a reduced mortality rate on shipments, achieved by the changes to shipping practices, the effect of the moratorium on sheep survival will be reduced compared to the historical scenarios analysed.

While a moratorium limits the chance of heat stress periods occurring, it has a significant impact upon participants within the live sheep export industry across the supply chain.



CONCLUSION

Data from January to September 2019 indicates that shipping practices put in place the previous year for live sheep exports to the Middle East are having a positive impact on mortality rates. In 2019, mortality rates were 54% below the historic seasonal averages calculated from 2013 to 2017.

This shows that the current heat stress risk assessment tools utilised by exporters, regulations, and changes being implemented by industry are working to improve welfare outcomes more broadly on voyages. This is a positive outcome for all involved in the live sheep export trade.

However, there is a widespread concern under the surface of Western Australia's sheep industry that continued uncertainty, instability and negativity will see the demise of crucial support services in the supply chain. This would be the 'nail in the coffin' for sheep farmers, who are resoundingly fed up with the portrayal of their industry and increasing regulations, compounding the struggle of recent poor seasons.

The 'fight for acres' has already claimed some of the WA flock. There are plenty of anecdotal reports of mixed farmers restructuring their enterprises away from sheep by converting land to cropping or adding cattle. Some farmers are choosing to let their yards and shearing sheds decay as they turn to 100% cropping enterprises. Not only does this increase farm risks by narrowing the economic base of farm incomes, it is detrimental to land values.

While participants such as farmers, livestock agents and shipping services would adapt and manage their system to work around an annual three-month moratorium, the same optimism can't be applied to the security of many other participants in the supply chain. The cost of the moratorium to these businesses is not exclusively in the form of lost revenue. Many are faced with additional strain from distorted workloads, cashflow issues, asset devaluation and competition for labour; often compounding to take effect on the social and mental wellbeing of those impacted.

Should the moratorium continue in its current length, rationalisation will undoubtedly occur in service sectors of the value chain. This is a concern for an industry stretched by the tyranny of distance and at the core of regional communities.

The full impact of the moratorium on the entire WA value chain must be considered, along with the measured improvements achieved through regulatory and self-imposed changes to shipping practices in order to secure a sustainable and valuable live sheep export trade for all participants into the future.





CONSULTATIONS

Number of consultations

AAVs	6
Exporters	6
Farmers	13
Feed suppliers/manufacturers	6
Industry representatives	4
Livestock agents	7
Quality control specialist	1
Saleyard managers	2
Shearing services	7
Sheep buyers	2
Shipping/wharf services	2
Stockman	1
Transport operators	7
Total	64

ABOUT MECARDO

Mecardo (A Nutrien Ag Solutions Business) is an independent, specialist agricultural market intelligence and advisory business.

Mecardo is recognised throughout the Australian rural sector as the “go to” source for data based analysis and research in the Australian agriculture space, and has built an enviable reputation with a well-established footprint.

Supply chain management and collaborative marketing and implementation are areas of experience gained over a long time of analysing and understanding markets and applying this knowledge to the farming and agribusiness sector.

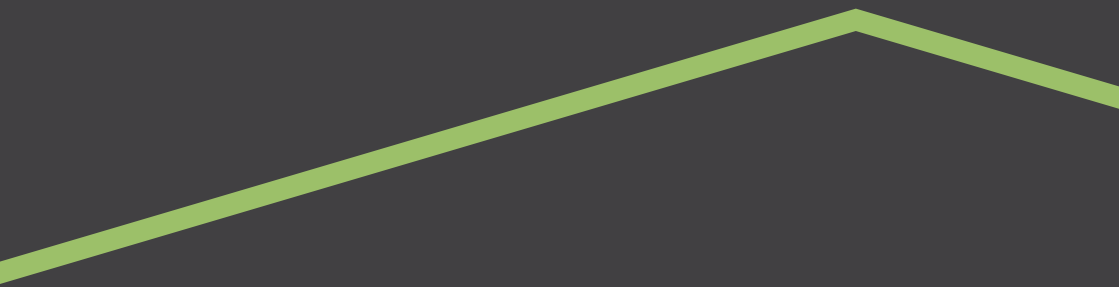
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ANALYSIS OF DOMESTIC FUNDAMENTALS INFLUENCING THE NATIONAL SHEEP FLOCK

August 2020

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A NUTRIEN AG SOLUTIONS BUSINESS



This report was commissioned by LiveCorp and Meat & Livestock Australia

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FOREWORD

While historically the Merino sheep industry has been a mainstay of Australian broadacre farming, along with its associated meat and wool, it is no longer the preferred or only option for many producers. With changes in farming practices and business decisions, the traditional farming enterprise mix has shifted. This paper explores the shifts and analyses the trends in the Australian sheep flock.

There has been a national decline in the sheep flock and specifically the Merino component. This represents a shift in the relationship where cropping and sheep production have co-existed and, in many areas, complemented each other.

For Western Australia (WA) this has greater relevance, as compared to the 'east coast' with a larger demographic and therefore greater meat processing capacity. The WA sheep flock has traditionally relied heavily on wool and the live export of Merino wethers for sustainable revenue.

This report identifies the risk to the WA sheep flock into the future. Uncertainty created by recent regulatory changes to the live sheep export trade as well other unique WA factors have the potential to shift the decision making of farmers away from sheep breeding towards larger areas of crop plantings.



PROJECT SCOPE

Mecardo has been engaged by LiveCorp and Meat & Livestock Australia (MLA) to undertake an analysis of the Australian live sheep export trade. The objective of this project is to determine the value of the industry to regional zones across the country. This is the final report of a three-stage project:

1. Identify and outline the economic benefit that flows from the live sheep export trade to participants in the Australian supply chain.
2. An economic analysis of the impact from the industry's self-imposed three-month moratorium and the regulatory changes introduced in 2018.
3. An analysis of a range of farm level decision-making options (domestic fundamentals) influencing national sheep flock numbers, with a primary focus on Western Australia (WA).

This report analyses the historical trends in the demographics of the Australian sheep flock, with a focus on 2008 to 2018, examining domestic factors that influence farm-level enterprise decision making. By exploring some of the drivers of change, it provides insight as to whether the WA sheep flock is at risk of further decline and which enterprises farmers may be turning to, particularly in light of changes to the live sheep export industry.

Analysis in this report includes:

- The decline in the WA flock as a proportion of the national flock.
- Changes in the mix of WA agricultural enterprises.
- Changes within sheep enterprises, including WA sheep numbers (production) vs turnoff (slaughter), and the price trend for sheep sold to live export markets vs alternative market outlets (saleyards & domestic processing).
- The impact of farm debt on enterprise return.

METHODOLOGY

A compilation of relevant datasets from the following sources was used in this project:

- Australian Bureau of Statistics (ABS)
- Meat & Livestock Australia (MLA)
- ABARES Australian Agricultural and Grazing Industries Survey (AAGIS)
- Department of Primary Industries and Regional Development Western Australia (DPIRD)

Descriptive and correlation analysis was completed to explain recent and historic trends in the Australian and Western Australian sheep flock. This was combined with desktop research to provide insight into the farm-level decision-making factors.



FLOCK DEMOGRAPHICS

The national sheep flock has been in a declining trend since 1990. From its peak of 180 million head in 1970, the national sheep flock stood at just 70 million head on June 30 2018.¹ Current forecasts predict that the flock will fall to 63 million in 2020.² This would put the Australian flock at the lowest level in 100 years. In Western Australia (WA), the flock has also experienced a decline. There were 14.5 million sheep and lambs in WA at June 30 2018.

The sustained national decline in sheep numbers has been driven by several macro and micro-economic barriers, production and market factors.

- Sheep and grain industry mix
- Access to labour
- Debt structure
- Market barriers
- Greater focus on lamb production and turn-off of wethers.
- Ewe management, early turnoff and flock replacement.

The trade-off and interplay between grain, wool and meat prices are fundamental dynamics, and a key barrier to sustainable supply as effort is shifted between activities.³ Both wool and sheepmeat industries compete for a decreasing ewe base.

The remarkable growth of the Australian sheepmeat industry has come with a consequence. The changing flock demographic from wool production towards lamb production has seen fewer Merino ewes joined to Merino rams and a subsequent decline in the availability of Merino wethers and young replacements coming into the system.⁴

A study by Ellis (2015) reported that a significant latent capacity to expand lamb and sheep turnoff existed in WA and that substantial opportunity was envisaged with investment. Interestingly, 28% of producers surveyed indicated that land acquisition, and another 28% indicated reducing cropping, would be the main types of changes required to expand their sheep production.

¹ Data source: Australian Bureau of Statistics. Agricultural Commodities 2017-2018

² Meat & Livestock Australia (2020) Industry projections 2020 Australian sheep. Accessed at: www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/sheep-projections/mla_feb-2020-australian-sheep-industry-projections-1.pdf

³ Ellis, D. and Alignment, G. (2015) Western Australia's Sheep Meat Supply Chain - Supplier profile and behavioural segmentation. Research report for Meat & Livestock Australia, North Sydney.

⁴ For detailed analysis on the changing flock demographic see section- "Sheep enterprises".

CROPPING AREA AND SHEEP FLOCK

The 'fight for acres' between land for cropping versus pasture for livestock is anchored in the history of many agricultural regions in Australia. Between 1990 and 2010, the growth in area planted to winter crops correlated to a decline in the number of sheep at a national level (Figure 1). Since 2010, however, both the hectares of winter crop planted and the sheep flock have largely stabilised.

With this stabilisation, the correlation between winter crop area and sheep numbers has also declined. Over the period 1992 to 2018, the relationship between Australian winter crop area and sheep numbers was reasonably strong, as shown by a coefficient (r^2) of 0.6704. Narrowing the time frame to the period 2008 to 2018 produces a correlation of $r^2=0.0466$, indicating a weakening of the relationship. This reveals that the variation in area planted to winter crops explained very little of the variation in the number of sheep between 2008 and 2018.

Unlike the national situation, in Western Australia (WA) the relationship between winter cropping area and sheep numbers has remained strong in the last decade.

The reduced correlation between the sheep flock and crop area at a national level suggests that for the east coast the move from sheep enterprises to cropping that was evident during 1990 to 2010 may have run its course.

A factor contributing to the breakdown in the switch from sheep to cropping enterprises across the east coast in the last decade could be successive drought periods during 2013-15 and 2018-19 limiting the area planted to crops.

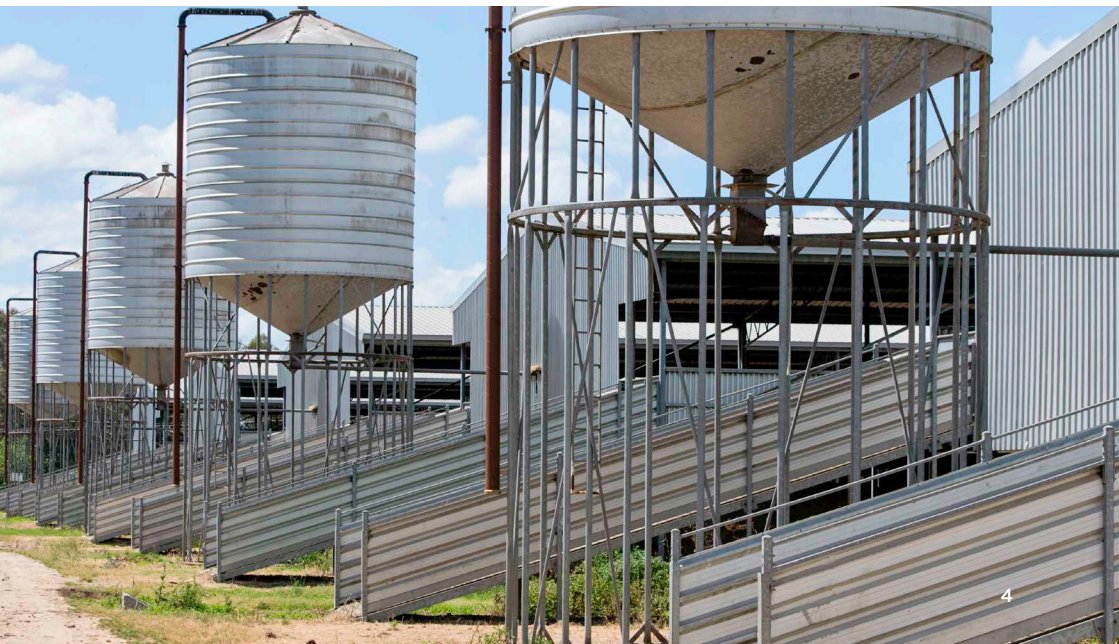
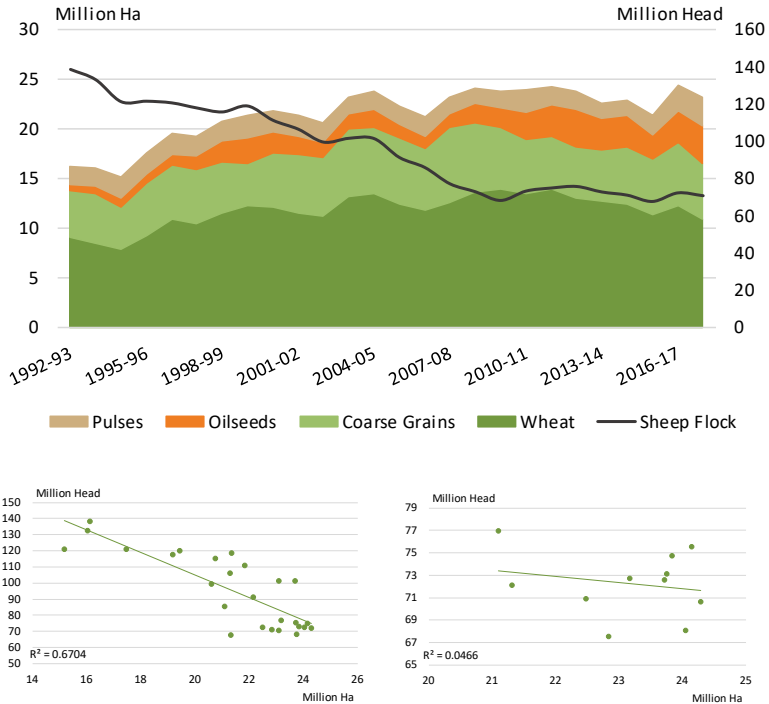




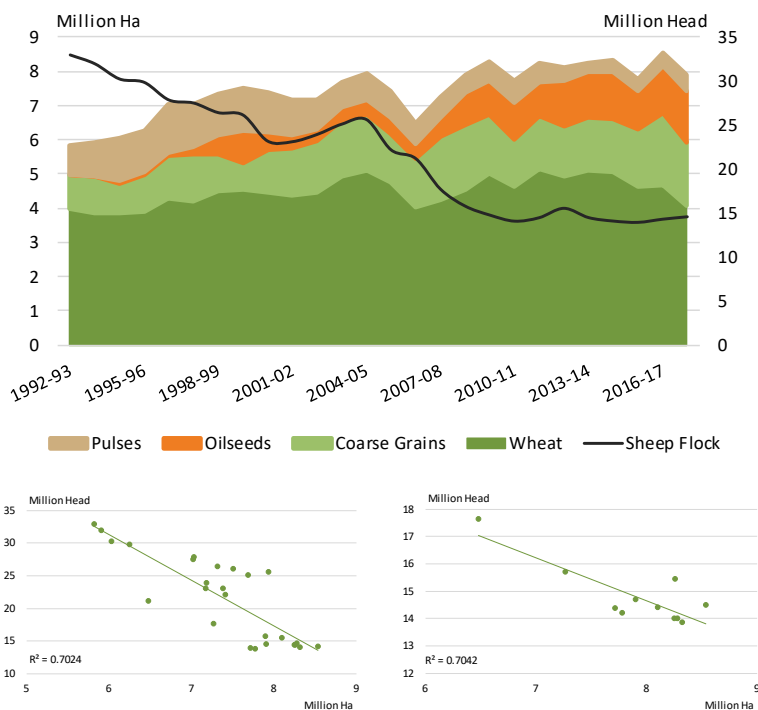
Figure 1. Australian crop area (hectares) and sheep flock numbers. Correlation bottom left 1992-2018 and bottom right 2008-2018.



Source: ABARES, Mecardo

Focusing on the relationship in WA between crop area and sheep flock numbers tells a different story and provides more evidence of WA's independence from the east coast in terms of agricultural markets. In WA, from 1992 to 2018 the coefficient of these two variables was 0.7024 (Figure 2). The strength of this relationship remains when isolating the period from 2008 to 2018, as demonstrated by a slight increase in the coefficient to $r^2=0.7042$.

Figure 2. Western Australian crop area (hectares) and sheep flock numbers. Correlation bottom left 1992-2018 and bottom right 2008-2018.



Source: ABARES, Mecardo

The strong correlation between the sheep flock and area under cropping in WA suggests that there is still capacity for further movement away from sheep production toward cropping in future seasons. This is likely to occur if the trading conditions for sheep operations become further compromised.





SHEEP ENTERPRISES

The decline in the national flock has been evident from the early 1990s to 2010 (Figure 3). Despite the reduction in the flock and the number of breeding ewes during this time there has been an increase in the proportion of lambs produced as improved husbandry techniques, expanded genetic technology and enhanced ewe management practices have seen sheep enterprises become more productive.

The national lamb flock has remained fairly consistent since 2006 while breeding ewe and other adult sheep numbers have continued to decline.⁵ Exceptions to the drop in breeding ewe numbers occurred during periods of more favourable climatic conditions such as in 2010-11 and more recently during the 2016-17 and 2017-18 seasons. At a national level, there has been a steady increase in the proportion of lamb to adult sheep from a ratio of 20:80 in the early 1990s, to a ratio of 30:70 in recent years (Figure 4).

Figure 3. Australian sheep flock numbers by category and lamb and sheep price indices over time.⁶

Source; ABARES, Mecardo

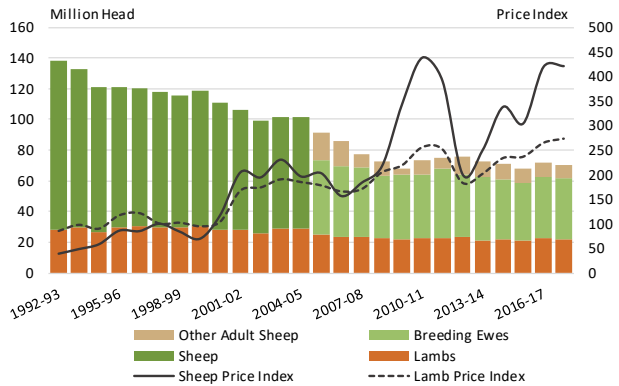
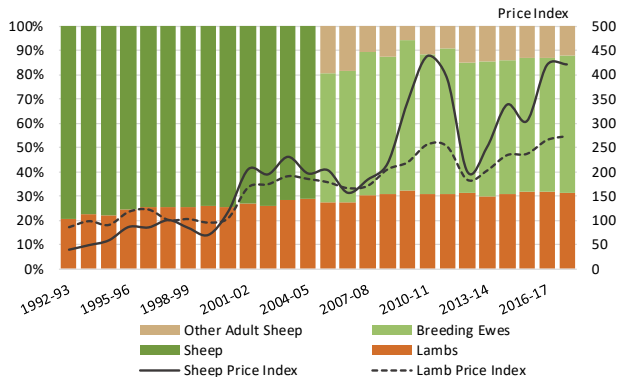


Figure 4. Australian sheep flock categories as a proportion of the total flock, and lamb and sheep price indices over time.⁶

Source; ABARES, Mecardo



⁵ Note: Most lambs are born after the census date and sold before the following census thus aren't captured in the flock numbers. The lamb flock is therefore majorly representative of early lambs from NSW or carryover replacements.

⁶ Sheep category split into Breeding ewes and Other Adult Sheep for reporting purposes in 2006.

Seasons that experienced favourable climatic conditions also saw significant increases in the price index for sheep. This is unsurprising given the reduced proportion of adult sheep in the national flock and overall numbers being at low levels unseen in a century.

At a national level, the proportion of sheep going into the live export channel has dropped from over 10% of turnoff to under 5% during the past three decades (Figure 5). There has been a significant expansion of lamb as a proportion of turnoff nationally, particularly throughout 2003-2010, from around 45% to 70%. The increase in lamb turnoff highlights the shift in focus from wool production to prime lamb production over the period. A higher proportion of turnoff of adult sheep was also noted in dry seasons, such as during the 2013-15 drought.

Similar to the national trend, in Western Australia (WA) the proportion of lamb turnoff has increased at the expense of adult sheep and live export turnoff (Figure 6). Lamb turnoff has increased from approximately 15% to 50% over the past three decades.

Figure 5. Australian sheep flock and turnoff

Source: ABARES, ABS, MLA, Mecardo

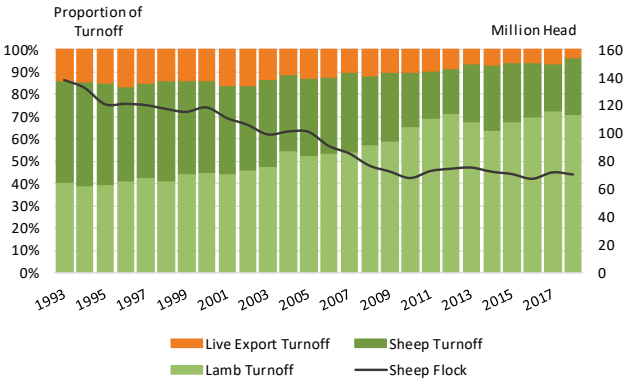
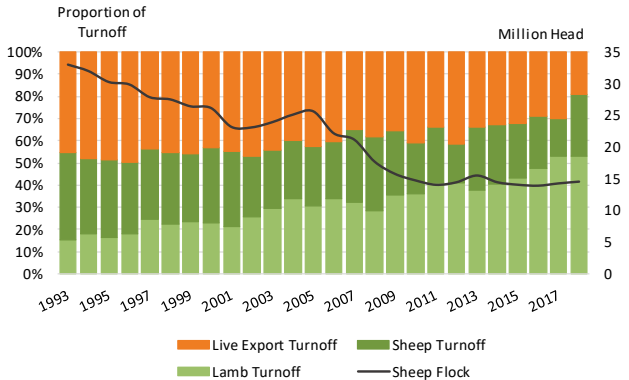


Figure 6. Western Australian sheep flock and turnoff

Source: ABARES, ABS, MLA, Mecardo





However, the WA sheep industry has additional capacity constraints, such as a smaller domestic market, restricted options for sheepmeat export markets, and fewer processing facilities compared to the eastern sheep industry. For instance, WA has less access to the US lamb market, due to shipping schedules and proximity. In effect, this has meant that the WA sheep producer continues to rely heavily on the live sheep export trade as an alternative to domestic turnoff.

The proportion of live sheep export turnoff in WA exceeded 40% of the state total turnoff from the early 1990s to the mid-2000s. Live sheep export turnoff began to ease toward 30% of total turnoff in WA during the past decade. In recent times, live sheep export restrictions during the northern hemisphere summer have contributed to the proportion of live export turnoff dropping to nearly 20% of WA's total turnoff.

CHANGE IN THE FLOCK SIZE

In the Australian flock, the swing factor in terms of numbers is how many adult sheep are sold rather than kept on farm. Sheep offtake is a rolling 12-month sum of adult sheep sold to abattoirs and sent as live exports, expressed as a proportion of the flock size.⁷ The sheep offtake accounts for nearly 60% of the year on year change in flock size in recent decades, so it is the key contributing factor. Sheep offtake rises when seasonal conditions are dry, and contracts during wet seasons.

As a rule, the experience of the past few decades shows that the sheep offtake needs to be below 10% before the flock can grow. Somewhere in the 10-12% range is neutral and above 12% the flock is in decline.

In 2018, high wool prices helped reduce the flow of adult sheep to abattoirs despite the dry seasonal conditions being experienced (Figure 7). However, this was short-lived, indicating downward pressure on the flock size.

The other way farmers can adjust their flock size is by changing the volume of lambs they sell to abattoirs, although this measure has a much lower correlation with changes in the flock size.

Rainfall or seasonal conditions have been the key driver of sheep offtake, accounting for two thirds of the variation in the number of sheep sent to abattoirs. The dry spring in many eastern regions in 2019 kept the pressure on adult sheep sales to abattoirs. East coast drought conditions during 2013-15 saw the sheep offtake ratio climb above 12% and coincided with a decline in the national flock and falling east coast prices for sheep and lambs. During the 2015 season, WA also experienced a drier than normal seasonal pattern with live export prices coming under pressure.

⁷ Woods, A (2019) Sheep offtake still contractionary, Mecardo. Accessed at: <https://mecardo.com.au/sheep-offtake-still-contractionary/>

Analysis of the sheep offtake pattern and flock for WA shows that the offtake ratio threshold between flock rebuild to liquidation is higher than the national offtake pattern (Figure 8). The historic data from 1982-2020 indicates that when the WA offtake is above 22% the WA flock is in a liquidation phase, while under 22% indicates flock rebuild.⁸

Figure 7. National sheep flock & turnoff

Source: ICS, ABS, ABARES, MLA, Mecardo

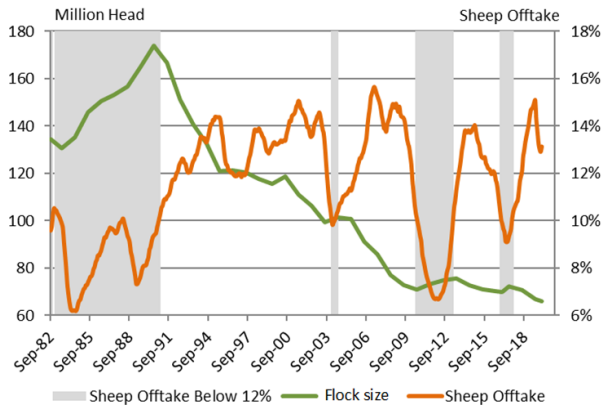
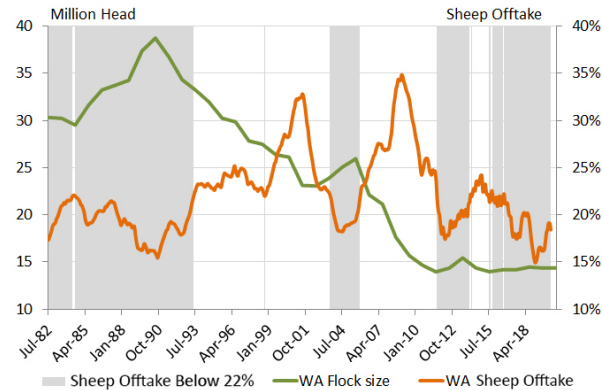


Figure 8. Western Australian sheep flock & turnoff

Source: ICS, Mecardo



⁸ Note that the transfer of sheep between states is not fully accounted for in the WA offtake calculations so the 22% threshold between rebuild/liquidation is a best estimate on available data.



PRICE INDICES

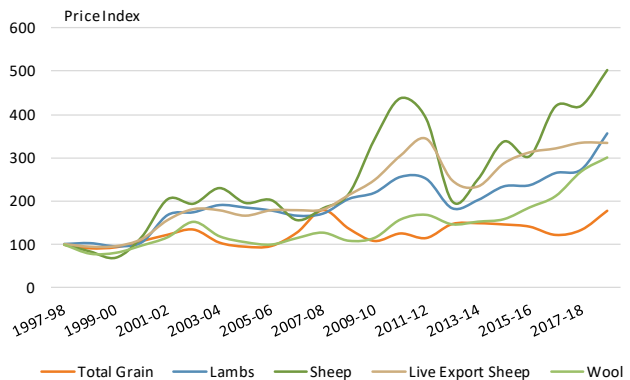
Price indices are used in lieu of absolute prices to compare the relative changes in prices received by Australian producers across a selection of broadacre enterprises. Strictly speaking, these indices are not a substitute for respective enterprise profitability and this is particularly true for grain producers.

During periods of drought, domestic grain prices can rally significantly as cropping production and yield decrease, but often don't totally offset the fall in productivity. Similarly, increased crop production and higher yields are present during favourable seasons but prices received by grain producers are generally lower.

Prices for grain in Australia have remained relatively steady since 2008 (Figure 9). The major exception has been during the recent poor climatic conditions, particularly across the eastern seaboard, which led to a small local crop and an increase in domestic prices. As previously outlined, very good climatic conditions during the 2010-11 season saw sheep and lamb prices rally substantially. Beyond 2011, growth in offshore market demand for sheepmeat and a decline in supply from Australia's only real sheepmeat export competitor, New Zealand, saw prices continue in an upward trajectory.

Figure 9. Indices of prices received by farmers- Australia

Source: ABARES, Mecardo



Tightening supply and improved climatic seasons during the 2016-17 period saw sheep and lamb prices create historic highs, pushing the sheep and lamb indices into uncharted territory. However, live sheep export prices in 2016-17 were unable to increase above the level of the peak experienced in 2010-11.

Wool prices reached historic highs towards the end of the decade. This was a result of reduced supply of wool, due to the smaller size of the sheep flock and the changing composition towards crossbred meat sheep enterprises at the expense of Merino wool enterprises, combined with increased demand from woollen mills in China since 2015.

GROSS VALUE OF WA LIVE SHEEP EXPORTS

Gross value of production of wool, sheepmeat and live sheep exports in Western Australia (WA) shows that the wool industry dominates the landscape for sheep enterprises (Figure 10).

In the early 1990s, wool comprised approximately 70% of the total gross value of production for sheep enterprises (Figure 11). However, a decline following the collapse of the Reserve Price Scheme saw the proportion of wool as a measure of total gross value of production drop to below 50% by 2009. Since then, the gross value of production for wool as a proportion of total wool, sheepmeat and live export in WA has recovered towards 65%.

Figure 10. Western Australian enterprise gross value of production

Source: DPIRD WA, Mecardo

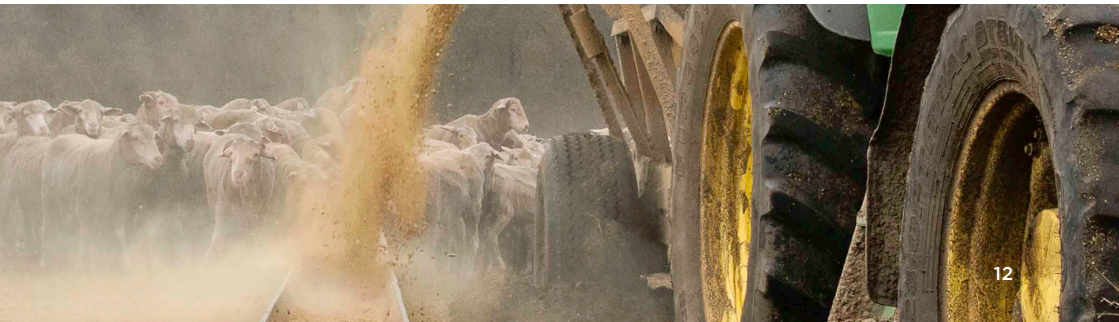
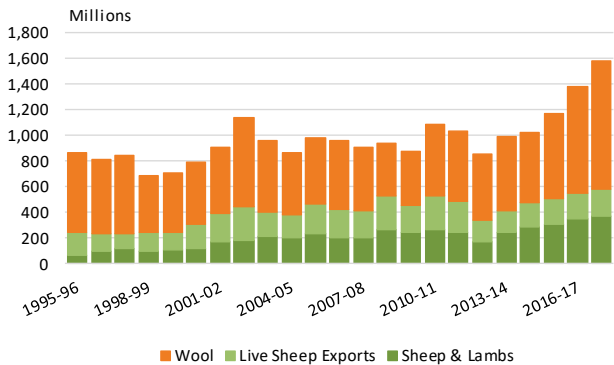
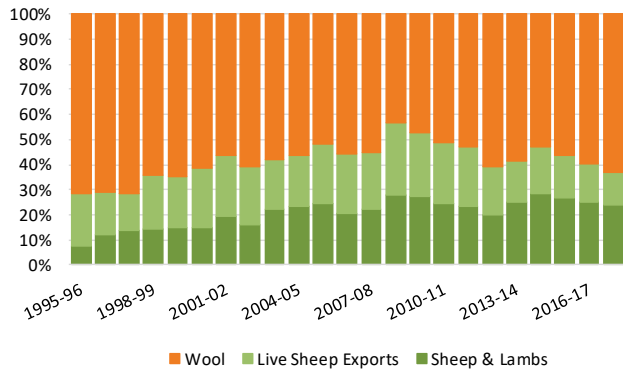




Figure 11. Western Australian enterprise proportion of gross value of production

Source: DPIRD WA, Mecardo



When sheep producers in WA were asked under what circumstance they would increase their sheepmeat enterprise and expand sheep/lamb turnoff, the most common response was that prices for sheep would need to increase, and that there needed to be greater consistency of price.⁹

Incremental expansion to the flock could be encouraged by such factors as more favourable seasons, enhanced ewe productivity measures, increased labour efficiencies, and improved water storage capacity. However, producers' ability to receive strong, reliable and consistent pricing throughout the season and between seasons are key components in encouraging them into or out of a particular enterprise mix.

As a commodity, wool is non-perishable, easily stored for an extended period and/or transported long distances. In this way, it is unlike freshly processed meat products or live sheep. Wool prices in WA are more in tune with the movement of wool prices in the eastern states, reflecting the same supply and demand influences that drive east coast wool markets. Therefore, wool producers in WA generally experience the consistency/reliability of price and similar price levels (relative to wool micron and other technical specifications) that are received by east coast wool producers.

In contrast, sheep and lamb pricing in WA is impacted by factors such as a smaller domestic consumer market, reduced competition among fewer processor participants and a heavy reliance on the live export sector.

On average, WA sheepmeat producers receive lower prices for their livestock than east coast producers and are susceptible to a higher degree of price volatility.

⁹ Ellis, D. and Alignment, G. (2015) Western Australia's Sheep Meat Supply Chain - Supplier profile and behavioural segmentation. Research report for Meat & Livestock Australia, North Sydney.

FARM RECEIPTS TO INTEREST IN WESTERN AUSTRALIA

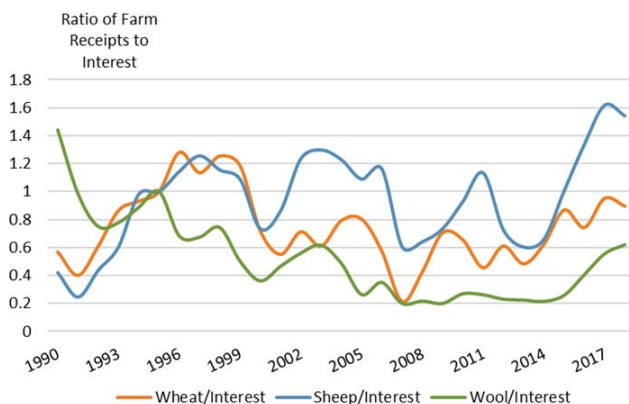
The ability for farmers to service debt is a factor that may influence enterprise decision making. To determine how different enterprise/commodity types in Western Australia (WA) have performed historically, the trend in farm receipts for wheat, sheepmeat and wool production have been compared to farm interest costs.¹⁰

Farm receipts indices for each enterprise were compared to the interest cost index, then converted to a ratio (Figure 12). A higher ratio indicates an enterprise/commodity that has an increased ability to service debt compared to those with lower ratios. The decline in wool enterprises in WA from 1990 to 2009 saw wool-related farm receipts as a ratio to farm interest costs decrease dramatically, from 1.4 to 0.2. Over the past decade, an increase in both wool prices and production in WA saw the ratio to interest recover to reach 0.6. This remains below levels experienced in the early 1990s.

Growth in sheepmeat production in WA during the 1990 to 2005 period saw sheepmeat-related farm receipts as a ratio to interest costs improve from 0.2 to 1.2. Favourable climatic factors during 2010-11 drove sheep prices to rally strongly, further benefiting the sheepmeat farm receipts to interest cost ratio. Over the past decade, tightening sheep industry supply and rising export market demand for sheepmeat has supported sheep market prices, increasing the sheepmeat related farm receipts to interest cost ratio to 1.6.

Figure 12. Farm receipts (price plus volume) to interest for Western Australia

Source: ABARES, Mecardo



¹⁰ ABARES AAGIS survey data used for key sheep and grain regions within Western Australia.



CONCLUSION

The driving forces influencing the decline in the sheep flock and the change in the flock's demographic have, in themselves, changed over time. The unique characteristics of the sheep industry in Western Australia (WA) have also meant that at times, sheep producers in WA are exposed to different macro and micro-economic barriers, production and market factors to producers in the east.

The return to favourable seasonal conditions and projected strong demand from the sheepmeat export market are fundamentals currently in place to incentivise flock rebuilding and increasing sheep production. However, enterprise decision making in WA will be influenced by additional factors.

Analysis in this study suggests that in WA there is the risk of a continued move away from wool/sheepmeat production towards cropping, which could lead to less diversity of the income stream of farm enterprises in WA and increased volatility of farm receipts.

The following factors will have a key role in determining future growth or decline in WA sheepmeat and wool sectors:

- Price consistency/reliability and pricing levels compared to the east coast.
- Supply chains and access to services such as shearing teams and transport operators.

The attraction of other more financially rewarding farming enterprises and disruption to live export market access have undoubtedly influenced some enterprise decisions in WA in recent times.

While the recent instability of the live sheep export industry appears to have added to the stress experienced by sheepmeat and wool sectors in WA, the industry appears to be moving to a more stable footing. This began with the introduction of new regulatory measures¹¹, which provide all supply chain participants with greater assurance on trade access and allows them to make more confident business decisions.

Security in financial returns and access to reliable supply chains and services will ultimately influence farm-level enterprise decision making.

¹¹ The Department of Agriculture, Water and the Environment (DAWE) have introduced new regulation that Australian live sheep exports to, or through, the Middle East are prohibited from leaving any port in Australia from June 1 to September 14. Source: www.agriculture.gov.au/export/controlled-goods/live-animals/livestock/information-exporters-industry/sheep-to-middle-east

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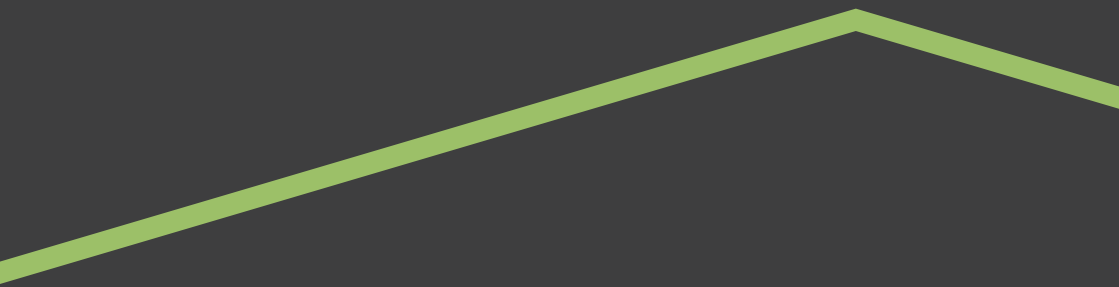
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June 2023

Report to LiveCorp and Meat & Livestock Australia

Performance and value of the live sheep export trade

Final report



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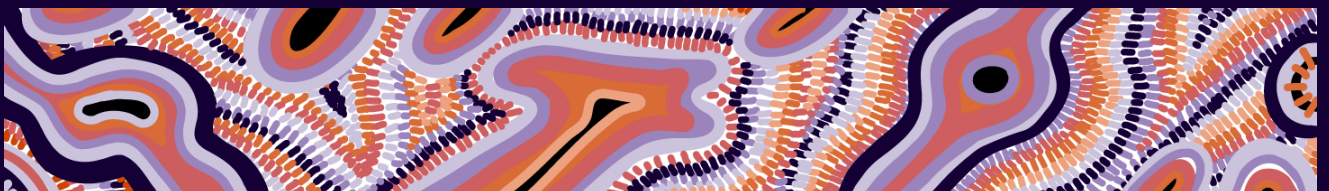
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Goomup, by Jarni McGuire

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Executive summary

Background

Live sheep exports have been an important option for sheep producers over many years. Over time there has been a decline in live sheep exports nationally and now 99% of live sheep exports are from the Western Australian production system.

Since 2017 several factors have been identified which may have contributed to the decline in live sheep exports. These include but are not limited to:

- good seasonal conditions across Australia, meaning:
 - the production of higher quality sheep which are more likely to be slaughtered domestically for sheepmeat
 - also influenced by changes in domestic sheep prices leading to an increase in transfer of sheep to Eastern states ¹
 - the potential shift away from sheep production to cropping, further influenced by relatively high grain prices
- some sheep producers may have chosen to transition their businesses away from live sheep exports (because of the good seasonal conditions but also anecdotally due to changing government and consumer sentiment) ²
- changes in regulation focused on improvements in animal welfare specifically:
 - ceasing shipments to the Middle East during the northern hemisphere summer
- relatively high price of Australian live sheep exports relative to competitor product (e.g., live sheep from Romania)
- impacts associated with the COVID-19 pandemic. ³

In March 2023, the Australian Government announced both its commitment to phasing out the live export of sheep by sea and the appointment of an independent panel to examine this issue. The panel is expected to report to the Minister for Agriculture, Fisheries and Forestry on 30 September 2023.⁴

¹ Refer: <https://episode3.net/livestock/the-sun-also-rises-in-the-east/>

² From consultation with industry stakeholders.

³ From consultation with industry stakeholders.

⁴ Refer: <https://www.agriculture.gov.au/biosecurity-trade/export/controlled-goods/live-animals/livestock/live-sheep-exports-phase-out>

Objectives

This study aims to better understand how the live sheep export industry contributes to and demonstrates economic benefits nationally and in Western Australia. The objectives of this project were achieved.

There are three main outputs of this project:

1. The value and importance of the sheep industry supply chain to the:
 - a) Australian economy
 - b) Western Australian economy
2. A point in time estimate of the impact of a cessation of the live sheep export industry's activities.
3. An assessment of Australia's key live sheep export markets, a sub-set of five countries (Israel, Jordan, Kuwait, Oman, and the United Arab Emirates (UAE)) in the Middle East and North Africa (MENA) region.

Methodology

This project uses a range of different methodologies to achieve its objectives, including:

- Input-Output analysis
- Real options analysis
- A desktop review and qualitative analysis of key international markets.

Results/key findings

Over the last five years, the average annual value of the live sheep export trade was \$143 million.

Economic contribution

National economic contribution

The live sheep export industry (live sheep and the associated wool clip) has, using an average of the last five financial years (2017-18 to 2021-22):

- Directly contributed \$52 million of value-added and directly employed 88 FTEs post farm-gate annually.
 - This accounts for 1.4% of the national sheep industry value-added.
- A total (indirect plus direct) contribution upper bound of \$86 million value-added and employed 240 FTEs annually.

Western Australia's economic contribution

The live sheep export industry (live sheep and the associated wool clip) has, using an average of the last five financial years (2017-18 to 2021-22):

- Directly contributed \$45 million of value-added and directly employed 52 FTEs post farm-gate annually.
 - This accounts for 6.1% of the total sheep industry value-added in Western Australia.
- A total (indirect plus direct) contribution upper bound of \$71 million value-added and employed 179 FTEs annually.

Real options analysis

- Using a point in time model, results show that if the live sheep export trade ceased there is an estimated 19.19% reduction in the per head value of a male sheep in Western Australia, or in dollar terms a decline of \$21.84 per male sheep (based on current prices) with a price response.
- It is important to note that the model used for this project is a point-in-time model and does not incorporate dynamic elements. As such, it does not account for seasonal climate variations or market conditions that may fluctuate over time.

Markets and trade

- Australia has a significant and sustained presence in both the live sheep market and the sheepmeat market in the Middle East.
- In recent years, five countries (Israel, Jordan, Kuwait, Oman, and the UAE) have imported more than 80% of Australian live sheep exports.
- Based on available data (which is limited), it is concluded that these countries will raise their live product imports from other nations rather than substantially increase their imports of Australian boxed or chilled sheepmeat if Australia ceased its live sheep export trade.

Future research and recommendations

This project was constrained by the limited availability of public information, particularly quantitative data from the specific countries of focused. Therefore, future research endeavours should prioritise the quantification of the potential impact if Australia were to cease its live sheep export trade in the Middle East. Additionally, expanding the analysis to encompass all importers of Australian live sheep would provide a more comprehensive understanding of the trade dynamics.

Potential areas of focus for future research could include:

- Quantifying the trade implications of discontinuing live sheep exports from Australia.
- Conducting a thorough trade analysis encompassing all countries that import live sheep from Australia.
- Updating the assumptions of the real options model to incorporate market dynamics and climate-related factors such as drought conditions.
- Collecting primary data to better inform the real options model.

By addressing these research gaps, future studies can contribute to a more comprehensive and nuanced understanding of the implications, challenges, and opportunities associated with potential changes in Australia's live sheep export trade in the Middle East and beyond.

Introduction

1

1.1 Background

Over recent years, the number of sheep being exported live from Australia has been declining. Live sheep exports fell from 1.18 million head in 2018 to just over 500,000 in 2022 (an annual average decrease of 31%). Changes in animal welfare standards and other factors may have contributed to significant changes in the export of live sheep out of Australia.

Regulatory changes have led to the cessation of shipments to the Middle East during the northern hemisphere summer, the introduction of Independent Observers, increased space on ships for sheep, heat management plans, increased ventilation requirements, and automatic environmental sensors on ships.

Animal welfare has been an area of continual improvement through regulatory change, industry initiatives, and research. As a result, the average annual mortality rate of sheep shipments has decreased from 0.71% between 2013 and 2017 to 0.24% between 2019 and 2021. This represents a reduction of approximately 67% between the two periods.

These improvements were highlighted by the Al Kuwait voyage, which departed Western Australia in May 2020 after receiving an exemption to sail during the northern summer prohibition after a delay due to COVID-19. The ship had 33,341 sheep on board and delivered the lowest mortality rate ever recorded at that time, at any time of year (0.08%).

The Australian Government has announced its commitment to phasing out the live export of sheep by sea and announced an independent panel has been appointed and is expected to report to the Minister for Agriculture, Fisheries and Forestry on 30 September 2023.⁵

Other changes since 2017 which may have contributed to the decline in live sheep exports include but are not limited to:

- good seasonal conditions across Australia, meaning:
 - the production of higher quality sheep which are more likely to be slaughtered domestically for sheepmeat
 - also influenced by changes in domestic sheep prices leading to an increase in transfer of sheep to eastern states⁶
 - the potential shift away from sheep production to cropping, further influenced by relatively high grain prices

⁵ Refer: <https://www.agriculture.gov.au/biosecurity-trade/export/controlled-goods/live-animals/livestock/live-sheep-exports-phase-out>

⁶ Refer: <https://episode3.net/livestock/the-sun-also-rises-in-the-east/>

- some sheep producers may have chosen to transition their businesses away from live sheep exports (as a result of the good seasonal conditions but also anecdotally due to changing government and consumer sentiment)⁷
- relatively high price of Australian live sheep exports relative to competitor products (e.g., live sheep from Romania)
- impacts associated with the COVID-19 pandemic.⁸

1.2 Objective

This study aims to assess and demonstrate the economic contribution made by the live sheep export industry nationally and in Western Australia (where the majority of sheep destined for live export are produced), and its benefit to sheep producers.

There are three main outputs of this project:

1. The value and importance of the sheep industry supply chain to the:
 - a) Australian economy
 - b) Western Australian economy
2. A point in time estimate of the impact of a cessation of the live sheep export industry's activities.
3. An assessment of Australia's key live sheep export markets, a sub-set of five countries (Israel, Jordan, Kuwait, Oman, and the UAE) in the Middle East and North Africa (MENA) region.

Socio-economic profiles of each of these countries can be found in Appendix A.

The objectives have been achieved; however, the availability of public data limits the assessment of the markets and trade components of the project.

1.3 Methodology

This project uses a range of different methodologies to achieve its objectives. Each technique is summarised below, and further detail is available where relevant in the appendices. The Input-Output analysis and real options analysis was successful in achieving its outcome.

The desktop review and qualitative analysis was successful. However, it is limited in the availability of official public data, reports, and information.

1.3.1 Input-output analysis

Input-Output (I-O) analysis is used to estimate the economic contribution of an industry using key measures:

- Value-added — this measures the industry's contribution to the economy (i.e., its contribution to Gross State Product or Gross Domestic Product) by measuring the industry's impact on wages, salaries, profits, and indirect taxes. Value added is the preferred measure of economic contribution.
- Employment — this measures the industry's contribution in terms of the number of direct and indirect jobs (as full-time equivalent (FTE)) supported.

Further details on the analytical technique are provided in Appendix B.

⁷ From consultation with industry stakeholders.

⁸ From consultation with industry stakeholders.

The estimated value added and employment contributions from the industry to the national and Western Australian economies are outlined in the sections below and are presented as direct impacts and broader economic impacts (indirect impacts) for an upper and lower bound.

- Upper bound is the impact including the direct effects plus flow on effects from inter-industry purchases plus the flow on effects from employees' spending.
- Lower bound is the impact including the direct effects plus flow on effects from inter-industry purchases.

The analysis was conducted using an average of the last five financial years (2017-18 to 2021-22). Data was sourced from Australian Bureau of Statistics (ABS) including the National Accounts Input-Output data and additional industry level data from ABS, WA Department of Primary Industries and Regional Development (DPIRD) and Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES).

1.3.2 Real options analysis

A real options analysis is used to estimate the difference in the value of all male sheep in Western Australia on a per head basis with and without access to the live sheep export markets.⁹

For this project, ACIL Allen's sheep model, which utilises real options analysis¹⁰, was employed and tailored to the specific requirements. The model was updated with the latest available data from 2021-22. It is important to note that the model used for this project is a point-in-time model and does not incorporate dynamic elements. As such, it does not account for seasonal climate variations or market conditions that may fluctuate over time.

Real options valuation methods estimate the value of the opportunity (here the option to live export sheep), but not the obligation to take that option. Typically, real option values rise as uncertainty rises.

Access to the live sheep export market influences whole of enterprise decision making. It may influence the way in which producers manage the use of the resources on the farm where sheep are, or could be, part of the farming system. Having access to this market influences the breeding, culling, pasture management and genetics decisions of the producer for the whole enterprise.

The model is based on the turn-off (slaughter or live export) of Merino¹⁰ male sheep (wether sheep and wether lamb)¹¹ in the Western Australian system.

Turn-off is how sheep are disposed of at the end of their productive lives. Total turn-off in 2021-22 was approximately one third of the Western Australian flock. Male sheep are examined because the live sheep export industry is dominated by male sheep (approximately 95% of sheep exported live in 2020 were wethers).¹²

Interstate transfer is not considered in the model as when the model was developed it was a very small proportion of turn-off (Refer Table 2.2). Although interstate transfer has increased in recent years it is still largely circumstantial and dominated by breeder sheep (ewes and rams) (Refer Box 2.2).

⁹ The majority of sheep that are live exported are wethers. It should be noted that around 5% of the trade in 2020 were rams and ewes, not wethers.

¹⁰ Merinos make up approximately 85% of the Western Australian flock.

¹¹ A wether is usually considered a castrated/neutered adult male sheep. However, the term wether lamb is also used, this would refer to castrated lambs under 12 months of age or without any permanent incisor teeth in wear. Refer Box 2.1 and https://www.learnaboutwool.com/globalassets/law/resources/factsheets/secondary/qd3270-secondary-fact-sheet-2019_c.pdf

¹² Refer: <https://livecorp.com.au/report/24Y2N6MZflAdwHlqCNznkZ>

The value of access to markets is presented on a per head basis as a net present value (NPV). NPV calculations estimate the present value of a series of cash flows, to allow comparisons in the value of sheep, with and without access to the live sheep export trade.

An immediate (within 12 months) cessation scenario was modelled. Options included with and without price responses, meaning that one option assumed that prices would not change if live sheep exports ceased and the other assumed that price would change.

The base case scenario includes all the direct inputs, such as drench, vaccination, shearing and crutching, and an allocation of pasture maintenance costs and direct enterprise labour. It does not include allocations for overheads such as general labour, administration costs, interest, or tax. These calculations have used a 7.5 per cent weighted average cost of capital (WACC) to calculate the present value.

The Western Australian sheep industry

2

This study aims to understand how the live sheep export industry contributes to the national economy. However, as the majority (between 80% and 99% over the last five years) of sheep for live export are produced in Western Australia it is important to discuss the Western Australian sheep industry as this is where most of the economic contribution is attributed.

The sheep industry in Western Australia is characterised by a predominately Merino (wool) breed of sheep, with a small number of British bred Merino crossbreds, dual purpose, and specialist sheepmeat breeds. This allows the industry to produce both high-quality wool from adult animals and sheepmeat from lambs. Over time there has been an increasing focus on sheepmeat production in Western Australia and reduced reliance on wool production. As such the Western Australian flock has restructured to a higher proportion of ewe breeding animals versus wethers (refer Box 2.1).

The live export market is a good fit for wether sheep for numerous reasons:

- it's a flexible market that can take animals from lambs through to adults
- those animals that don't meet the weight or other specifications required for the prime lamb market can find a viable market in live exports
- there is no need for pregnancy testing (an added cost that must be done within 30 days of export).

2.1 The value of sheep to the WA economy

The Western Australian agri-food and fibre production sector was worth \$14 billion in 2021-22. Sheep (live export and slaughter) accounted for \$692 million (5%), and wool accounted for \$655 million (4.7%). This combined is \$1,347.1 million (9.7 per cent) in total.¹³ Refer Table 2.1.

In 2021-22, live sheep exports represented 11% by volume and 7% by value of the Western Australian sheep industry accounting for \$99 million in total export value (live sheep and the associated wool clip).

This is a significant decline over time. In 2010-11 live sheep exports represented 33% by volume and 25% of value to the sheep industry. Most of the decline can be seen since 2018-19 in terms of volume following on from a decline in value from 2017-18. Refer Table 2.1.

¹³ ABS (2023), Agricultural Commodities.

Table 2.1 Western Australia sheep statistics, 2010-11 to 2021-22

Units		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Head	million												
Sheep slaughtered	000	1,282	743	1,431	1,562	1,327	1,358	941	1,368	1,396	1,771	1,381	1,156
Lambs slaughtered	000	2,057	1,733	1,908	2,386	2,353	2,753	2,876	2,630	2,691	2,457	2,296	2,508
Live sheep exported	000	2,288	1,813	1,717	1,783	1,788	1,669	1,682	1,603	895	1,065	585	487
Total turn-off	000	6,913	4,351	5,194	5,888	5,512	5,859	5,813	5,857	5,128	6,655	5,624	4,419
Live sheep export % of turn-off	%	33%	42%	33%	30%	32%	28%	29%	27%	17%	16%	10%	11%
Mutton produced	000	27.8	16.8	31.5	35.9	30.3	33.4	23.9	32.8	35.1	43.0	34.8	31.8
Lamb produced	tonnes(cw)	43.4	36.9	39.6	50.1	49.4	57.9	62.7	53.5	56.2	52.9	52.0	58.4
Value lamb and mutton	\$m	531	485	337	410	479	513	551	584	547	690	608	692
Wool produced	000 tonnes	65.1	71.0	71.8	67.2	65.2	71.1	65.1	62.1	59.6	56.2	59.7	58.5
Value of wool produced	\$m	557	549	521	582	540	661	826	995	976	637	570	655
Total sheep industry value	\$m	1,088	1,034	858	992	1,019	1,174	1,377	1,579	1,523	1,327	1,178	1,347
Value of live sheep exports	\$m	220	215	145	194	204	196	210	126	136	126	92	82
Value of wool live sheep exports ^a	\$m	57	54	46	48	50	60	59	68	43	39	18	17
Total value of live sheep exports	\$m	277	269	191	242	254	256	269	194	179	165	110	99
Live sheep exports as a % of value	%	25%	26%	22%	24%	25%	22%	20%	12%	12%	12%	9%	7%

Note: ^a ACIL Allen estimate based on the sheep categories exported, wool yield per animal and wool price. cw= carcass weight.

Source: ACIL Allen analysis based on ABS and WA Department of Primary Industries and Regional Development

2.2 The Western Australian sheep flock

In 2021-22, Australia's sheep flock comprised 70.24 million head,¹⁴ reflecting a growth of 3.2% compared to the previous financial year. Projections indicate that the national sheep flock will continue to expand, reaching an estimated 78.85 million head by 2023, which would be the highest level recorded since 2007.¹⁵ However, in Western Australia, the sheep flock experienced a decline of 2% to reach 12.4 million head in 2021-22.¹⁶ The Western Australian sheep flock represents approximately 18% of the national flock. Refer Figure 2.1.

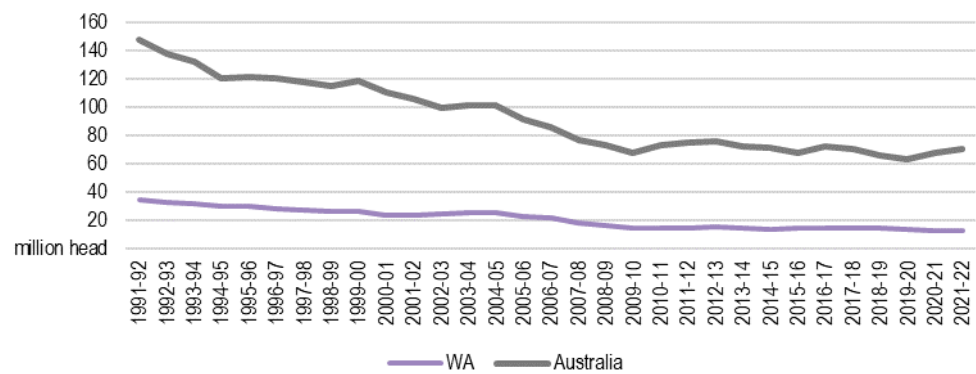
¹⁴ Australian Bureau of Statistics 2022. *Agriculture Commodities*.

<https://www.abs.gov.au/statistics/industry/agriculture/agricultural-commodities-australia/latest-release#:~:text=Australia's%20sheep%20flock%20increased%203,lambs%20at%2030%20June%202022>

¹⁵ Refer: <https://www.mla.com.au/news-and-events/industry-news/australias-sheep-flock-to-reach-largest-size-in-over-15-years/>

¹⁶ The decline in flock in Western Australia has been a long-term issue.

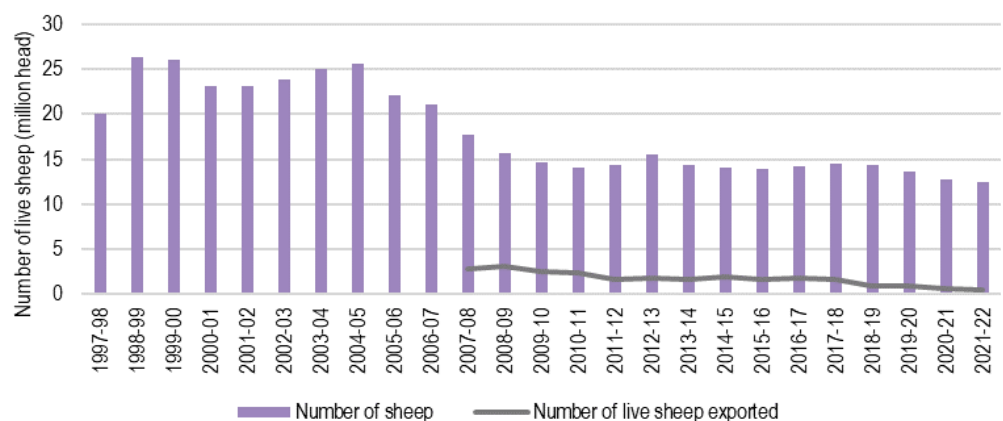
Figure 2.1 National and Western Australia flock size over time



Source: ACIL Allen based on Australian Bureau of Statistics and Department of Agriculture, Fisheries and Forestry, 2023

Western Australia's sheep flock has been decreasing since 2004-05, although the rate of decrease has slowed since the early 2010s when the wool price stabilised. Live sheep exports from Western Australia comprised around 3.8% of the total number of sheep in the state in the 2021-22 financial year, down from 6.9% from the 2018-19 financial year. Figure 2.2 shows the sheep flock in Western Australia over time and the comparative number of sheep exported overseas from the state.

Figure 2.2 Number of sheep in and live sheep exported from Western Australia, 1997-98 to 2021-22



Note: Includes sheep and lamb.

Number of live sheep exported from 2007-08 to 2016-17 were based on calendar year instead of financial year due to data limitations.

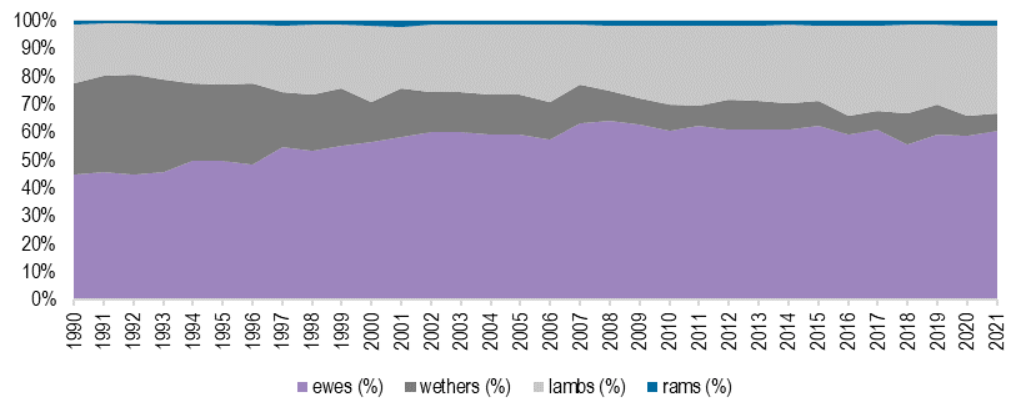
Source: ACIL Allen based on Australian Bureau of Statistics and Department of Agriculture, Fisheries and Forestry, 2023

In Western Australia, the proportion of ewes in the flock has been increasing since 1990. Ewes now comprise the largest proportion of the flock, accounting for 60% in 2021, compared to 45% in 1990.

This shift indicates a restructuring of the industry toward sheepmeat production. This implies a greater demand for breeding animals in the system, resulting in a surplus of wethers, particularly during periods of unfavourable seasonal conditions when feed is scarce or supplementary feed is expensive. When ewes reach the end of their productive lives, they are typically sold into the domestic slaughter market.

The proportion of wethers has decreased significantly, to over 6% (2021) from 32% (1990), whilst lamb numbers have increased 10% in the last 20 years. There has been little change to the ram numbers over time.¹⁷ Refer Figure 2.3.

Figure 2.3 Sheep flock composition in Western Australia, 1990-2021



Source: ACIL Allen based on Department of Primary Industries and Regional Development, 2023 from ABARES/MLA data, DPIRD analysis

Box 2.1 Sheep types and age

In the AUS-MEAT Language, dentition is used as a measure of approximate age in order to determine both basic and alternative categories for sheepmeat:

- a lamb has milk teeth only
- 12-18 months = two-tooth (a typical live sheep export lamb is a two-tooth sheep)
- 18 months to 2 years = four-tooth
- 2-3 years = six-tooth
- Sheep are no longer considered lambs once the first adult teeth are cut (have come through), at roughly 14 months of age
- An adult sheep has 8 incisor teeth.

In terms of sheepmeat – the three basic categories are lamb, mutton, and ram. Lamb and ram are defined below. Mutton is meat derived from either wethers (with no evidence of secondary sexual characteristics) or ewes and are typically over 10 months of age.

Lambs: An ovine animal that is (a) under 12 months of age; or (b) does not have any permanent incisor teeth in wear. A wether lamb is a castrated lamb over 12 weeks and under 12 months of age.

Hoggets: are an immature male and female sheep older than weaners but not yet adults. Although often kept through to adults, hoggets do not produce as much wool as adult sheep.

Wethers: are male sheep that have been castrated so they cannot breed. Wethers are primarily used for wool production. Wethers are the most common sheep type that are live exported.

Ewes: are adult female sheep. Ewes are used for breeding and for wool production.

Rams: Typically, entire male ovine animals that are over at least 10 months of age (with at least 1 permanent incisor tooth in wear). Rams can be castrated or not, but to be classified as a ram the animal needs to show secondary sexual characteristics.

Source: https://www.ausmeat.com.au/WebDocuments/Producer_HAP_Sheepmeat_Small.pdf and https://www.learnaboutwool.com/globalassets/law/resources/factsheets/secondary/gd3270-secondary-fact-sheet_2019_c.pdf

¹⁷ The definition of a lamb changed in 2019. Refer Box 2.1 for information on sheep types. This means that a lamb is now able to cut one or both of its permanent central incisor teeth as long as they are not in wear.¹⁷ This may contribute to the reduction of wethers and the increase in lambs since 2019.

2.3 Turn-off in Western Australia

Lamb and sheep slaughter has remained steady in Western Australia with approximately 2.5 million lambs and 1.3 million sheep slaughtered each year. Refer Figure 2.4.

Data from 2021 suggests sheep disposals are primarily attributed to slaughter (75%), with live sheep exports accounting for 11%, while interstate transfers represent 14%. Refer Figure 2.5.

These figures indicate that the majority of sheep in Western Australia are processed for meat production within the state, with a smaller portion exported live or transferred to other states.

The five-year averages for each of the four categories is presented in Table 2.2.

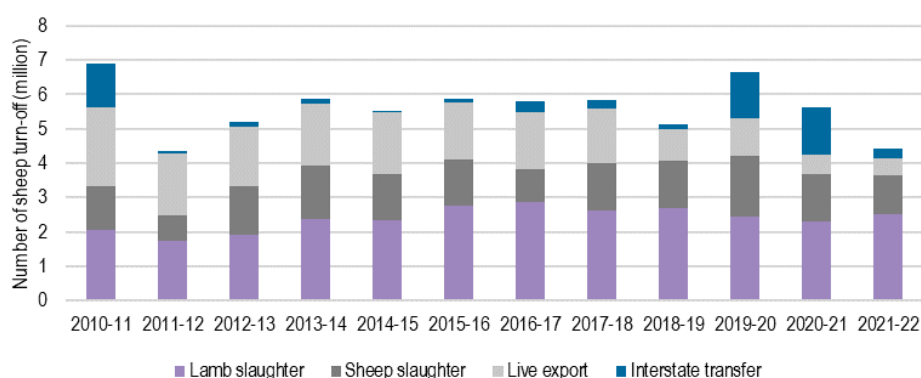
Table 2.2 Proportion of Western Australia sheep by turn-off category (five-year average)

Five-year period	Lamb slaughter	Sheep slaughter	Live sheep export	Interstate transfer
2017-18 to 2021-22	45%	26%	17%	12%
2012-13 to 2016-17	43%	23%	31%	3%

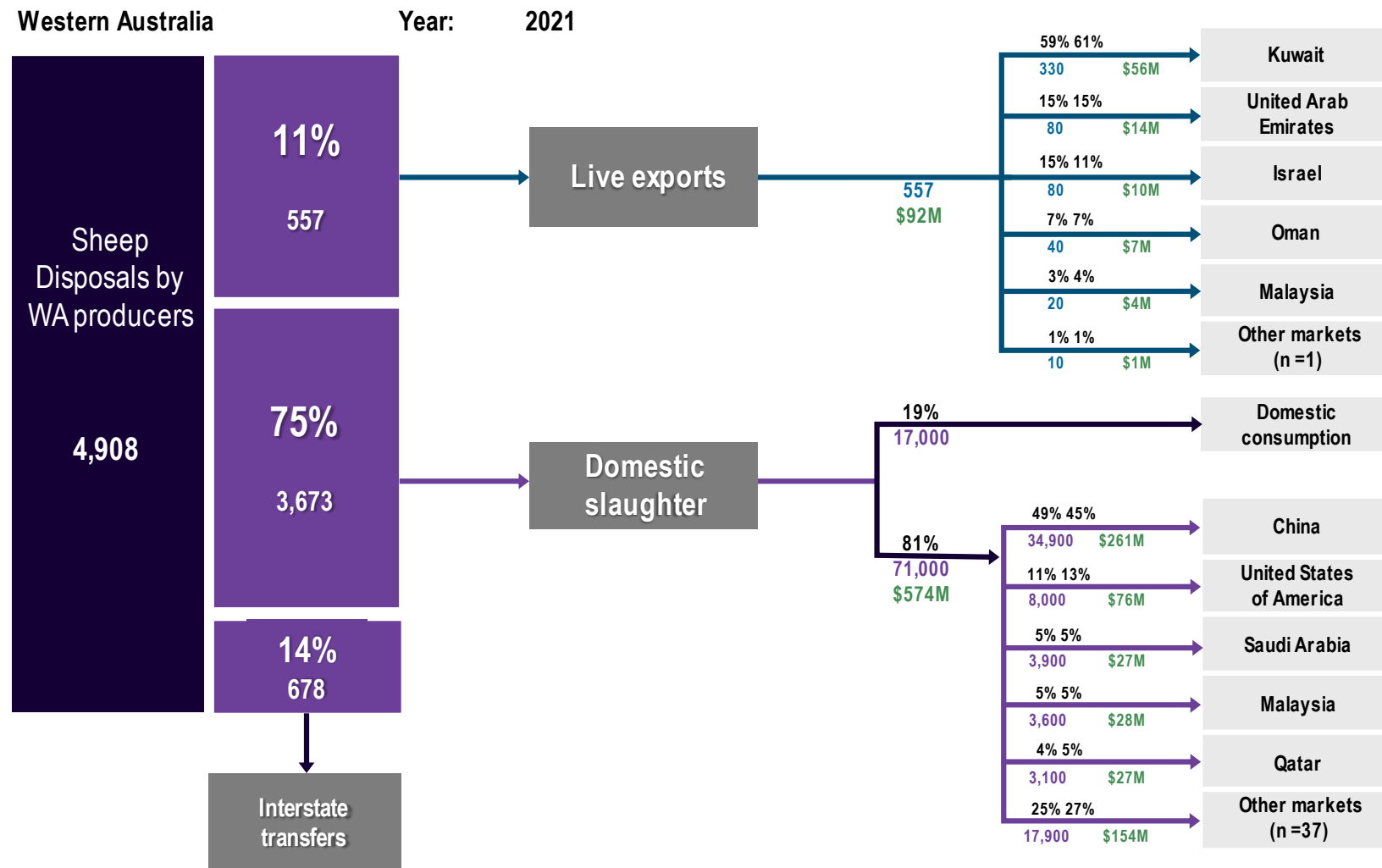
Source: ACIL Allen based on Department of Primary Industries and Regional Development, 2023

As shown in Figure 2.4, interstate transfer was small in volume between 2011-12 and 2018-19 but was significantly higher in 2019-20 and 2020-21. This broadly aligns with the drought breaking in the eastern states. It is important to note that while droughts are often associated with interstate transfers, they are not the sole reason they occur. Refer Box 2.2.

Figure 2.4 Sheep turn-off in Western Australia, 2010-11 to 2021-22



Source: ACIL Allen based on Department of Primary Industries and Regional Development, 2023

Figure 2.5 Sheep disposals Western Australia (2021)

Source: ABS data, DPIRD analysis. Available at: <https://www.agric.wa.gov.au/sheep/western-australian-sheep-and-wool-industries>

Box 2.2 Interstate transfers, droughts, prices, and the role of live export

Western Australian sheep producers (as seen in Figures 2.3 and 2.4) have several turn off (or disposal) options – slaughter within Western Australia, interstate transfer and live export.

Interstate transfers of sheep from the west to the east coast is variable (up to 70% annual variability) and is often driven by a combination of adversity (typically drought) and prices.

The end of a drought in the east (as eastern states look to rebuild their flocks) or the start of one in the west (as producers de-stock) are key drivers for interstate sheep (breeder) transfers from Western Australia to the east coast. Lambs are also transferred for restocking purposes, but when trade prices are higher in the east, they are shipped for slaughter. For lamb, if the price discount of western sheep to their eastern counterparts widens, it makes the transport worthwhile for the eastern buyer.

In 2019-20, the interstate transfers were due to restocking and were trade price influenced. The Western Australian Trade Lamb indicator was at a 22% discount in October 2020.

Episode 3 reports that drought on its own is not enough to encourage interstate transfer, pointing out that the 2014 and 2015 seasons were both dry on the east coast and very few sheep were transferred from the west. Further, they note that WA price spreads relative to the east coast prices (restocking and trade prices) decline during June to September – the period when sheep cannot be exported to the Middle East due to the Northern hemisphere summer. This is coupled with the fact that over the last two decades, the Western Australian sheep prices have, on average, been discounted relative to east coast prices.

There are potential negative impacts for Western Australian sheep producers with the removal of live exports as a disposal option if domestic price trends continue and Western Australian slaughter capacity can't absorb the additional sheep numbers.

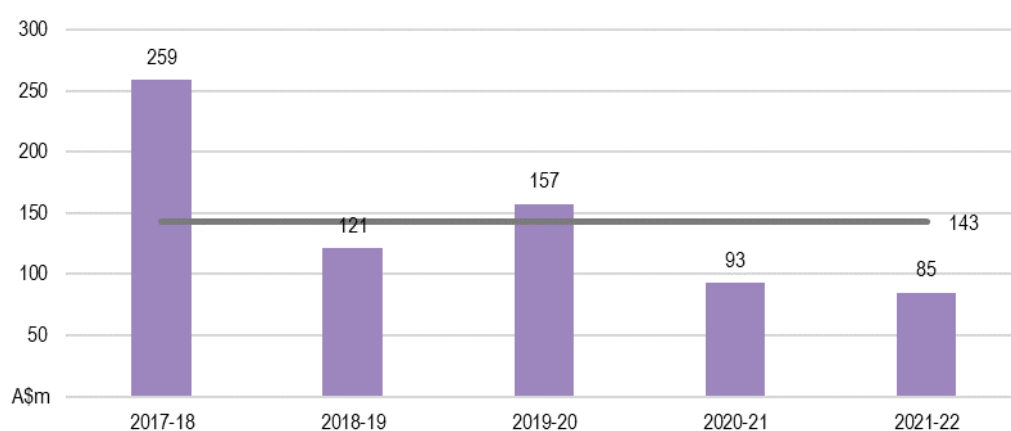
Note: Episode 3 (EP3) is an independent, data-driven market analysis service that provides premium insights and reports to the agriculture industry, food manufacturing sector and their associated markets.

Source: <https://episode3.net/livestock/the-sun-also-rises-in-the-east/> and <https://episode3.net/livestock/wa-crunched/> and <https://episode3.net/livestock/the-cheap-sheeps/> and <https://mecardo.com.au/sheep-shopping-from-west-to-east-eases/>

2.4 Live sheep exports

On a national basis the value of live sheep exports on average has been \$143 million over the last five years (2017-18 to 2021-22). Refer Figure 2.6.

Figure 2.6 Value of live sheep exports (national)

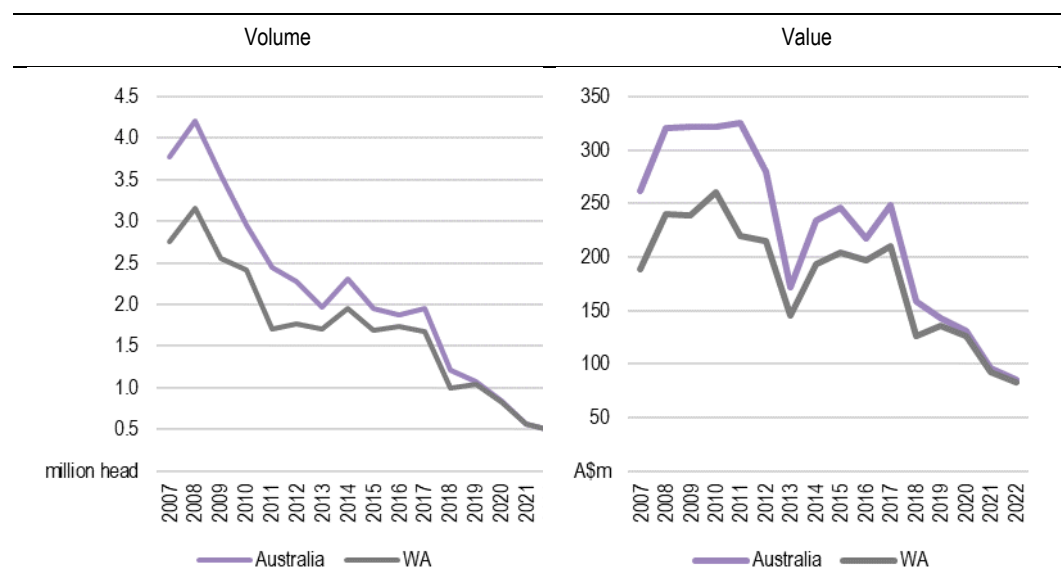


Source: ABARES, Australian Commodity Statistics, 2022.

The volume and value of live sheep exported from Western Australia relative to all Australian live sheep exports are summarised in Figure 2.7. In 2021-22, approximately half a million sheep were

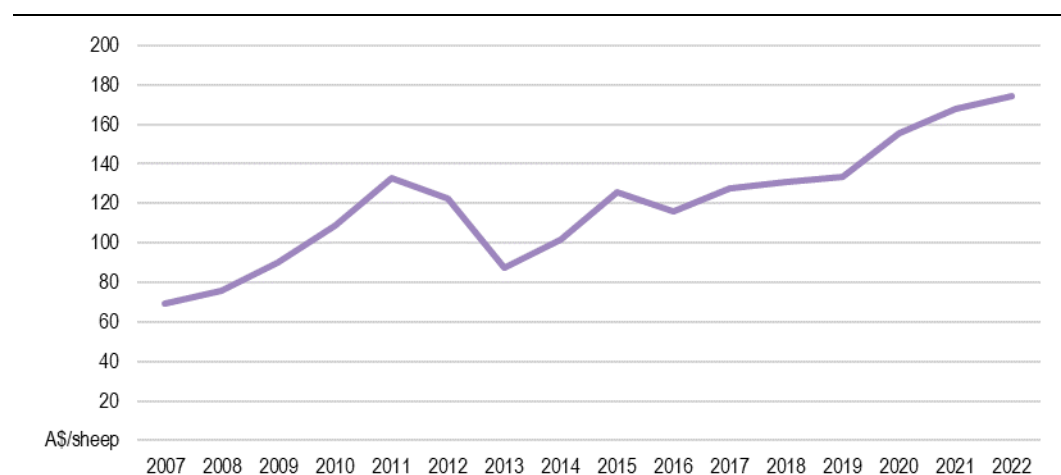
exported from Australia, with 99% of them originating in Western Australia and a total national value of \$85 million.

Figure 2.7 Live sheep exports from Western Australia and Australia, 2007-2022



Source: WA Department of Primary Industries and Regional Development, 2023

Figure 2.8 Average live sheep export price, 2007-2022



Source: WA Department of Primary Industries and Regional Development, 2023

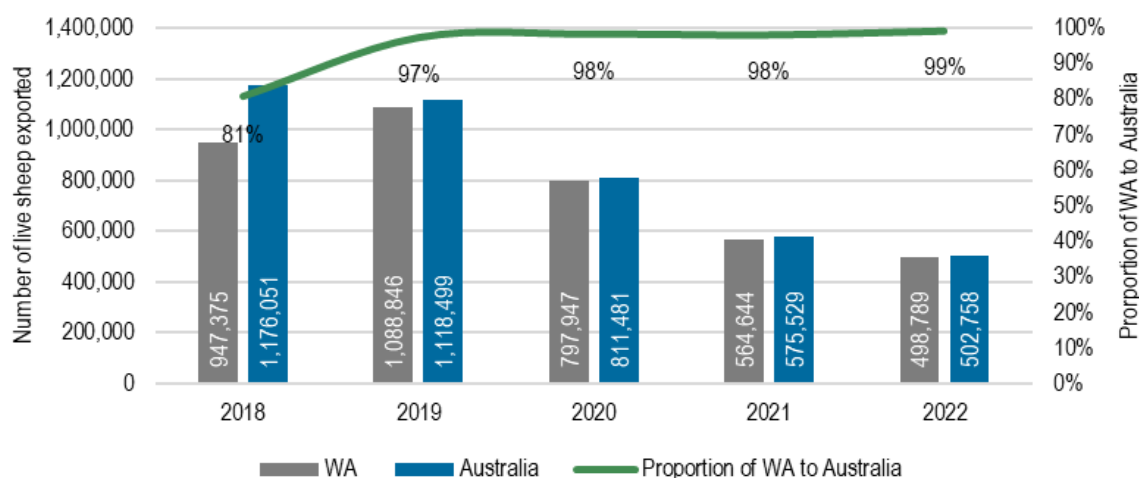
As noted above the majority (99% in 2022) of Australia's live sheep exports are from Western Australia; all shipped through the Port of Fremantle.¹⁸ In 2018, just over 200,000 slaughter sheep were also exported from the Port of Adelaide.¹⁹ Over the last five years, the number of live sheep

¹⁸ A small number of live sheep are exported by air – these are typically breeder sheep and since 2018 have flown out of Adelaide, Melbourne, and Avalon (VIC). Between 2018 and 2022 this was a total of 12,792 head of breeder sheep. Some breeder sheep also travel by sea (ex Portland (VIC)) comprising a total of 6,371 head in 2018 and 2019. Department of Agriculture, Fisheries and Forestry.

¹⁹ There were 10 shipments from the Port of Adelaide in 2018, to the Middle East and Turkey. Department of Agriculture, Fisheries and Forestry.

exported from Western Australia has fallen from just over 947,000 head in 2018 to under 490,000 head in 2022 (a 48% decrease). Refer Figure 2.9.

Figure 2.9 Live sheep exports (sea and air) by calendar year, 2018-2022



Source: ACIL Allen based on Department of Agriculture, Fisheries and Forestry, February 2023

Live sheep exports are an important part of Western Australian sheep producers' strategies to manage the risks associated with a short growing season in spring. A short growing season means lambs may not reach the weight or quality standards of the prime lamb market before the hot summer conditions restrict pasture growth, necessitating supplementary feeding. This is particularly relevant in times of drought, refer Box 2.2.

Live sheep exports provide WA sheep farms with an alternative, more flexible market than prime lambs in terms of age, quality, and timing of delivery. This flexibility allows producers to adapt their marketing strategies to the prevailing seasonal conditions. For instance, if conditions prove unfavourable for producing prime lambs, producers can still sell the sheep for live export at reasonable prices.²⁰

In Western Australia, sheep are well suited to mixed-farming enterprises, and live export is one of the key outlets for sheep producers when turning off stock. It provides them with an alternative market option that enables them to optimise their production and adapt to changing circumstances.

A breakdown of sheep by class using the latest available data is provided in Table 2.3.

²⁰ ABARES (2021), The economic impact of regulating live sheep exports, Research report 21.01. February 2021.

Table 2.3 Proportion of sheep by class²¹

		2018*	2019	2020
Wethers	adults	40%	39%	31%
	hoggets	18%	16%	23%
	lambs	34%	40%	41%
Rams	adults	3%	2%	2%
	hoggets	0%	0%	0%
	lambs	2%	1%	2%
Ewes	adults	3%	1%	0%
	hoggets	0%	0%	0%
	lambs	1%	0%	1%

Note: * 2018 data includes 200,000 head of sheep shipped from the Port of Adelaide.

Source: ACIL Allen with data available from <https://livecorp.com.au/report/24Y2N6MZfiAdwHlqCNznkZ> accessed 22 May 2023

Western Australia has developed a successful live sheep export trade due to:

- comparatively lower cost of production stock
- high quality and consistency of meat
- capacity to supply large volumes of animals
- ability to provide animals with low disease incidence
- the suitability of breeds.

The Western Australian Department of Primary Industries and Regional Development note:

In 2017, prior to the new restrictions imposed on the industry, 2.0 million sheep were exported live from Australia. The value of live sheep exports was A\$249 million in 2017. Western Australia contributed 86% of live sheep exported from Australia.

In 2019, 1.1 million sheep were exported from Australia. The value of these exports was A\$143 million, a reduction of 43% when compared to 2017 due to the restrictions imposed from mid-2018. Western Australia contributed 97% of the live sheep exported from Australia in 2019.

*Western Australian DPIRD, 2020*²²

Regulatory requirements predominantly include the Australian Standards for the Export of Livestock (refer Box 2.3) and Exporter Supply Chain Assurance System (refer Box 2.4) introduced by the Australian Government.

²¹ There is no breakdown of how these classes are derived.

²² Western Australia DPIRD accessed 28 April 2023. https://www.agric.wa.gov.au/sheep/sheep-live-export?page=0%2C1#smartpaging_toc_p1_s0_h2

Several factors contribute to higher costs associated with live sheep for overseas export, including:

- Quarantine and health protocols: Live sheep exports require adherence to stringent quarantine and health protocols to ensure the animals meet the importing country's regulatory standards. These measures involve health examinations, vaccinations, and quarantine periods.
- Transport and logistics: Exporting live sheep involves significant logistical challenges. Transportation by sea or air requires specialised infrastructure and vessels equipped to handle live animals. Transportation costs include vessel chartering, animal handling facilities, and veterinary services.
- Compliance with export regulations: Adherence to Australian regulations, such as ASEL and ESCAS, is mandatory. These regulations set out specific requirements for the welfare, food provisions, and overall conditions of animals during transportation. Sea voyages carrying live sheep must also comply with standards set by the Australian Maritime Safety Authority (AMSA).
- Compliance with import regulations: Each importing country may have specific import regulations and documentation requirements for live animal imports. Complying with these regulations involves administrative procedures, certifications, and inspections.

These various factors contribute to the overall costs of live sheep exports, reflecting the stringent requirements and quality assurance measures involved in ensuring the welfare and compliance of the animals throughout the export process.

Box 2.3 Australian Standards for the Export of Livestock

The Australian Standards for the Export of Livestock (ASEL) are a set of Australian Government regulations which outline the conditions, and criteria that should be followed for the export of livestock. The standards apply to cattle, sheep, goats, deer, buffalo, and camelids exported by air or sea. There are 6 Standards:

Standard 1 Sourcing and preparation of livestock for export by sea

Standard 2 Land transport of livestock

Standard 3 Management of livestock in registered establishments

Standard 4 Vessel preparation and general management for export by sea

Standard 5 Loading and onboard management requirements

Standard 6 Air transport of livestock

The standards are extensive and specific to each different animal, although they include general and all species requirements. They also include a part-by-part breakdown of the condition of the animal when exported and arriving at its destination. The purpose of ASEL is to specify the regulatory conditions so that the quality of exported Australian livestock is as expected, and animal welfare requirements are met.

There have been multiple reviews of ASEL and it is continuously being updated to ensure the welfare of livestock being exported from Australia.

Source: Various including Department of Agriculture, Fisheries and Forestry, Australian Standards for the Export of Livestock 3.2

Box 2.4 Exporter Supply Chain Assurance System

To ensure the health and welfare of animals along the supply chain, the Exporter Supply Chain Assurance System (ESCAS) was introduced in 2011. A significant reform for the livestock export trade, ESCAS ensures the welfare of exported livestock from disembarkation in destination markets up to and including slaughter in the importing country and is based on four principles:

1. Animal welfare – animal handling and slaughter in the importing country conforms to World Organisation for Animal Health
2. Control through the supply chain – the exporter has control of all supply chain arrangements for livestock transport, management and slaughter
3. Traceability through the supply chain – the exporter can trace all livestock through the supply chain
4. Independent audit – the supply chain in the importing country is independently audited.

The aim of ESCAS is:

to ensure that Australian livestock exported for feeder and slaughter purposes are transported, handled, and slaughtered humanely for the purposes of delivering good animal welfare outcomes and facilitating the trade. A key attribute of ESCAS is that it enables the department to take action against exporters to stop the supply of livestock to specific facilities or supply chains without the need for whole-of-market suspensions.

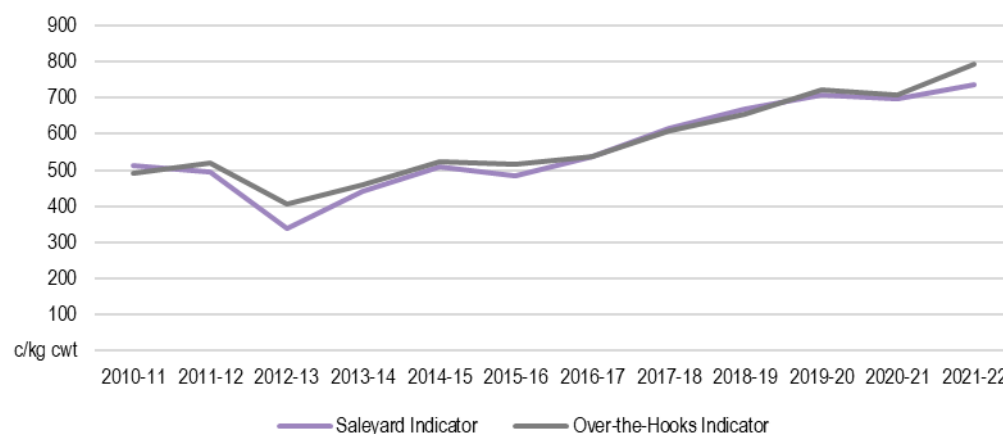
Source: Various including <https://www.agriculture.gov.au/biosecurity-trade/export/controlled-goods/live-animals/livestock/exporters/escas> and Inspector-General of Live Animal Exports, 2021, Review of the Exporter Supply Chain Assurance System, review report 2021/01.

2.5 Market conditions for sheepmeat

Sheepmeat prices have been rising over time. Figure 2.10 and Figure 2.11 show the heavy lamb and mutton indicators for sheepmeat in Western Australia. These prices are in cents per kilogram (c/kg) of carcass weight (cwt), indicating both 'over-the-hooks'²³ and 'saleyard'²⁴ prices.

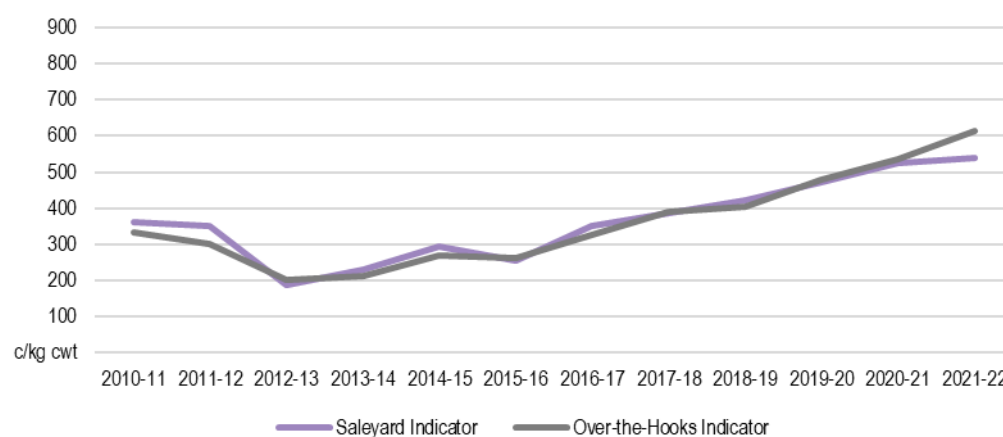
In 2021-22, the heavy lamb indicator averaged 793 c/kg cwt for over-the-hooks and 737 c/kg cwt for saleyard in Western Australia. The mutton indicator average is at 613 c/kg cwt for over-the-hooks and below 539 c/kg cwt for saleyard. Prices in 2021-22 were the strongest they have been over the last decade and have followed a similar trajectory to live sheep export prices.

Figure 2.10 Average lamb indicator price in WA, 2010-11 to 2021-22



Source: WA Department of Primary Industries and Regional Development, 2023

Figure 2.11 Average mutton indicator price in WA, 2010-11 to 2021-22



Source: WA Department of Primary Industries and Regional Development, 2023

²³ Over-the-hook sales occur when livestock are sold directly to an abattoir. Abattoirs have their own terms of sale and price penalties for animals that do not meet the agreed specifications.

²⁴ Saleyards offer the immediate sale of animals, so prices reflect demand and supply on the day, and they accept all stock types and lot sizes.

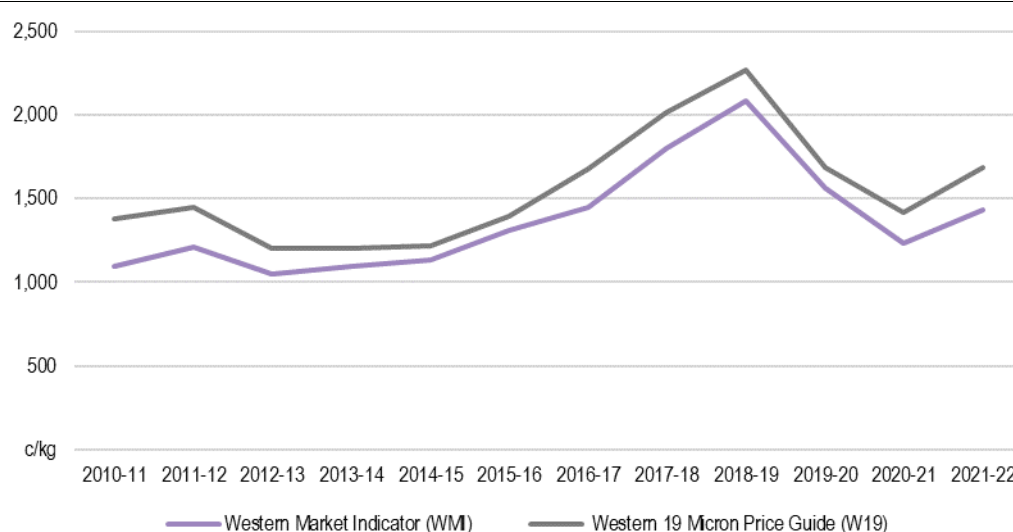
2.6 Market conditions for wool

The wool industry in Western Australia and in Australia more generally has been improving over the last couple of years. For many years prices hovered in a wide band, as wool battled competition with synthetic fibres and Australia invested in product innovation, marketing, and improvement in production. Australia's wool clip has swung towards a greater proportion of fine and super fine Merino wool, now representing 49.3% of the 2021-22 clip, compared with 11 per cent in 1991-92.²⁵

The wool market indicators (Eastern and Western) are a series of benchmarks maintained by the Australian Wool Exchange (AWEX).²⁶ In Western Australia, the key indicator is the Western Market Indicator (WMI) which is expressed in cents per clean kilogram.²⁷

Figure 2.12 displays the tracking of the WMI and the Western 19 Micron Price Guide (W19) (fine wool) since 2010-11.

Figure 2.12 Wool indicator price in Western Australia, 2010-11 to 2021-22



Source: WA Department of Primary Industries and Regional Development, 2023

²⁵ Australian Wool Innovation Ltd (2022), Australian Wool Production Forecast Report, <https://www.wool.com/globalassets/wool/market-intelligence/wool-production-forecasts/australian-wool-production-forecast-report--april-2022.pdf>

²⁶ Wool market indicators are based on fixed baskets of wool types, calculated each sale day. The indicators are economic expressions relating to the current and previous levels of the wool market, some of which are used as the basis for derivative wool market trading.

²⁷ A series of sub-indicators, known as Micron Price Guides, are published for each regional sale day. These are expressed in cents per clean kilogram. Micron (short for micrometre) is wool's mean fibre diameter; the smaller/lower the number, the finer the yarn, and generally the more expensive. Fine wool is considered 19.5 micron or less, with superfine 17.6-18.5, and ultrafine equal to or less than 17.5 micron.



3.1 Economic contribution of the sheep industry

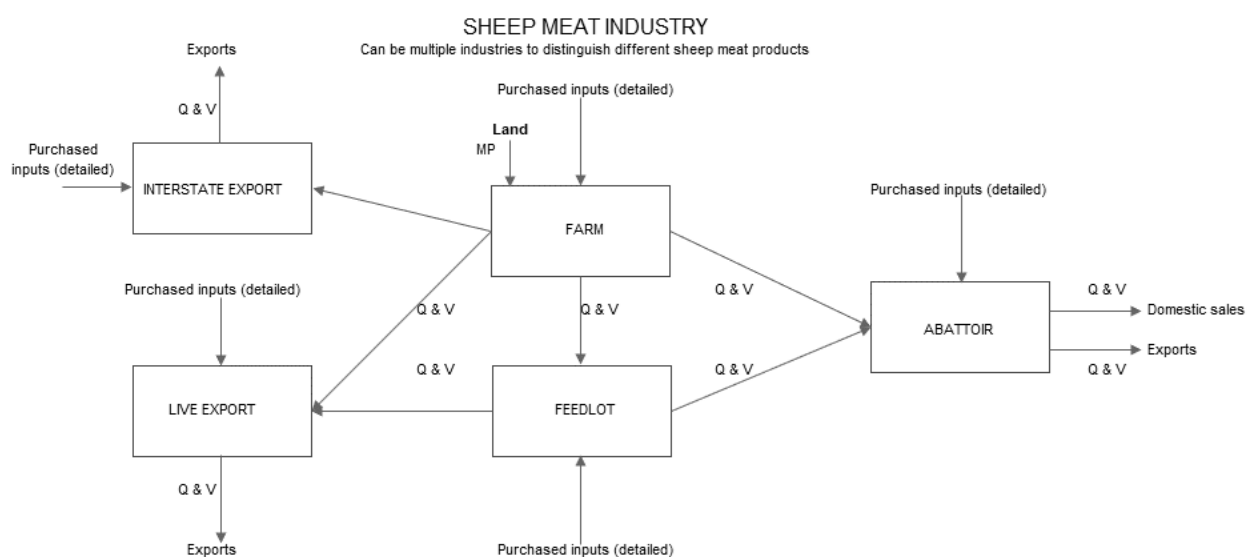
The economic contribution of the sheep industry to the size of the national economy is measured by the impact of the industry on wages, salaries, profits, and indirect taxes. The sheep industry has been separated out into its various components to allow analysis of the contribution of live sheep exports, sheepmeat and wool. The industry has been segmented as follows:

- sheep farming (meat)
- sheep farming (wool)
- sheep feedlot
- sheepmeat abattoir
- live sheep exports (sheep)
- live sheep exports (wool)²⁸
- interstate trade.

The interaction between these segments is present in Figure 3.1 and Figure 3.2 where each block creates a value-added stage (returns to land and capital) that is additive to the value-added impacts calculated from the purchased inputs.

²⁸ Sheep are shorn prior to being shipped and that wool (known as a wool clip) can be sold by live sheep exporters and provides revenue.

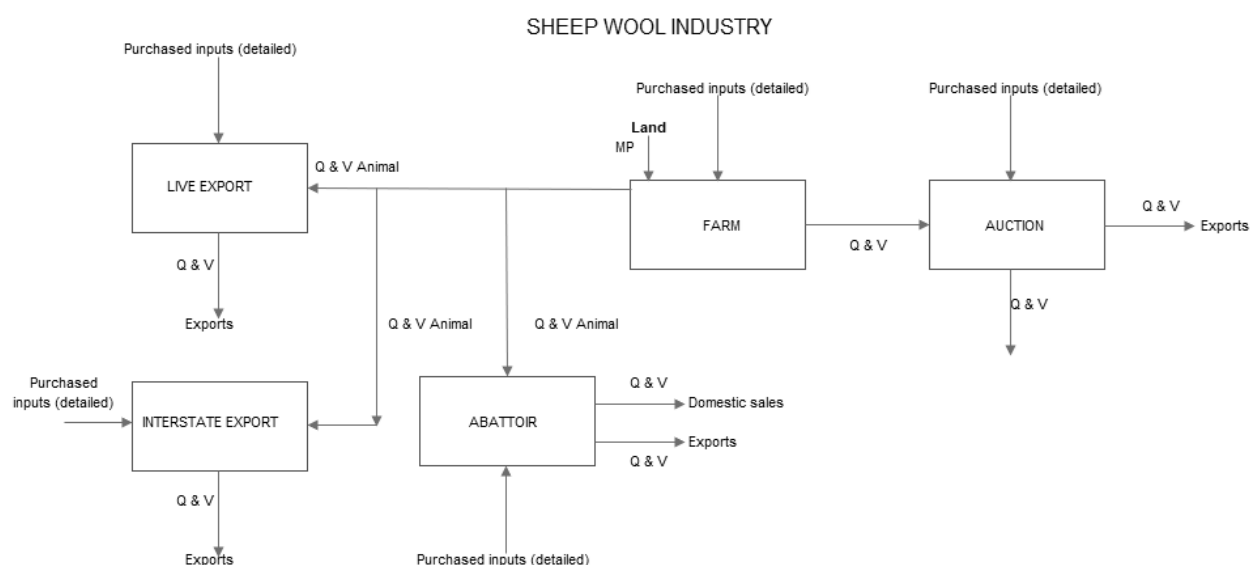
Figure 3.1 Sheepmeat industry



Note: Q = quantity; V = value; Purchased inputs include goods, services and employed labour.

Source: ACIL Allen

Figure 3.2 Sheep wool auction industry



Note: Q = quantity; V = value; Purchased inputs include goods, services and employed labour.

Source: ACIL Allen

Economic contribution extends beyond the direct value added by sheep farms and live exporters to those working in other economic sectors and states. These significant contributions are generated indirectly by the industry's use of intermediate inputs and increased consumption demand from spending as well as the income (wages and salaries) of those in other industries and regions.

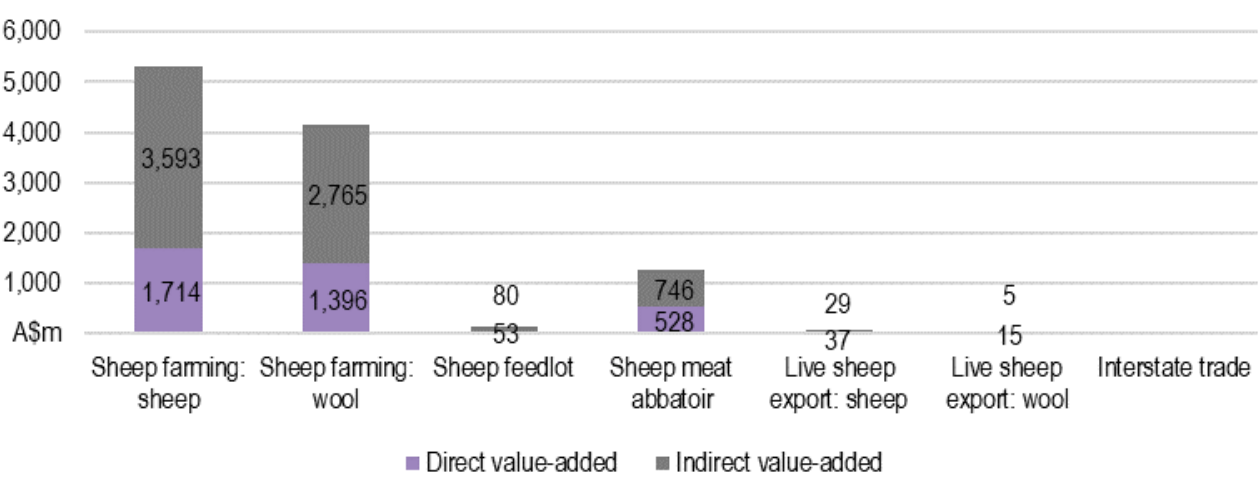
The results are presented as a range (bounds) in the method used (Input-Output analysis). The **lower bound** includes the flow-on effects of live sheep export purchasing from other industries or the direct plus the estimated contribution associated with the supply chain. The **upper bound** estimate then adds the impact of those industries' resulting additional spending (or the consumption-induced effect) to the lower bound associated with direct workers and workers within the supply chain spending the wages and salaries.

- Direct value-added is lower than industry gross value because the value-added includes wages, operating surplus, and taxes and not the other intermediate purchases made in the sheep industry.
- Direct employment is typically those involved in the production of sheep for live export (e.g., producers and live exporters). Indirect employment estimates for live sheep exports are those in related professions often upstream of the farm gate.

3.1.1 National summary statistics

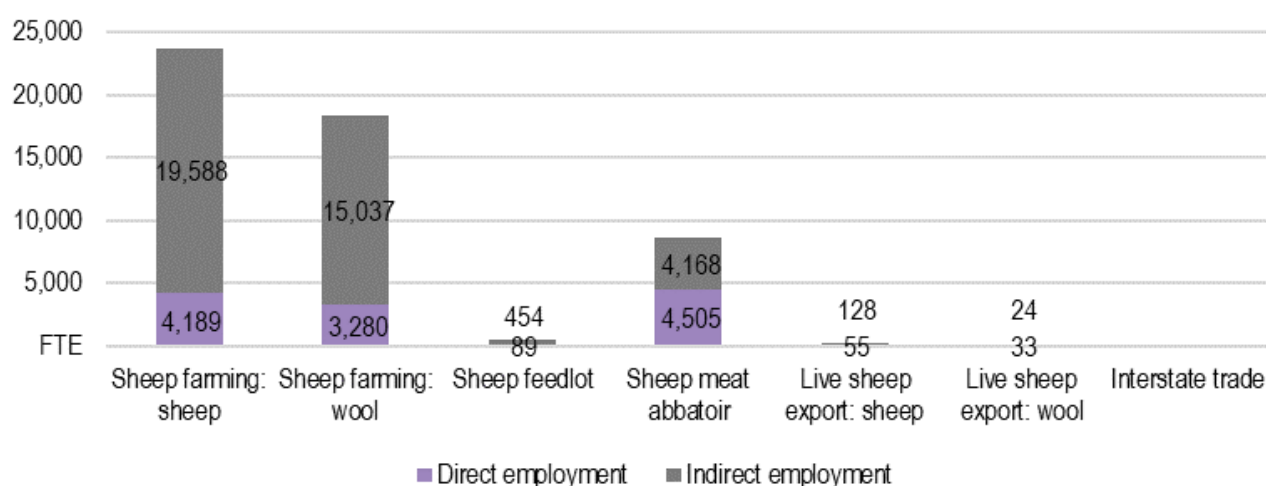
Over the last five years, the Australian sheep industry (including sheep farming (meat and wool), feedlots, abattoirs, live exports (meat and wool) and interstate trade) has on average, **directly** contributed \$3,744.05 million of value added annually and employed 12,110 full time equivalents (FTEs). (Refer Figure 3.3 and Figure 3.4).

Figure 3.3 The Australian sheep industry direct and indirect value-added (five-year average to 2021-22)



Source: ACIL Allen

Figure 3.4 The Australian sheep industry direct and upper bound indirect FTEs (five-year average to 2021-22)

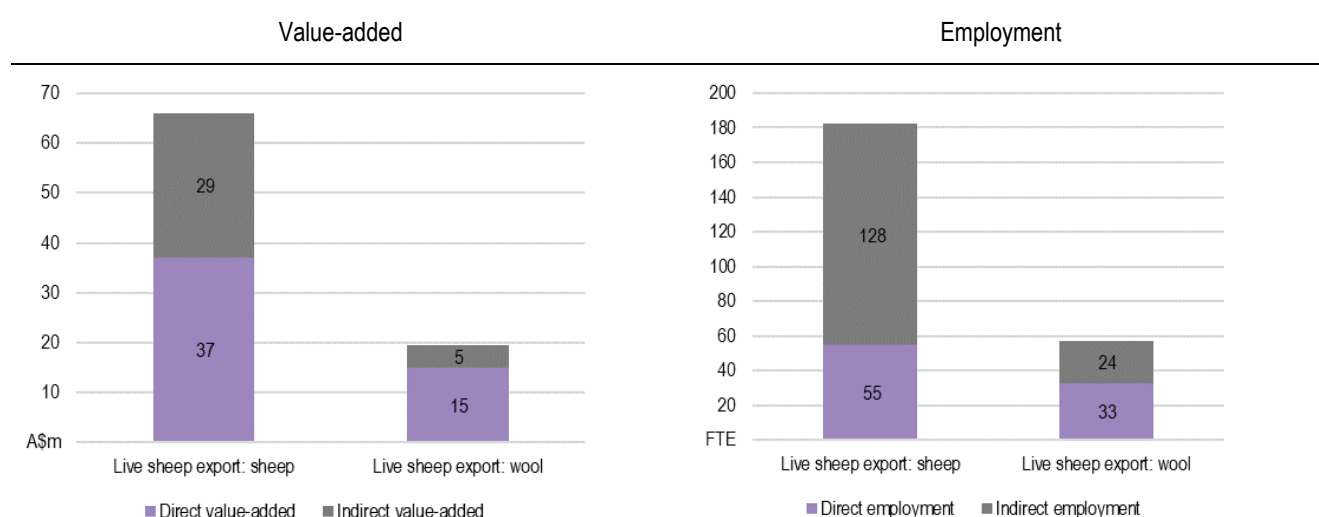


Source: ACIL Allen

Over the last five years, the live sheep export industry (live sheep and the associated wool clip) has, on average, **directly** contributed \$52 million of value-added annually and employed 88 FTEs. This is 1.4% of the overall industry value. (Refer Figure 3.5).

Total (indirect plus direct) contribution for the live sheep export industry had an **upper bound** of \$86 million value-added annually and employed 240 FTEs and a **lower bound** of approximately \$74 million and 174 FTEs.

Figure 3.5 The Australian live sheep export industry total contribution (upper bound) (five-year average to 2021-22)



Source: ACIL Allen

3.1.2 Impact on Western Australia

This section presents the direct and indirect value-added and employment impacts for Western Australia.

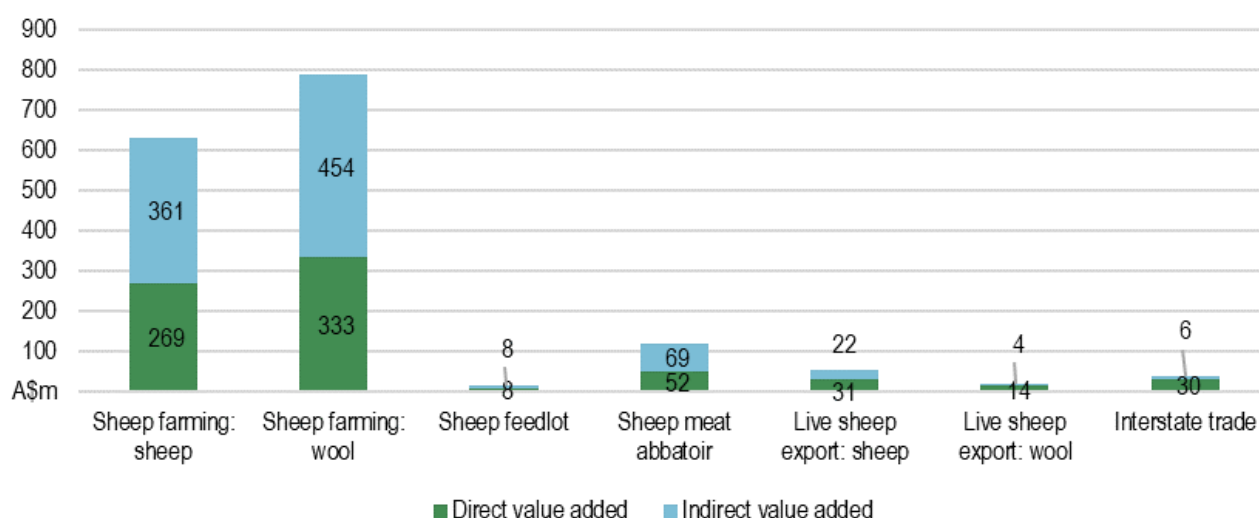
Over the last five years, the Western Australian sheep industry (including sheep farming (meat and wool), feedlots, abattoirs, live exports (meat and wool) and interstate trade) has, on average, **directly** contributed \$737.2 million of value-added annually and employs 1,770 full time equivalents (FTEs). (Refer Figure 3.6 and Figure 3.7).

As Western Australia dominates the market for live sheep exports (93% of live sheep exports over the last five years) the results are very similar to the national contribution but live sheep exports (sheep plus the associated wool clip) account for a higher proportion (6.1%) of the total sheep industry value added in Western Australia than they do nationally (1.4%).

In the last five years, the live sheep export industry in Western Australia (live sheep and the associated wool clip) has, on average, **directly** contributed \$45 million of value-added annually and employed 52 FTEs. (Refer Figure 3.8).

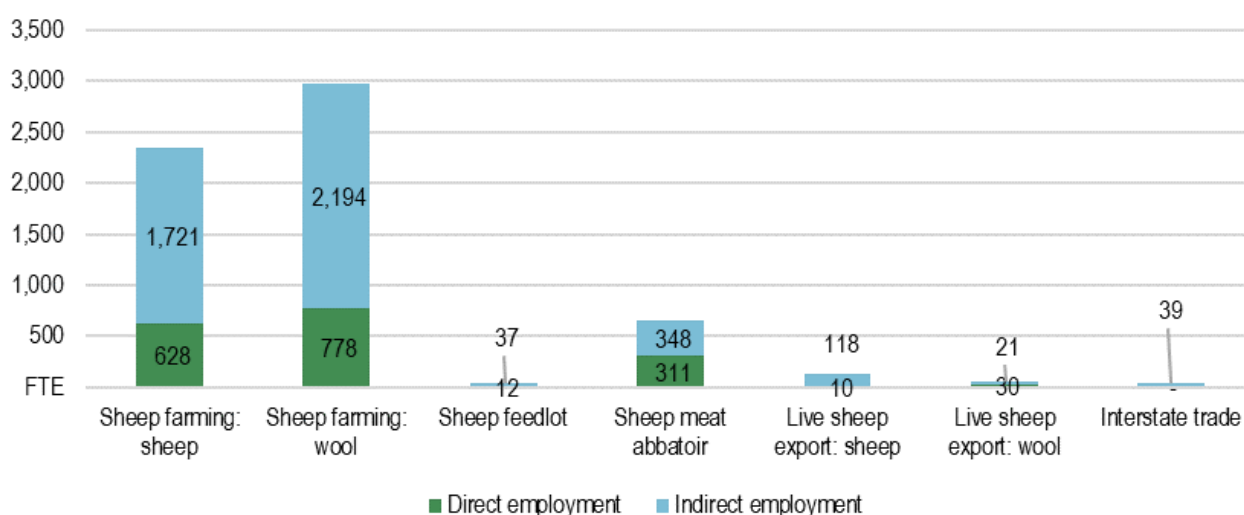
Total (indirect plus direct) contribution for the live sheep export industry had an **upper bound** of \$71 million value-added annually and employed 179 FTEs and a **lower bound** of approximately \$62 million and 130 FTEs.

Figure 3.6 The Western Australian sheep industry direct and indirect value added (five-year average to 2021-22)



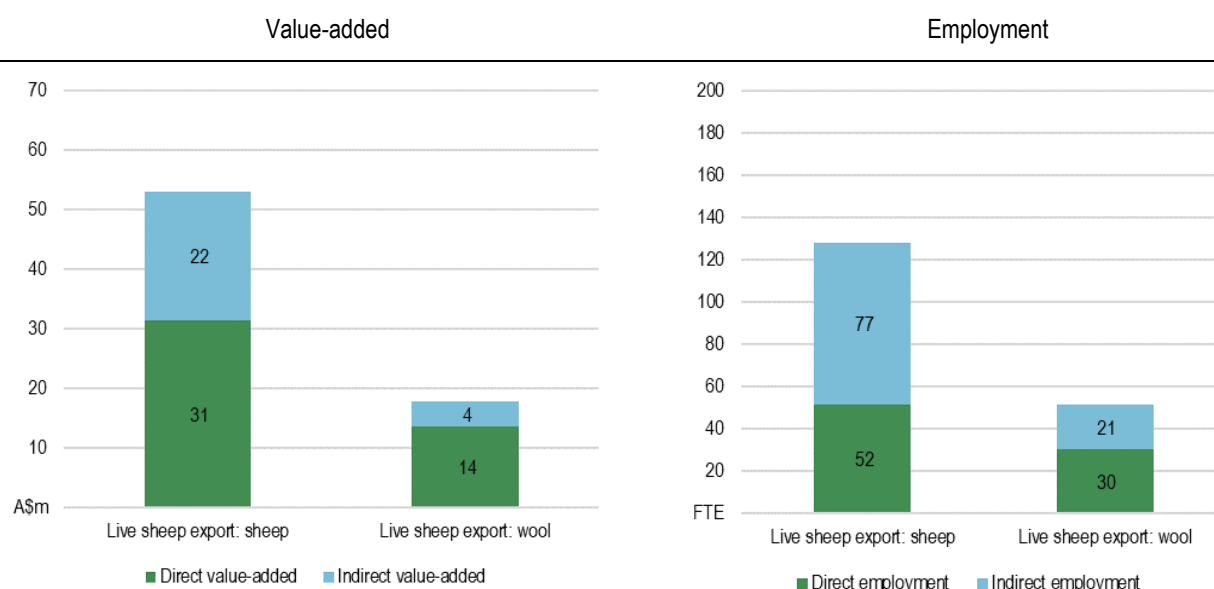
Source: ACIL Allen

Figure 3.7 The Western Australian sheep industry direct and indirect FTEs (five-year average to 2021-22)



Source: ACIL Allen

Figure 3.8 The Western Australian live sheep export industry direct and indirect (upper bound) (five year average to 2021-22)

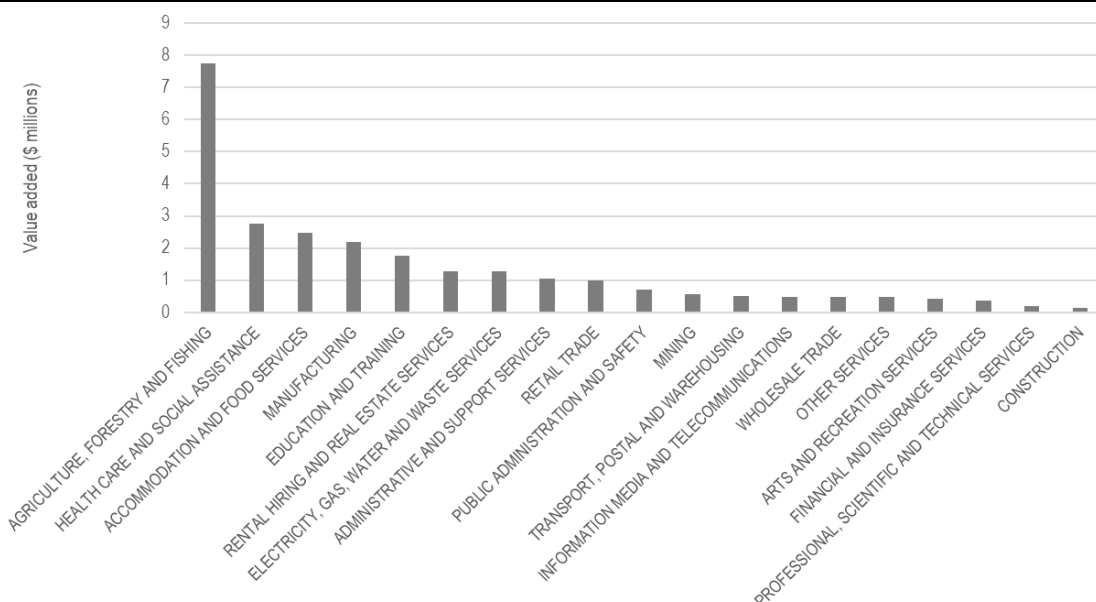


Source: ACIL Allen

Flow on impacts to other industries from live sheep exports

The total (direct plus indirect) upper bounds value added of \$71 million from live sheep exports (live sheep and associated wool clip) are distributed across other industries in the Western Australian economy. Outside the agriculture sector, the largest impacts are seen in health care and social assistance, accommodation and food services, manufacturing and education and training. (Refer Figure 3.9).

Figure 3.9 Total (direct + indirect) value added (\$ millions), upper bounds



Source: ACIL Allen

3.2 Impact of cessation of live sheep exports

Two scenarios are analysed to quantify the impact of the cessation of live sheep exports.

- **Scenario 1:** no change to the current situation (the Merino wether production system 'as is', or business as usual forms the baseline for comparison)
- **Scenario 2:** the immediate cessation of live sheep exports, with and without price responses.

Price responses have been calculated using elasticities calculated from econometric studies (refer Appendix C).

3.2.1 Scenario 1: Business as usual

In Western Australia, sheep flocks are run as part of a mixed farming enterprise. Sheep production systems produce wool, lamb and sheep for slaughter, and lamb and sheep for live export. This means that producers have several alternative and complementary products within their system.

Purebred Merino, the majority of the WA flock (refer Chapter 2), are mainly utilised for wool production. Cross-bred lines are generally used for sheepmeat production. There is a degree of flexibility present, meaning that both crossbred and purebred lines are used for both wool and sheepmeat production. This flexibility is critical to managing risk and operating effectively in the dynamic and seasonal agricultural enterprise.

For both wool and sheepmeat production, most flocks are self-replacing, and Merino ewes remain in the breeding stock until they reach the end of their reproductive life, at which point they are cast for age. Refer Box 2.1 for details on sheep type.

There are four primary expected outcomes for **Merino male sheep** in a typical Merino sheep farming enterprise in Western Australia (refer Figure 3.10):

1. Male lambs are **sold as Merino prime lamb at six to eight months of age**. Merino lines have been bred to optimise wool properties rather than sheepmeat, so the proportion of Merino wethers sold as prime lamb in this age range is limited.
2. Male lambs are **sold into the Merino prime lamb market at 10 to 12 months of age**. Generally, this outcome comprises sheep that are not heavy enough to be sold in the previous six to eight-months. They have often been fed with higher quality pasture and fodder crops to increase weight for slaughter.
3. Sheep that are not initially sold into the Merino prime lamb market are generally **retained for wool production**. Typically, they are held until first shearing and assessed for their wool quality to determine their value to the business. Sheep are kept based on their wool quality and quantity and sometimes based on the state of the flock. For example, flocks in a rebuilding phase (e.g., after a sell-off due to drought) may hold more sheep. Wethers are usually held for wool production if not sold into the Merino prime lamb market.
The value of the sheep is determined by the amount and quality of wool produced, and the state of the flock in general should also be considered. For example, if the flock is in a rebuilding phase, sheep that would otherwise be sold may be held.
4. Those male sheep not retained for wool production are usually **sold into the live export trade or sold for slaughter**.

Due to constant changes in supply, demand, price and environment, producers must consider various factors to decide how to distribute their flock among the four outcomes. These factors include the:

- amount of feed available for grazing, and (if required) the cost of additional feed
- possible impact of forward contracts
- weather outlook for the current and future seasons
- opportunity costs from competing operations. For example, consider an increase in the price of other livestock products or crops, and the effect on the relative value of sheep enterprises.
- condition of the sheep relative to the market specifications of quality.

Figure 3.10 presents a decision tree diagram that examines the points at which sheep are sold or moved to the next node/level.

The model is constructed on a per head basis for all male sheep that are turned-off in the 2021-22 year in the Western Australian flock. Each level represents a different point in time. All sheep begin as lambs and then progress to wether lambs and adult wether sheep.²⁹

The final branches are the terminal branches, showing Net Present Value (NPV) for each outcome.

NPV calculations factor in all direct income and expenditure incurred from each individual outcome. The calculation considers the costs of any additional pasture required, health, shearing, crutching and direct labour. The NPV also factors in wool and sheep sale value, meaning all other expenditure and income for outcomes is considered in the NPV calculation. The values at each branch in this decision tree are the NPV and the probability of this event occurring. The outcomes are all combinations of the normal distribution of the sheep within the flock, the seasonal conditions at the time, and a range of other management considerations.

²⁹ Although hoggets are a frequently used term in the system and hoggets are a specific class of sheep (refer Box 2.1) for live export (Refer Table 2.3), this model assumes that hoggets are the same as adult sheep.

The proportion attributed to each branch is seen underneath the branch line. These proportions have been determined by making the following assumptions about a Merino wether production system, where:³⁰

- Level 1: this system emphasises wool production, and as a result, most (90%) wether lambs are retained as light sheep. A small proportion (10%) may make the weight for the trade lamb market and are sold into that market.
- Level 2: At this stage the majority (80%) of sheep are retained at the second chance node due to the emphasis on wool production. Similarly, at this stage, a percentage (20%) are fed to increase weight and sold off in level 3b.
- Level 3a: The majority (80%) of sheep retained for wool in level 2 are also retained for wool in level 3a and are sold for slaughter (90%) or live export (10%) when they reach the end of their productive life producing wool.
- Level 3b: the third chance node consists of lamb sold into the live sheep export market (25%) or slaughter (75%).

Considering the probability and NPV of all outcomes, the expected value of Merino wether lamb in this production system is **\$113.81**.

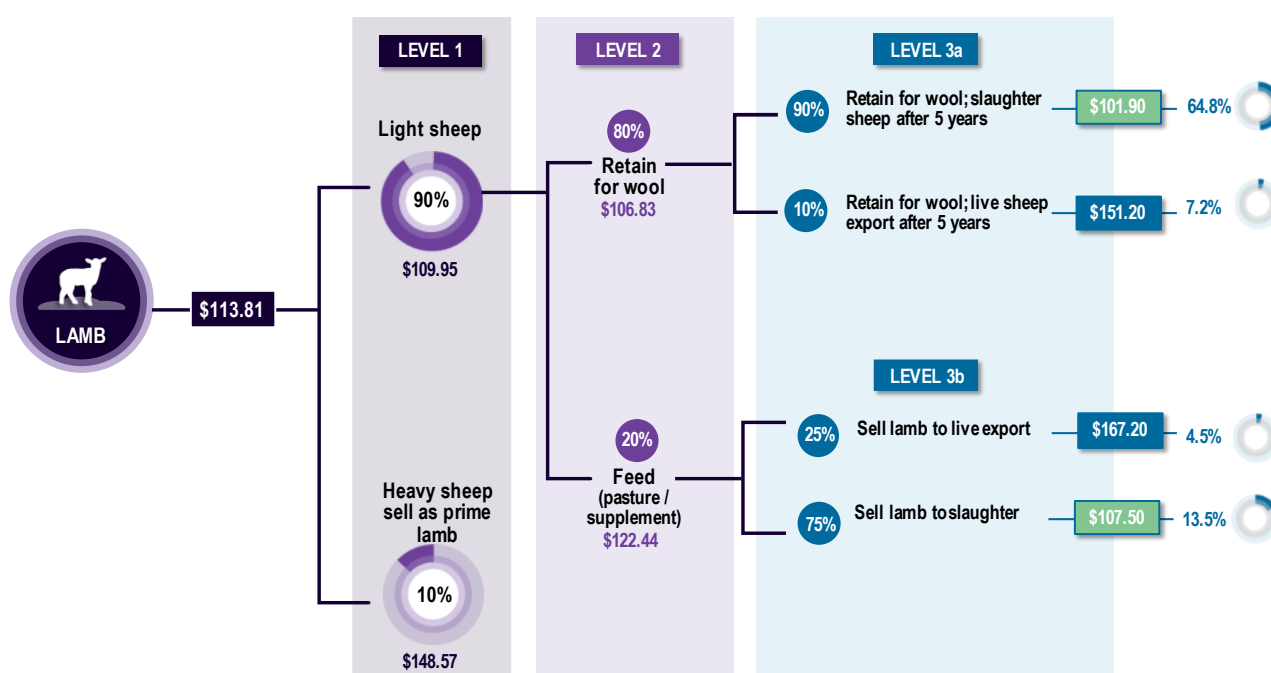
Interpreting the proportions (probability of the event occurring) on the far-right hand side of Figure 3.10 requires consideration of the turn-off statistics for 2021-22 (Refer Table 3.1).

Figure 3.10 shows that 4.5% of all sheep are sold to live export as lambs and 7.2% are sold to live export as adult sheep. This broadly equates to the 11% turned-off to live export in 2021-22 and generally aligns with 40% (4.5% of 11%) wether lambs live exported versus 60% exported as adults and hoggets³¹ in 2020 as per Table 2.3.

³⁰ These assumptions are based on discussions in 2017 with stakeholders in the Western Australian sheep industry including discussions with experts such as those running the Model of an Integrated Dryland Agricultural System (MIDAS). There was not time as part of this project to update these assumptions however it is generally believed that there has not been significant change over the last five years.

³¹ Although hoggets are a frequently used term in the system and hoggets are a specific class of sheep (refer Box 2.1) for live export (Refer Table 2.3), this model assumes that hoggets are the same as adult sheep.

Figure 3.10 Scenario 1: Business as usual, with live exports for male sheep



Source: ACIL Allen

Table 3.1 Western Australia sheep turn-off (2021-22)

2021-22	Lamb slaughter	Sheep slaughter	Live export	Interstate transfer	Total
Thousands of head	2,508	1,156	487	268	4,419
%	57%	26%	11%	6%	100%

Source: ACIL Allen with data from WA Department of Primary Industries and Regional Development, 2023

3.2.2 Scenario 2: the impact of cessation of the live sheep trade

In this scenario, for the purpose of economic analysis, it is assumed that there is no time for the industry to adjust resources, and the scenario is analysed without and with price responses.

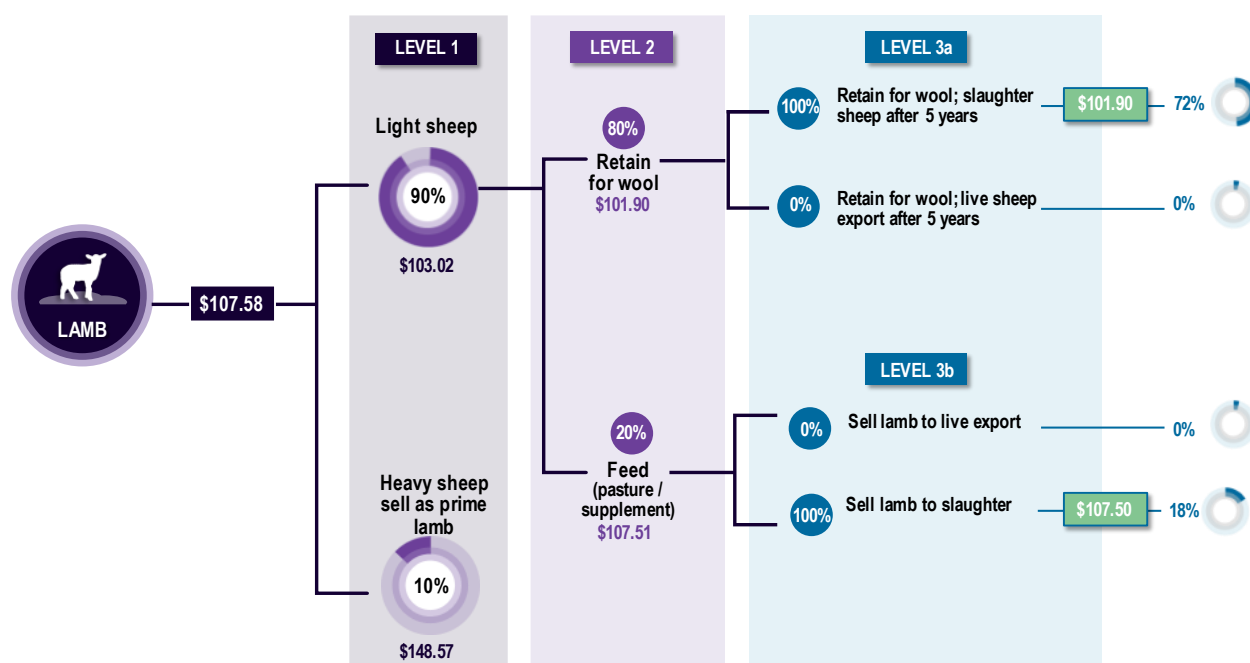
The decision tree in Figure 3.11 shows the same scenario as presented in Figure 3.10, except that in this scenario there is no option to sell into the live sheep export market. As a result, the proportions for live export are zero.

In this scenario, the expected value of the Merino wether lamb in this system is **\$107.58**.

Compared to the NPV in Scenario 1, in which live export was an option, the NPV in this scenario is **\$6.24 or 5.48% less**. The value of the producer's option to sell sheep to live export is worth **\$6.24 per wether**.

The NPV calculations from Figure 3.11 do not consider any movement in prices at the abattoir due to a sudden change in supply.

Figure 3.11 Scenario 2: Cessation of live sheep exports (no price response), for male sheep



Source: ACIL Allen

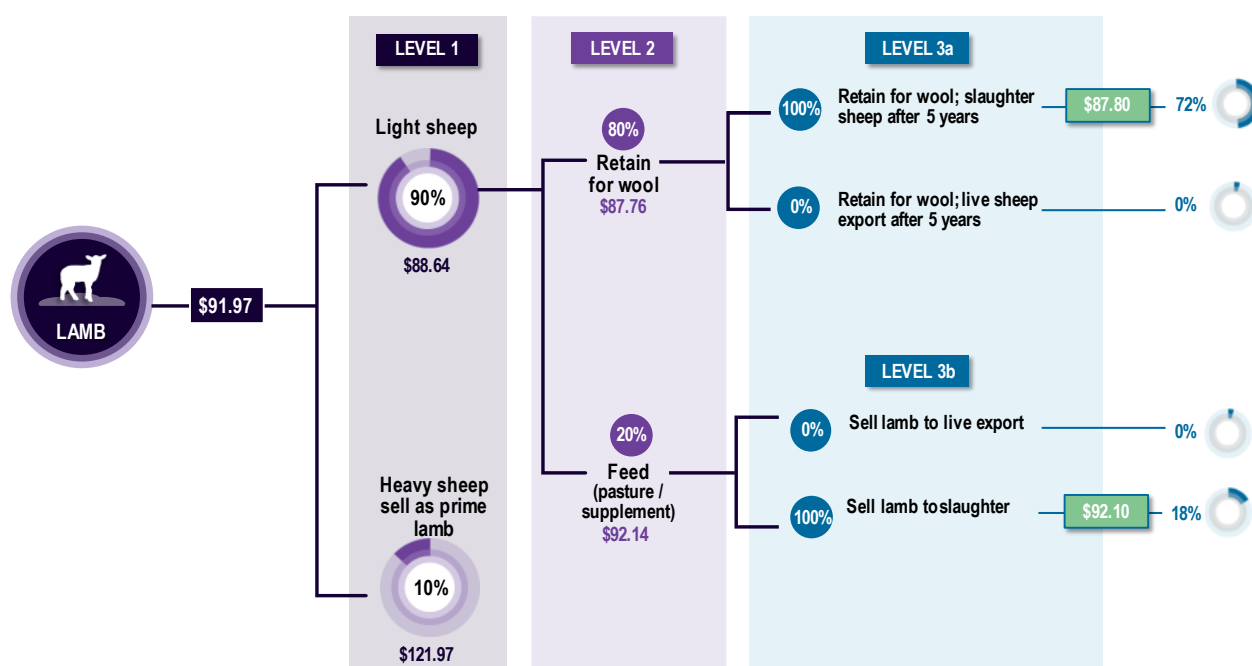
The value of the producer's option to deliver sheep to live export is \$21.84 per wether in the Merino production system with a price response.

However, domestic prices paid for animals can respond quickly to market changes, and it can be expected that an increase in supply created by the cessation of live sheep exports would likely put downward pressure on prices paid. Figure 3.12 includes price responsiveness to estimate the potential impact on price return to producers. Discussion around these elasticities and the sensitivity of the analysis to the elasticity values can be found in Appendix C. Accounting for potential price impacts of a sudden cessation, reduces the NPV value to \$91.97. This is a difference of **\$21.84 (19.19%) less**, than in Scenario 1 (business as usual), where live export is an alternative.

It can be hypothesised that if the cessation were to occur during a period of high supply and low demand, the price response would likely be more pronounced. This implies a higher elasticity of demand, indicating that the market is more sensitive to changes in supply. In this scenario, using the higher elasticity point as a reference, it is estimated that the net present value (NPV) loss could potentially amount to as much as \$37.44 (32.90%). This estimation suggests that the impact of the

surge in supply on prices and overall profitability could be significant under the given market conditions.

Figure 3.12 Scenario 2: Cessation of live sheep exports (with price response), for male sheep



Source: ACIL Allen

3.3 Markets and trade

This analysis focuses on a subset of five MENA countries, Israel, Jordan, Kuwait, Oman, and the United Arab Emirates (UAE) as the largest importers of Australian sheep in recent years.

Limited livestock production, particularly at scale,³² coupled with the cultural significance of sheep and sheepmeat means the MENA region is a large importer of both live sheep and sheepmeat products. Appendix A provides a socio-economic profile of each of these countries.

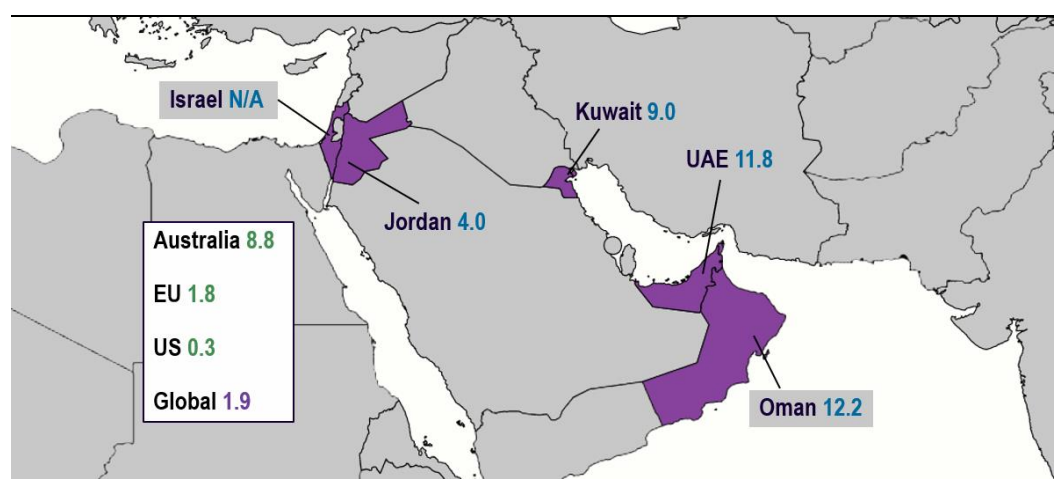
The importance of sheep and sheepmeat can be seen in the region's per capita consumption, which is significantly higher than the global average of 1.9kg (2018).³³ (Refer Figure 3.13). The average Oman citizen consumed 12.2kg carcass weight equivalent (cwe) of sheepmeat in 2021, followed by the UAE (11.9kg cwe), Kuwait (9kg cwe), and Jordan (4kg cwe).³⁴ In comparison, Australia consumes 8.8kg cwe and the per capita consumption is considerably lower in the EU (1.8kg cwe) and US (0.3kg cwe).³⁵

³² LiveCorp, *Ruminations – Stories of Live Export, November 2021*, accessed 18 April 2023

³³ Food and Agriculture Organization (FAO), *OECD-FAO Agricultural Outlook 2015, Sheepmeat consumption, Projection per capita*, accessed 11 April 2023, https://www.oecd-ilibrary.org/sheep-meat-projections-consumption-per-capita_5jrxx434l23.pdf?itemId=%2Fcontent%2Fcomponent%2Fagr_outlook-2015-table144-en&mimeType=pdf

³⁴ Data for Israel is not available.

³⁵ Food and Agriculture Organization (FAO), *OECD-FAO Agricultural Outlook 2015, Sheepmeat consumption, Projection per capita*, accessed 11 April 2023, https://www.oecd-ilibrary.org/sheep-meat-projections-consumption-per-capita_5jrxx434l23.pdf?itemId=%2Fcontent%2Fcomponent%2Fagr_outlook-2015-table144-en&mimeType=pdf

Figure 3.13 Per capita sheepmeat consumption in MENA countries, 2021 (kg cwe/capita/year)

Note: Data for Israel is not available.

MENA countries' figures are in 2020-21 financial year, other countries' figures are 2024 projections

Source: ACIL Allen based on *Meat & Livestock Australia, MENA Beef & Sheep meat Snapshot, 2021 and projections from United Nations' Food and Agriculture Organisation, 2015*

3.3.1 Cultural importance of sheep and sheepmeat in MENA

Sheep have played a vital role in the region's culture, religion, and traditions throughout a history spanning thousands of years, and sheepmeat remains one of the most widely consumed sources of protein in the Middle East.

There is a clear demand for fresh (also known as 'hot')³⁶ meat in the Middle East. The Australian Livestock Exporters' Council report that citizens in MENA countries prefer 'hot' meat as "they slaughter the animal in the morning and will eat that at lunch time or at the latest at dinner"³⁷.

Countries in the Middle East have a preference for live sheep due to several factors:

- **Cultural and religious traditions:** The Middle East has a long-standing cultural and religious tradition that includes the sacrifice of live animals during religious festivals and occasions. Live sheep are an integral part of these traditions, and the ability to select and sacrifice the animal themselves hold cultural and religious significance.
- **Freshness and quality control:** The preference for live sheep allows individuals to personally inspect the animal before purchase, ensuring freshness and quality. This gives consumers confidence in the health and condition of the animal, as they can assess factors such as the animal's weight, appearance, and overall well-being.
- **Customised butchering and preparation:** By opting for live sheep, individuals have control over how the animal is butchered and prepared according to their specific requirements and preferences. This allows for the customisation of cuts and portions, ensuring that the meat is prepared in a manner that suits their cultural and culinary traditions.
- **Taste and texture:** Some individuals believe that freshly slaughtered and prepared meat from live sheep provides a superior taste and texture compared to pre-packaged or frozen meat.

³⁶ Refers to meat that is freshly or recently killed and not chilled.

³⁷ Senate Select Committee on Animal Welfare, (1985) *Export of Live Sheep from Australia*, accessed 4 April 2023
https://www.aph.gov.au/parliamentary_business/committees/senate/significant_reports/animalwelfarectte/exporthivesheep/index

The immediacy of the slaughter and preparation process is believed to contribute to the overall quality, tenderness and flavour of the meat.

- **Familiarity and connection to tradition:** The preference for live sheep in the Middle East may also be influenced by the familiarity and connection to traditional practices. Live sheep have been an integral part of Middle Eastern culture for generations, and the continuation of these practices maintains a sense of cultural identity and heritage.

It's important to note that these preferences may vary among individuals and communities within the Middle East. While live sheep are favoured by many, there is also a demand for processed sheepmeat that caters to different consumer preferences and convenience.

The below excerpt describes the significance of sheepmeat as part of food culture in the region:

The meat of sheep is the most popular in the Near and Middle Eastern and North African cuisine. A lamb is slaughtered on special occasions like a wedding, birth of a child or circumcisions...Often families buy one or two lambs before a festival and fatten them in anticipation. Often, half of a slaughtered lamb is given to the poor. So by this a family is observing the commands of God...Normally, the meat of a lamb of about one year of age is used, because of the quantity of fat and the quality of taste...all eatable parts of the lamb are used.

Heine, P., 2004. Food Culture in the Near East, Middle East and North Africa, Greenwood Publishing, p 42.

The role of sheep in religion

Sheep play an important role in Islam. During the annual Hajj pilgrimage to Mecca, Muslims are required to sacrifice an animal, typically a sheep or goat, as part of the Eid al-Adha festival. This is meant to commemorate the story of Ibrahim (Abraham) and his willingness to sacrifice his son for the sake of God.³⁸

The sacrifice of a live animal is seen as an expression of faith, gratitude, community solidarity; an act of devotion and generosity. It is deeply ingrained in the cultural and religious identity of many people in the region.³⁹

Sheep in broader culture and tradition

From a cultural perspective, sheep are seen as symbols of hospitality, generosity, and kindness. It is not uncommon for Middle Eastern families to keep sheep on their properties, especially in rural areas. In many cases, guests are greeted with the sight of sheep grazing in the yard, and it is considered a sign of respect and honour to offer a guest a sheep as a gift or as a meal.⁴⁰

Sheep also feature prominently in cultural and social traditions, such as weddings, feasts, and community gatherings. The rearing and care of sheep are often part of the rural lifestyle, fostering a connection between communities and their livestock.

The cultural importance of live sheep in the Middle East can also be seen in traditional festivals and events featuring sheep, such as the Oman National Sheep Show.⁴¹ These events showcase the

³⁸ Franck, A. et al (2016). Blood and the City, Anthropology of the Middle East, 11(1), pp 85-111.

³⁹ Peters, F. E. (1994). The Hajj: The Muslim Pilgrimage to Mecca and the Holy Places. Princeton University Press.

⁴⁰ Seegers, J. L. (1991). Sheep and Goat Production in the Near East. FAO Animal Production and Health Paper No. 88. Food and Agriculture Organization of the United Nations.

⁴¹ See: <https://gulfnnews.com/world/gulf/oman/omanis-flood-habta-livestock-markets-on-eid-1.2269102>

region's cultural heritage and celebrate the role that sheep play in the daily lives and traditions of many Middle Eastern communities.

This practice is so embedded and prolific that the Government of Saudi Arabia, for example, has established local government slaughterhouses where people can take animals to be slaughtered to maintain food safety and hygiene. Many countries, especially Kuwait, emphasise locally slaughtered meat rather than the consumption of frozen or chilled meat. Kuwait maintains that despite any religious practices, the slaughtering of sheep helps to “teach our [their] children about what they’re eating and to thank God for it, so they understand and show respect to what they consume” (The CEO of the Kuwait Livestock Transport and Trading Company (KLTT)).⁴² Box 3.1 shows this sentiment has not changed over time.

Box 3.1 Case study –Al Mawashi – Kidzania Kuwait partnership

Al Mawashi is a Kuwaiti livestock trading company that specialises in the export of sheep and other livestock to various countries around the world. The company was founded in 1978 and has since become one of the largest exporters of live sheep in the world.

Al Mawashi has its own fleet of specialised livestock carriers, which are equipped with advanced facilities to ensure the comfort and well-being of the animals during transport. The company also has its own quarantine and holding facilities, where the animals are kept before and after shipment to ensure that they are healthy and fit for transport.

In addition to exporting live sheep, Al Mawashi also offers a range of other services, including the import and distribution of frozen and chilled meat products, the provision of animal feed and veterinary services, and the development of livestock production projects.

In 2018, KidZania, in partnership with Al Mawashi, was opened in Kuwait. The vision was to enrich children's learning experience about meat processing and the livestock industry. Al Mawashi has embedded two separate establishments in KidZania:

- Learning about meat processing and production in a simulated meat factory
- Opting to become a veterinarian, engine room engineer, or captain of a ship that transports livestock from Australia to Kuwait.

KidZania, a Mexican concept established in 1999, provides facilities for children and offers a range of experiences that are relevant to each region, culture, and geography by way of professions, entertainment and food and uses real-world fun and learning through role-playing, to help prepare children for their future.

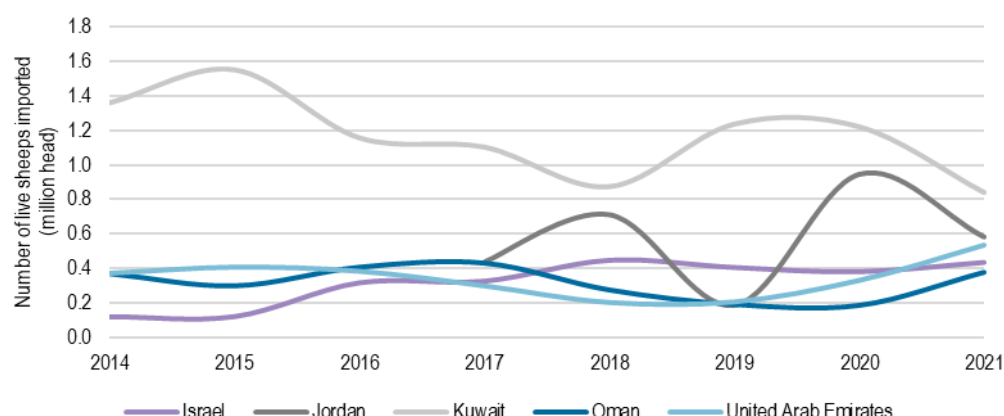
Source: Various including <https://kidzania.com/en/index>; <https://almawashi.com.kw/news-&-media/news-single-story/kidzania-partner-with-al-mawashi> and <https://almawashi.com.kw/>

3.3.2 The global market for live sheep in MENA

Figure 3.14 shows the estimated total number of live sheep imported by the five MENA countries of focus from all suppliers. In 2021, Kuwait imported the most live sheep (approximately 837,000 head), followed by Jordan (585,000), the UAE (532,000), Israel (535,000), and Oman (378,000).

The trends show that the number of live sheep imported by Kuwait has decreased significantly since 2015, while Jordan has been increasing numbers since 2019.

⁴² LiveCorp, *Ruminations – Stories of Live Export*, November 2021, accessed 18 April 2023

Figure 3.14 Estimated number of live sheep imported by calendar year, 2014-2021

Note: Data for Jordan prior to 2017 is not included due to potential errors.

Source: ACIL Allen based on United Nation's Food and Agriculture Organisation, 2023

Market share

Australia dominates the live sheep trade in the region; however, several other countries also export live sheep into the Middle East. Eastern Europe and MENA-adjacent countries are among the world's top live sheep exporters.

ACIL Allen's analysis based on data from the United Nations' Food and Agriculture Organization (FAO) shows that Australia is consistently in the top countries exporting live sheep to the five countries of focus (see Table 3.2).⁴³ The ranking is based on the total gross import of numbers of live sheep between 2017 and 2021.

Table 3.2 Ranking of gross total top live sheep exporters to selected MENA countries (head), 2017-2021

Ranking	Israel	Jordan	Kuwait	Oman	UAE
1 st	Portugal	Romania	Australia	Somalia	Australia
2 nd	Australia	Spain	Jordan	Australia	Somalia
3 rd	Romania	Australia	Iran	Sudan	India
4 th	Serbia	Ukraine	Saudi Arabia	Iran	Iran
5 th	Hungary	France	South Africa	UAE	Jordan

Note: FAO data includes estimates and unofficial figures

Source: ACIL Allen based on United Nation's Food and Agriculture Organisation, 2021

Within the region, there is also significant trade of live sheep.⁴⁴ Jordan, Iran, and Saudi Arabia are the largest exporters of live sheep to regional partners (see Table 3.3). The ranking is based on the total gross export of numbers of live sheep between 2017 and 2021.

The inter-regional trade of live sheep is growing due to non-MENA countries reducing their trading of live sheep to and from MENA countries. To limit the amount of informal live sheep trading, countries like the UAE have made policies and alliances with other MENA countries to facilitate

⁴³ FAO data is not suitable for a more in-depth analysis as it contains estimates and unofficial figures.

⁴⁴ Australian sheep are not permitted to be traded to a third party under ESCAS. Refer Box 2.3.

safe, and formal live sheep imports and exports.⁴⁵ Kuwait has engaged in inter-regional live sheep trade to keep their industry alive, as it is 'vital'⁴⁶ to the culture and economy.

Table 3.3 Ranking of gross total top live sheep exporters inter-regionally (all MENA countries) (head), 2017-2021

Ranking	Israel	Jordan	Kuwait	Oman	UAE
1 st	Jordan	Saudi Arabia	Jordan	Iran	Iran
2 nd	-	Israel	Iran	UAE	Jordan
3 rd	-	-	Saudi Arabia	Saudi Arabia	Lebanon
4 th	-	-	Lebanon	Yemen	Saudi Arabia
5 th	-	-	Oman	-	Kuwait

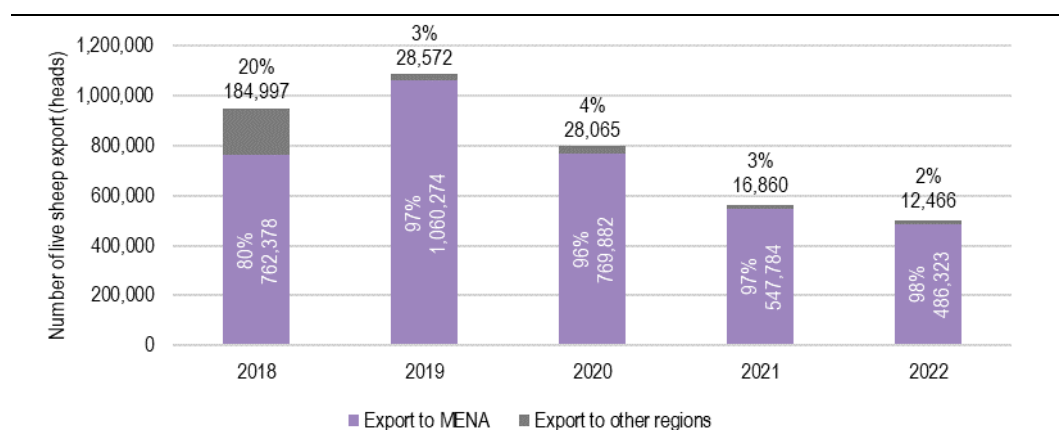
Note: FAO data includes estimates and unofficial figures

Source: ACIL Allen based on United Nation's Food and Agriculture Organisation, 2021

3.3.3 Australian live sheep exports to MENA

In 2018, 80% of live sheep exported from Western Australia went to all countries in MENA (refer Figure 3.15). By 2019, 97% of all live sheep from Western Australia were exported to MENA, with most of the remaining 3% airfreighted to Malaysia. This trend has remained over the last few years, although the total number of live sheep being exported has declined due to a combination of factors including increased regulatory costs, changes in domestic sheep prices meaning an increase in transfer of sheep to eastern states, relatively higher prices for Australian sheep than other suppliers, and the COVID-19 pandemic. By 2022, live sheep export numbers were at record lows, with nearly all being exported to MENA countries.

Figure 3.15 Live sheep export from Western Australia to all MENA countries by calendar year, 2018-2022

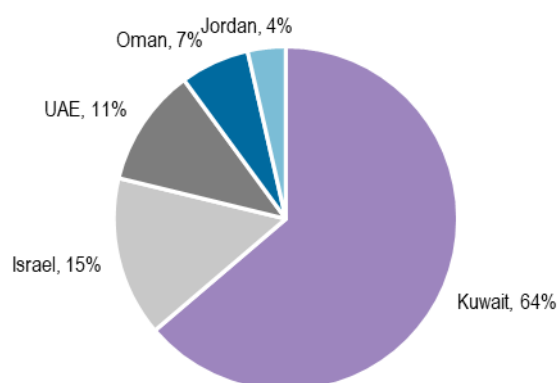


Source: ACIL Allen based on Department of Agriculture, Fisheries and Forestry, February 2023

With a focus on 2022, and the five countries presented in this study, 64% (290,000 head) of Australia's live sheep exports went to Kuwait, followed by Israel at 15% (69,000 head), the UAE 11% (51,000 head), Oman 7% (30,000 head), and Jordan 4% (17,000 head) (refer Figure 3.16).

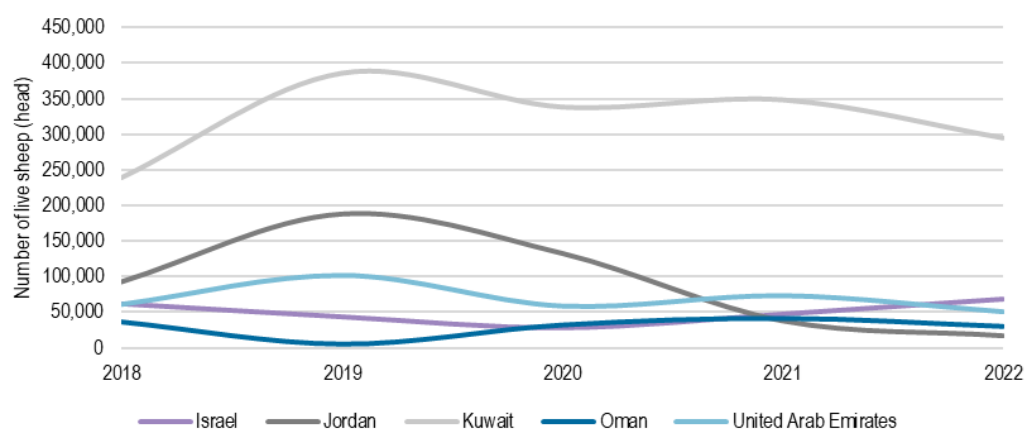
⁴⁵ Interafrican Bureau for Animal Resources, *Inter-Regional Conference to Promote Safe and Stable Livestock Trade Between the Horn of Africa and the Middle East*, accessed 27 April 2023. <https://www.au-ibar.org/au-ibar-communique/communique-inter-regional-conference-promote-safe-and-stable-livestock-trade>

⁴⁶ Australian Financial Review, *Kuwait says live sheep trade vital as producers turn on Albanese*, accessed 27 April 2023. <https://www.afr.com/companies/agriculture/kuwait-says-live-sheep-trade-vital-as-producers-turn-on-albanese-20230317-p5ct3y>

Figure 3.16 Relative share of Australia's live sheep exports to selected MENA countries, 2022

Source: ACIL Allen based on Meat & Livestock Australia, 2023

While the total number of live sheep being exported has declined over the last five years, the exports to certain countries have been increasing in this period (specifically Oman and Israel). Exports to Kuwait and the UAE have slightly decreased since 2019, and exports to Jordan significantly decreased (by 24%) since 2019 (see Figure 3.17). Jordan has primarily reduced imports of Australian sheep due to price, preferring to source from Romania (refer Table 3.2).⁴⁷

Figure 3.17 Australia's live sheep exports to selected MENA countries (calendar year, 2018-2022)

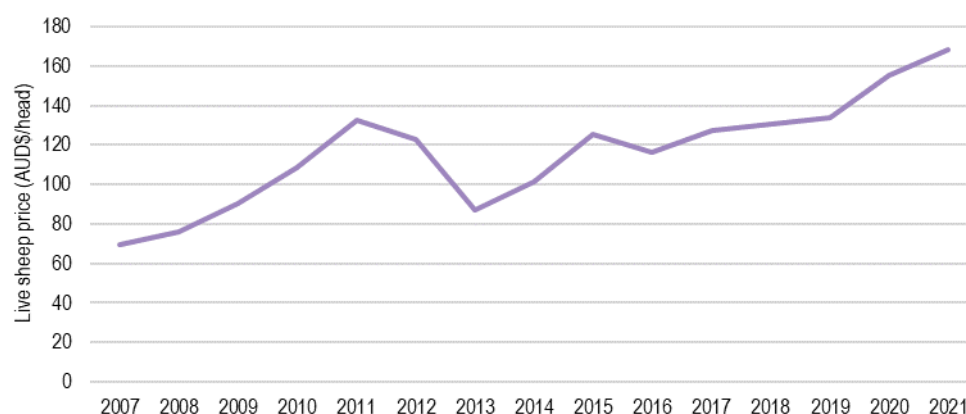
Source: ACIL Allen based on Department of Agriculture, Fisheries and Forestry, February 2023

⁴⁷ Meat & Livestock Australia 2019, *Sheep export market evolving*, accessed 7 April 2023, <https://www.mla.com.au/prices-markets/market-news/2019/sheep-export-market-evolving/>

3.3.4 Price of live sheep

While data on live sheep prices is limited, ACIL Allen's analysis using data from Western Australian Department of Primary Industries and Regional Development shows that the average export price in 2021 was AUD\$168/head.^{48,49} Using the Western Australia price from 2021, and the total number of live sheep exported from Western Australia indicates the changes in value for the industry over time. Refer Figure 3.18.

Figure 3.18 Estimated value of sheep being sent to live export (Western Australia)

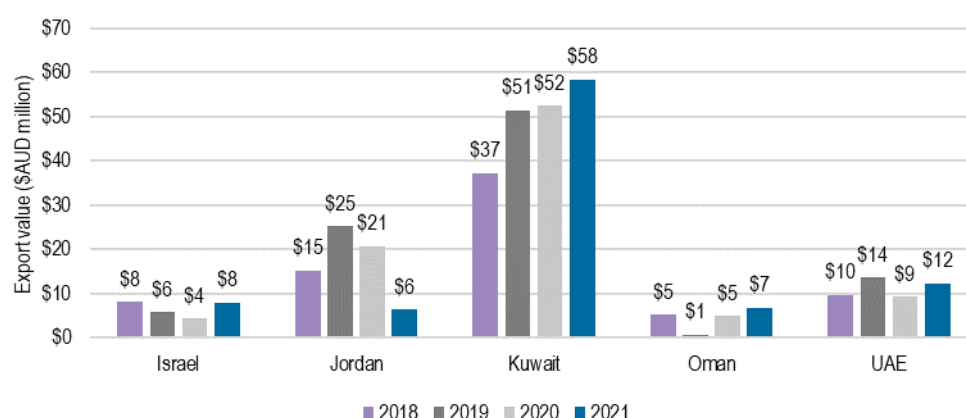


Price is calculated by dividing value to volume of live sheep exported.

Source: ACIL Allen based on Department of Primary Industries and Regional Development, 2023

Using the estimated price of live sheep and export volume data, it was calculated that Australia exported AUD\$92 million worth of live sheep to the five MENA countries in 2021, a 21% increase from AUD\$75.7 million in 2018. Refer Figure 3.19.

Figure 3.19 Estimated live sheep export value from Australia to selected MENA countries, 2018-2021



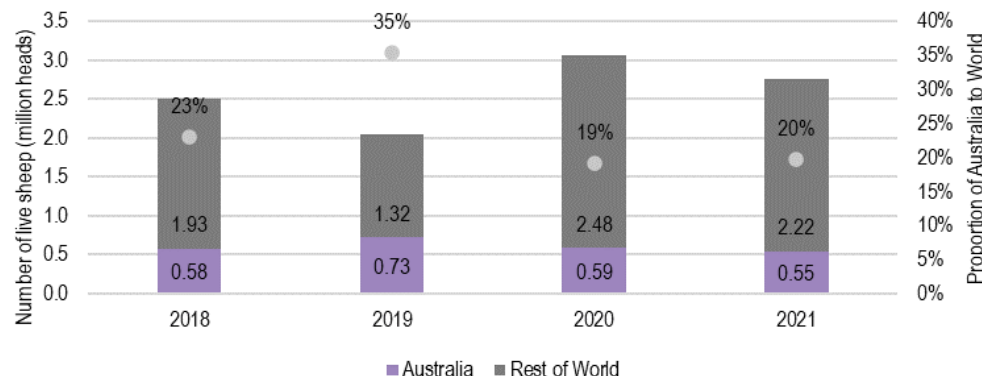
Source: ACIL Allen based on Department of Primary Industries and Regional Development and Department of Agriculture, Fisheries and Forestry, 2023

⁴⁸ Department of Primary Industries and Regional Development 2023, *The Western Australian sheep and wool industries*, accessed 24 April 2023, <https://www.agric.wa.gov.au/sheep/western-australian-sheep-and-wool-industries>. This price is fairly consistent with data from Meat & Livestock Australia (2021), where results show the 2020-21 financial year export price of AUD\$148.05/head.

⁴⁹ Based on Meat & Livestock Australia, 2021. Total live sheep export value of AUD\$84.5 million, 570,729 head of live sheep exported to Kuwait, UAE, Jordan, Israel, Oman, and Qatar.

Figure 3.20 estimates the Australian versus the rest of the world share of live sheep trade to the five MENA countries of focus and shows that the Australian market share ranges between 19% and 35% from 2018 to 2021.

Figure 3.20 Number of live sheep imported from Australia and rest of world by the MENA countries of focus (blue dots indicate Australian share)



Source: ACIL Allen based on United Nation's Food and Agriculture Organization, 2021

More recent data shows that price of live sheep varies greatly between country and the source of sheep. A selection of available live sheep prices in MENA countries is shown in Table 3.4. The price of live Australian sheep is only available in the UAE, and ranges from \$275 to \$392 per head (2022). This is marginally higher than Somali sheep, but lower than local sheep. The same pattern can be observed in Jordan, where imported Australian sheep are sold for nearly double the price of Somali sheep, indicating that Somali sheep tend to be cheaper in the region.

Table 3.4 Live sheep prices in selected MENA countries, 2022

Country	Type of sheep	Price (USD)	Price (AUD)
Israel	N/A	N/A	N/A
Jordan	Non-Somali sheep	\$190	\$274
	Somali sheep	\$92 - \$105	\$133 - \$151
Kuwait	N/A	N/A	N/A
Oman	Local sheep	\$299 - \$351	\$431 - \$506
United Arab Emirates	Australian sheep	\$191 - \$272	\$275 - \$392
	Somali sheep	\$181 - \$177	\$261 - \$255
	Local sheep	\$408 - \$680	\$588 - \$980

Note: USD to AUD conversion used the average 2022 exchange rate of 1.442.

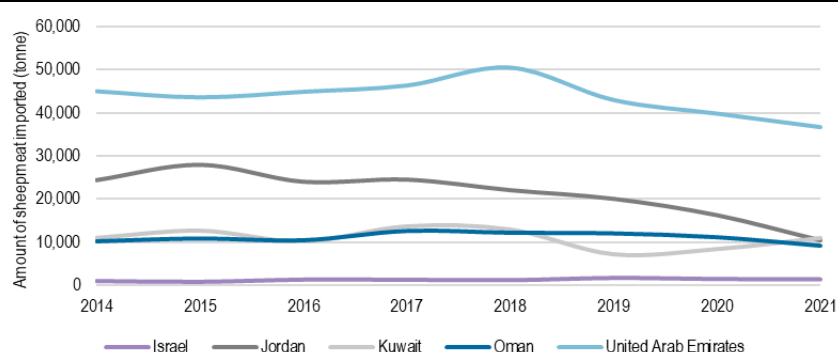
Source: ACIL Allen based on data provided by the Livestock Export Program, 2022

3.3.5 The market for sheepmeat in selected MENA countries

In 2021, the UAE imported the most sheepmeat (approximately 36,000 tonnes), followed by Kuwait, Jordan, and Oman. Israel imported the least with just under 1,400 tonnes. Although sheepmeat imports to all MENA countries have remained steady since 2014, there have been decreasing trends in the five focus countries in recent years. Jordan has seen the biggest annual average decline (10% since 2015). Refer Figure 3.21.

Reasons for this decline include changes in economic conditions, increased transport costs and the COVID-19 pandemic.⁵⁰ However, demand for sheepmeat in these countries is forecast to increase at 8.7% compound annual growth rate, driven by economic recovery, particularly growth in tourism and population growth.⁵¹ The latest figures show that in 2021-22, the whole MENA region imported approximately 105,000 tonnes of sheepmeat globally, a 7% increase from the previous year, further supporting this forecast.⁵²

Figure 3.21 Estimated amount of sheepmeat imported by calendar year for selected MENA countries, 2014-2021



Source: ACIL Allen based on United Nation's Food and Agriculture Organization, 2023

Market share

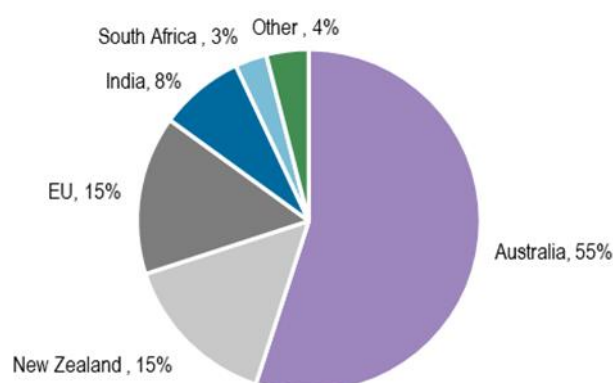
In the 2021-22 financial year, Australia was the dominant supplier (55%) of sheepmeat into all of MENA. New Zealand and the EU had 15% each, followed by India (8%), and South Africa (3%). Refer Figure 3.22). While New Zealand is generally seen as a major competitor of Australia, the majority of sheepmeat from New Zealand is exported to China and European countries instead of MENA.⁵³

⁵⁰ Meat & Livestock Australia 2021, *MENA Beef and Sheepmeat Snapshot*, accessed 6 April 2023

⁵¹ Ibid.

⁵² Meat & Livestock Australia 2022, *Global sheepmeat industry and trade report*, accessed 11 April 2023, <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/os-markets/mla-mi-global-industry-trade-report-sheep.pdf>

⁵³ Meat & Livestock Australia 2022, *Global sheepmeat industry and trade report*, accessed 11 April 2023, <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/os-markets/mla-mi-global-industry-trade-report-sheep.pdf>

Figure 3.22 Global share of sheepmeat export to MENA region, 2021-22 financial year

Source: ACIL Allen based on Meat & Livestock Australia, 2022

Table 3.5 shows the ranking of top sheepmeat exporters to the five MENA countries of focus based on FAO data. Australia is the biggest exporter (by a large margin) except for Israel. Other significant exporters include New Zealand, the EU (Spain and Romania), and India. The ranking is based on the total gross tonnes of sheepmeat between 2017 and 2021.

Table 3.5 Ranking of gross total sheepmeat exporters to selected MENA countries (tonnes), 2017-2021

Ranking	Israel	Jordan	Kuwait	Oman	UAE
1 st	Spain	Australia	Australia	Australia	Australia
2 nd	Australia	New Zealand	Spain	UAE	India
3 rd	Chile	Romania	New Zealand	New Zealand	Pakistan
4 th	Argentina	United Kingdom	India	India	Spain
5 th	France	Sudan	Romania	China	New Zealand

Note: FAO data includes estimates and unofficial figures

Source: ACIL Allen based on United Nation's Food and Agriculture Organization, 2021

In terms of inter-regional trade (refer Table 3.6), the UAE and Saudi Arabia are dominant regional suppliers. The ranking is based on the total gross tonnes of sheepmeat between 2017 and 2021.

Inter-regional sheepmeat trade amongst MENA countries has been established to ensure that the livestock and meat traded is safe and sustainable. In 2020, the Food and Agriculture Organization of the United Nations (FAO) and the IGAD Center for Pastoral Areas and Livestock Development (ICPALD) set up systems to enhance inter-regional trade between MENA and the Gulf countries.⁵⁴ This was primarily to aid the major actors in the meat value chain and ensure higher standards of hygiene and cross-border cooperation.

⁵⁴ Food and Agriculture Organization of The United Nations, *FAO and IGAD step towards improving livestock trade between IGAD and the Middle East and Gulf (MENA) Regions*, accessed 27 April 2023. <https://www.fao.org/africa/news/detail-news/en/c/1261182/>

Table 3.6 Ranking of gross total sheepmeat exporters inter-regionally (selected MENA countries) (tonnes), 2017-2021

Ranking	Israel	Jordan	Kuwait	Oman	UAE
1st	-	Saudi Arabia	UAE	UAE	Saudi Arabia
2nd	-	Lebanon	Saudi Arabia	Qatar	Oman
3rd	-	-	Lebanon	Saudi Arabia	Jordan
4th	-	-	Oman	Kuwait	Iran
5th	-	-	Jordan	Jordan	Lebanon

Note: FAO data includes estimates and unofficial figures

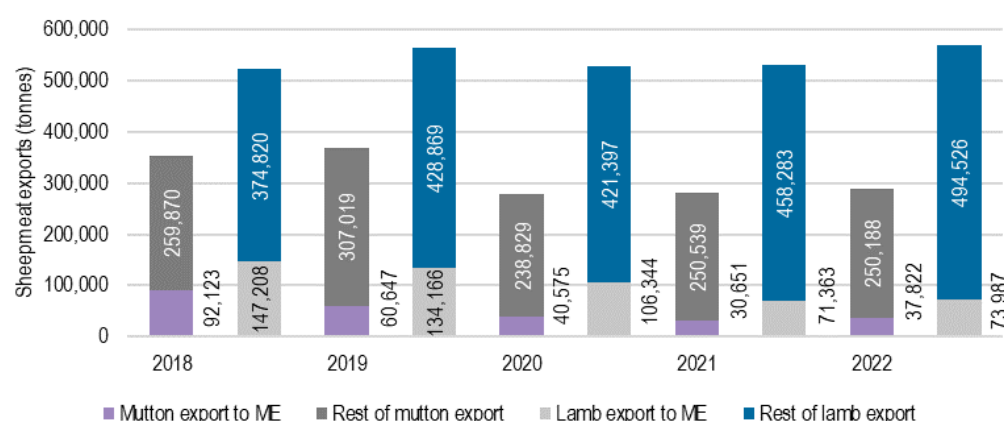
Source: ACIL Allen based on United Nation's Food and Agriculture Organization, 2021

3.3.6 Australian sheepmeat exports to all MENA countries

Although many consumers in the MENA region prefer live sheep that can be slaughtered and butchered locally, the preference for sheep protein also drives substantial demand for both chilled and frozen sheepmeat.

In 2022, Australia exported 288,009 tonnes of mutton and 568,513 tonnes of lamb, with 13% of each (37,822 tonnes of mutton and 73,987 tonnes of lamb) going to all MENA countries. While mutton has experienced some decline since 2019, lamb exports have remained consistent in the last five years with some fluctuations primarily due to COVID-19 disruptions.

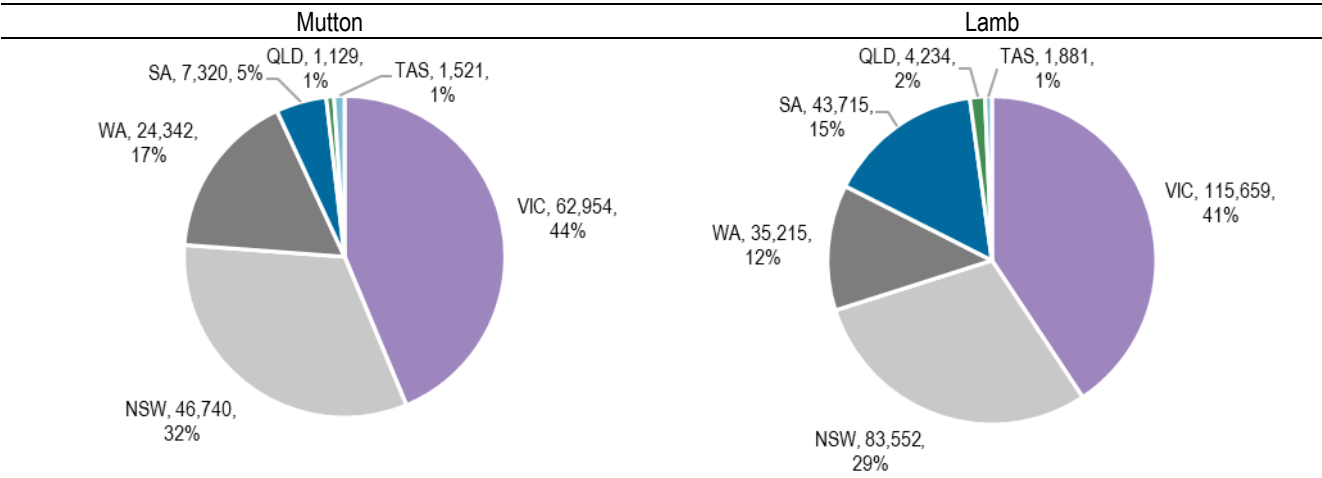
Figure 3.23 Chilled and frozen sheepmeat exports from Australia to all MENA countries by calendar year (2018-2022)



Source: ACIL Allen based on Department of Agriculture, Fisheries and Forestry, February 2023

Unlike live sheep, sheepmeat is exported from all Australian states. In 2022, Victoria accounted for about 40% of the global market, followed by New South Wales (30%). Western Australia exported 24,352 tonnes (17%) of mutton and 35,215 tonnes (12%) of lamb as seen in Figure 3.24.

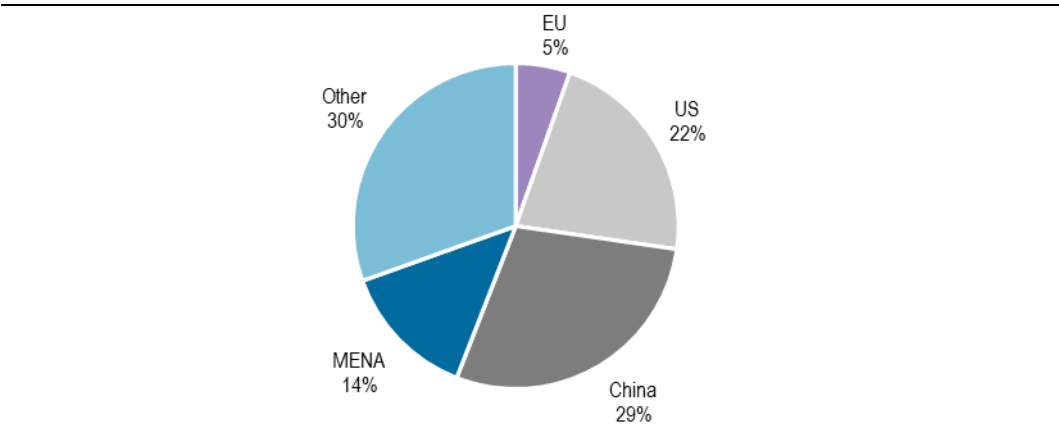
Figure 3.24 All Australian sheepmeat exports by state of origin, 2022



Source: ACIL Allen based on Department of Agriculture, Fisheries and Forestry, February 2023

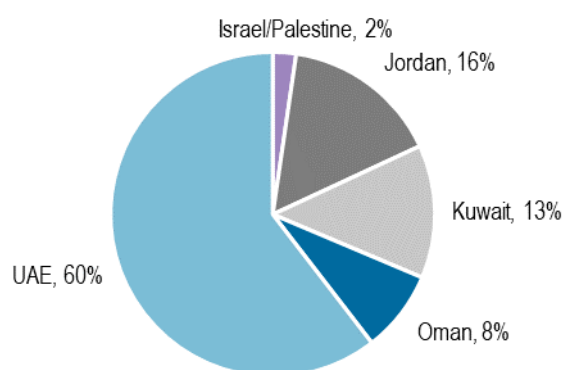
In 2022, Australia exported 430,000 tonnes of sheepmeat. Australia’s major markets are China, the US and MENA countries (see Figure 3.25).

Figure 3.25 Share of sheepmeat exports from Australia to key markets, 2022



Note: All MENA countries
Source: ACIL Allen based on Department of Agriculture, Fisheries and Forestry, 2023

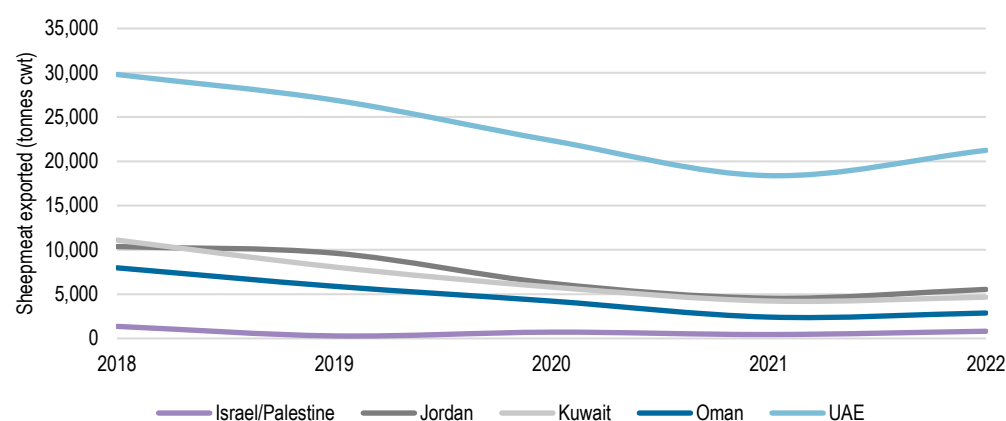
The export of sheepmeat from Australia to the UAE is significantly higher than other countries in this analysis, at 60% (over 21,000 tonnes carcass weight (cwt) in 2022). The country with the second highest import of Australia’s sheepmeat is Jordan (16%, 5,500 tonnes cwt), followed by Kuwait (13%, 4,700 tonnes cwt), Oman (8%, 2,900 tonnes cwt), and Israel (800 tonnes cwt). Figure 3.26 shows the share of Australia’s sheepmeat exports to the five countries of focus.

Figure 3.26 Relative share of Australia's sheepmeat export to selected MENA countries, 2022

Source: ACIL Allen based on Meat & Livestock Australia, 2023

From 2018 to 2021, the export of Australian sheepmeat to these countries has been decreasing. Among these countries, the UAE observed the most significant decrease, down 38% during this period. A factor contributing to this decline is the high cost per head of sheep in Australia, as illustrated in Figure 2.10 and Figure 2.11.

Other commonly cited reasons for this decline are decreasing oil prices reducing incomes in these countries, and the COVID-19 pandemic which significantly increased freight costs.⁵⁵ However, in 2022, there was a small recovery in the quantity of sheepmeat exports to all focus countries as economic conditions improved. Refer Figure 3.27.

Figure 3.27 Australia's sheepmeat export to selected MENA countries by calendar year (2018-2022)

Source: ACIL Allen based on Meat & Livestock Australia, 2023

⁵⁵ Meat & Livestock Australia 2021, *MENA Beef and Sheepmeat Snapshot*, accessed 6 April 2023

Conclusion

4

4.1 Key findings

4.1.1 Value and importance to the economy

National contribution

In the last five years, the live sheep export industry (live sheep and the associated wool clip) has, on average, directly contributed \$52 million of value-added annually and directly employed 88 FTEs. This is 1.4% of the national sheep industry.

Western Australian contribution

As Western Australia dominates live sheep exports, the results are very similar to the national contribution but live sheep exports (sheep plus the associated wool clip) account for a higher proportion (6.1%) of the total sheep industry value-added in Western Australia.

In the last five years, the live sheep export industry in Western Australia (live sheep and the associated wool clip) has, on average, directly contributed \$45 million of value-added annually and on average directly employed 52 FTEs.

Total (indirect plus direct) contribution for the live sheep export industry had an upper bound of \$71 million value-added annually, distributed across other industries in the Western Australian economy. Outside the agriculture sector the largest impacts are seen in health care and social assistance, accommodation and food services, manufacturing and education and training.

4.1.2 Impact of cessation of sheep live export

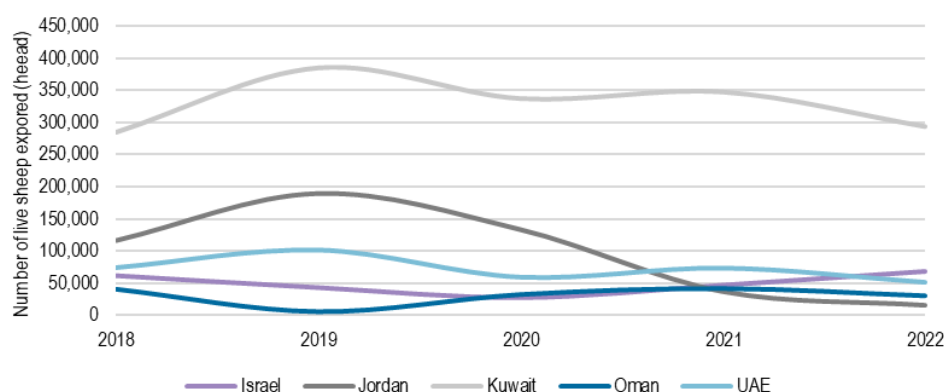
Without the option of live sheep exports there is an estimated a 19.19% reduction in the per head value of a wether in Western Australia, or in dollar terms a decline of \$21.84 per wether (with a price response).

4.1.3 Markets and trade

Australia has a large and sustained presence in both the live sheep market and the sheepmeat market in the Middle East.

In recent years five countries (Israel, Jordan, Kuwait, Oman, and the UAE) have imported more than 80% of Australia's live sheep exports with a value of \$92 million in 2021. Over the last five years Kuwait has consistently imported large numbers of Australian live sheep even during the COVID-19 pandemic. Refer Figure 4.1.

Figure 4.1 Australia's live sheep exports to selected MENA countries (calendar year, 2018-2022)



Source: ACIL Allen based on Meat & Livestock Australia, 2023

Live Australian sheep are preferred for quality, consistency and quality and the long-standing relationships and partnerships that have been established between Australian live sheep exporters and buyers in the region. For example, Australia has been supplying Kuwait with live sheep for over 60 years.⁵⁶ Many of these long-term relationships are built on trust, reliability, and a shared commitment to quality and customer satisfaction. Australia also has similar trade relationships, and strengths, in the sheepmeat markets in MENA, with market share of 55%. While the amount of Australian sheepmeat into the five countries of focus has declined in recent years, volumes are expected to grow over the next few years.

Although boxed or chilled meat may be a convenient and practical alternative to live sheep in some circumstances, it cannot fully replicate the cultural, religious, traditional and practical importance of live sheep in the Middle East⁵⁷, particularly during religious festivals such as Eid al-Adha.

Based on available data (which is limited), it is concluded that these countries will raise their live sheep imports from other nations rather than substantially increase their imports of Australian boxed or chilled sheepmeat. The key importers into the region include European nations such as Portugal, Spain, and Romania as well as Somalia, the Sudan and India. Inter-regional trade is dominated by Jordan, Saudi Arabia, Iran, and the UAE.

⁵⁶ Refer: <https://www.afr.com/companies/agriculture/kuwait-says-live-sheep-trade-vital-as-producers-turn-on-albanese-20230317-p5ct3y> accessed 22 April 2023.

⁵⁷ Nath et al. (2012). Impact on Western Australia's sheep supply chain of the termination of live sheep exports, Contributed paper for the 56th AARES annual conference, Fremantle, Western Australia, February 7-10, 2012.

Limitations and future research

5

5.1 Limitations

This project was limited by the following:

- Availability of public information, particularly in quantitative data from the countries of focus.
- Use of a real options model previously developed in 2017 (using updated data but with no change to the assumptions).

5.2 Future research

This project was constrained by the limited availability of public information, particularly quantitative data from the specific countries of focused. Therefore, future research endeavours should prioritise the quantification of the potential impact if Australia were to cease its live sheep export trade in the Middle East. Additionally, expanding the analysis to encompass all importers of Australian live sheep would provide a more comprehensive understanding of the trade dynamics.

Potential areas of focus for future research could include:

- Quantifying the trade implications of discontinuing live sheep exports from Australia.
- Conducting a thorough trade analysis encompassing all countries that import live sheep from Australia.
- Updating the assumptions of the real options model to incorporate market dynamics and climate-related factors such as drought conditions.
- Collecting primary data to better inform the real options model.

By addressing these research gaps, future studies can contribute to a more comprehensive and nuanced understanding of the implications, challenges, and opportunities associated with potential changes in Australia's live sheep export trade in the Middle East and beyond.

Appendices

Socio-economic profiles - key markets

A

The Middle East and North Africa (MENA) region includes 19 countries and makes up approximately 6% of the world's population. Due to its substantial petroleum and natural gas reserves, MENA is an important source of global economic stability. The MENA region accounts for approximately 45% and 60% of the world's natural gas and crude oil reserves, respectively.

According to Middle East and North Africa Economic Update⁵⁸ report by the World Bank in October 2022, the MENA region's economy will grow by 3.5% in 2023, which is the fastest rate since 2016. However, this growth is uneven as many countries struggle to overcome the lasting effects of the COVID-19 pandemic.

The MENA region has a mixture of both very wealthy and less wealthy countries. In 2022, there were approximately 6.9 million households who earn more than \$35,000 (US\$), and approximately 3.9 million households who earn more than \$50,000 (US\$).⁵⁹

The region is highly populated (486.2 million people)⁶⁰ with a young population (median age of 26.8 years old)⁶¹ and a higher-than-average population growth at 1.3%, far exceeding the global average of 0.9%.⁶² The region is also very culturally diverse.

A.1 Israel

Israel has a robust and stable economy. Its GDP per capita is approximately \$52,000 and economic growth is expected to accelerate in 2024, as inflation abates. Israel has a high employment rate (only 3.9% of the total labour force in Israel is unemployed (2022)).⁶³ A large part of the economy is funded by natural resources, specifically its mineral resources and power industries. Israel's economy is also heavily supported by immigrants and foreign workers.

⁵⁸ The World Bank. *Middle East and North Africa Economic Update*.

<https://www.worldbank.org/en/region/mena/publication/middle-east-and-north-africa-economic-update>

⁵⁹ Meat & Livestock Australia, *Market Snapshot | Sheepmeat – MENA (Middle East & North Africa)*,

Accessed 28 March 2023, <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/os-markets/export-statistics/oct-2018-snapshots/mla-sheepmeat-market-sn89apshot---mena---oct-2018-v2.pdf>

⁶⁰ World Bank 2021, *Population growth (annual %)*, accessed 29 March 2023,

<https://data.worldbank.org/indicator/>

⁶¹ Ibid.

⁶² Ibid.

⁶³ Central Bureau of Statistics Israel, *Unemployment*, accessed 4 April 2023,

<https://www.cbs.gov.il/en/Pages/default.aspx>

The country is small and is densely populated. Israel has a diverse culture, history, and population. Israel's population is approximately 9.7 million (2023)⁶⁴, with a population growth rate of 1.6% (2021).⁶⁵ The life expectancy at birth is 83 years old.⁶⁶ The population is also growing, with high birth and a relatively young population (approximately one-fourth are 15 years or younger)⁶⁷. Many people immigrate to or work in Israel, and its migrant and foreign worker population is set to grow as Israel continues to industrialise.

Israel's limited geographical size and growing population creates high demand for food imports.

A.2 Jordan

The economy of Jordan is developing. The GDP per capita was approximately \$4,103 (US\$)⁶⁸ in 2021 and 18.4% of the labour force was unemployed⁶⁹. However, Jordan has a positive GDP growth rate of 2.2% annually⁷⁰, suggesting that the economy is slowly gaining strength. Jordan is also using its strength in tourism to boost its economy, specifically after the effects of COVID-19. With robust and sustainable economic policy, Jordan has the potential for growth.

Jordan has a population of 11.1 million as of 2021⁷¹ with an annual population growth of 2%⁷². Its small population is an attribute of Jordan being a relatively young country, as it was only an independent kingdom from 1946 onwards.⁷³ However, the birth rate is high and the growth rate is almost double the world's average, further supporting growing Jordanian infrastructure, business, and society. The population of Jordan is also predominantly young, with around one-third under the age of 15. Jordan has had a lot of internal migration from rural areas to bigger cities.

Despite its population size and economy, Jordan consumes a high percentage of sheepmeat. In 2021, Jordan was the fourth largest importer of sheep and goats in the world (\$175 million)⁷⁴. Domestically, sheep and goat are amongst the top 20 products imported by Jordan.⁷⁵

⁶⁴ Central Bureau of Statistics Israel, *Population*, accessed 4 April 2023, <https://www.cbs.gov.il/en/Pages/default.aspx>

⁶⁵ World Bank, *Population growth (annual %) – Israel*, accessed 28 March 2023, <https://data.worldbank.org/country/israel>

⁶⁶ World Bank, *Life expectancy at birth, total (years) – Israel*, accessed 28 March 2023, <https://data.worldbank.org/country/israel>

⁶⁷ Encyclopedia Britannica, *Demographic Trends – Israel*, accessed 31 March 2023, <https://www.britannica.com/place/Israel/Demographic-trends>

⁶⁸ World Bank, *GDP per capita (current US\$) – Jordan*, accessed 5 April 2023, <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=JO>

⁶⁹ World Bank, *Unemployment, total (% of total labor force) (modeled ILO estimate) – Jordan*, accessed 5 April 2023, <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=JO>

⁷⁰ World Bank, *GDP per capita (current US\$) – Jordan*, accessed 5 April 2023, <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=JO>

⁷¹ World Bank, *Population, total – Jordan*, accessed 5 April 2023, <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=JO>

⁷² World Bank, *Population growth (annual %) – Jordan*, accessed 5 April 2023, <https://data.worldbank.org/indicator/SP.POP.GROW?locations=JO>

⁷³ Encyclopedia Britannica, *Jordan*, accessed 5 April 2023, <https://www.britannica.com/place/Jordan>

⁷⁴ The Observatory of Economic Complexity, *Sheep and Goats in Jordan*, accessed 5 April 2023, <https://oec.world/en/profile/bilateral-product/sheep-and-goats/reporter/jor>

⁷⁵ Meat & Livestock Australia, *MARKET SNAPSHOT | BEEF & SHEEPMEAT*, accessed 5 April 2023, https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/os-markets/export-statistics/november-2021/2021-mena-market-snapshot-red-meat_111121_distribution.pdf

A.3 Kuwait

Kuwait is regarded as a 'wealthy' country by virtue of its expansive petroleum extraction and processing industry; however, most people work in services and industry.

Kuwait has approximately 102 billion barrels worth of crude oil reserves, which further makes up around 7% of the entire world's reserves.⁷⁶ Unemployment is low at 2.8% (2021)⁷⁷ and Kuwait is heavily reliant on foreign labour. Its GDP per capita was approximately \$24,300 (US\$)⁷⁸; however, this is down on pre-COVID times as there was a substantial reduction in foreign workers during the pandemic.

Located on the Persian Gulf and one of the major urbanised countries in the world, Kuwait's population is approximately 4.2 million (2022).⁷⁹ Kuwait is home to a diverse range of cultural groups, with several historically important class divisions. However, Kuwaitis are a minority in their own country.

Migrant workers comprise about two-thirds of the population, some from other Arab states, but mostly from South and Southeast Asia.⁸⁰ Although the population is not growing rapidly the birth rate is close to the world average,⁸¹ and it is relatively young (approximately 25% are 15 years or younger).⁸²

A growing economy and high per capita income drive the consumption of sheep, which Kuwait is unable to produce domestically at scale, and is therefore highly dependent on imports.

A.4 Oman

Oman has a diverse economy. Its GDP per capita was \$19,509 (US\$) in 2021⁸³ and it has an annual growth rate of 4.1% (2023).⁸⁴ Though Oman has a thriving agricultural sector, it is mainly focused on fishing and exports, which is why it imports large amounts of live sheep and sheepmeat. The Oman economy is also thriving due to its commercial oil productions. Oil represents of two-fifths of Oman's GDP, and a significant part of the government income.⁸⁵ Only 2.5% of the labour force is unemployed.⁸⁶

⁷⁶ Encyclopedia Britannica, *Economy of Kuwait*, accessed 3 April 2023, <https://www.britannica.com/place/Kuwait/Demographic-trends#ref45147>

⁷⁷ World Bank, *Unemployment, total (% of total labor force) (modeled ILO estimate) - Kuwait*, accessed 28 March 2023, <https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS?locations=KW>

⁷⁸ World Bank, *GDP per capita (current US\$) - Kuwait*, accessed 28 March 2023, <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=KW>

⁷⁹ Kuwait Central Statistical Bureau, *Population and Households of Kuwait*, accessed 4 April 2023, <https://knoema.com/KWPH2013/population-and-households-of-kuwait>

⁸⁰ World Bank, *Population, Total – Kuwait*, accessed 28 March 2023, <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=KW>

⁸¹ World Bank, *Life expectancy at birth, total (years) – Kuwait*, accessed 28 March 2023, <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=KW>

⁸² Encyclopedia Britannica, *Demographic Trends – Kuwait*, accessed 31 March 2023, <https://www.britannica.com/place/Kuwait/Demographic-trends>

⁸³ The World Bank, *GDP (current US\$) – Oman*, accessed 3 April 2023, <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=OM>

⁸⁴ International Monetary Fund, *Oman*, accessed 3 April 2023, <https://www.imf.org/en/Countries/OMN>

⁸⁵ Encyclopedia Britannica, *Economy of Oman*, accessed 3 April 2023, <https://www.britannica.com/place/Oman/Economy>

⁸⁶ Foreign Ministry of Oman, *Economy*, accessed 3 April 2023, <https://fm.gov.om/about-oman/state/economy/>

A Gulf State, on the Arabian Peninsula, Oman serves as a major trading country. Oman's population is approximately 5 million (2023).⁸⁷ In recent years there has been an increasing number of immigrants from around the world. The population, like many Gulf countries is young, with approximately half the population under 30 years old.⁸⁸

Oman's sheepmeat consumption is among the highest in the world at 12.2kg per capita annually.⁸⁹ The country imports large amounts of both live sheep and meat to meet domestic demand.

A.5 United Arab Emirates

The UAE has one of the most open economies in the world, existing as a hub of global business and trade. The UAE's GDP per capita was approximately \$44,315 (US\$) in 2021⁹⁰ with the economy expanding at 7.6% (2022).⁹¹ UAE has 10% of the world supply of oil reserves, and the world's fifth largest natural gas reserves. The UAE has become a place for major business and commercial organisations. The unemployment rate is 3.1% but this number does not account for the number of expatriates and non-citizens who work in the UAE. Other than oil, the agricultural production and fishing industries of the UAE are expanding, although they contribute very little to the GDP.

The UAE is a prosperous country known for its oil industry, technological development, and financial opportunities. The UAE's population is approximately 9.3 million (2021)⁹² but only around 10% of the residents of the UAE are citizens. The remainder of the population are foreign workers and their families.⁹³ The UAE population is concentrated in coastal cities due to the trading and business opportunities that exist there. Around 75% of the population are younger than 45 years old.⁹⁴

The young, growing population of UAE provides a great substantial market for the consumption and import of sheep. The UAE's sheepmeat consumption per capita was 11.8kg (2021), one of the highest in the world.⁹⁵

⁸⁷ National Centre for Statistics & Information, *Population*, accessed 4 April 2023, <https://data.gov.om/OMPOP2016/population>

⁸⁸ Encyclopedia Britannica, *Demographic Trends – Oman*, accessed 31 March 2023, <https://www.britannica.com/place/Oman/Plant-and-animal-life#ref257073>

⁸⁹ Meat & Livestock Australia, *Market Snapshot | Beef & Sheepmeat*, accessed 31 March 2023, https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/os-markets/export-statistics/november-2021/2021-mena-market-snapshot-red-meat_111121_distribution.pdf

⁹⁰ World Bank, *GDP (current US\$) – United Arab Emirates*, accessed 3 April 2023, <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=AE>

⁹¹ Uppal, R., *UAE's GDP grew 7.6% in 2022, econ minister says*, accessed 3 April 2023, <https://www.reuters.com/world/middle-east/uae-gross-domestic-product-grew-76-2022-minister-2023-03-02/>

⁹² World Bank, *Population, total – United Arab Emirates*, accessed 4 April 2023, <https://data.worldbank.org/country/united-arab-emirates>

⁹³ Encyclopedia Britannica, *People of the United Arab Emirates*, accessed 28 March 2023, <https://www.britannica.com/place/United-Arab-Emirates/Land#ref45238>

⁹⁴ Encyclopedia Britannica, *Demographic trends of the United Arab Emirates*, accessed 28 March 2023, <https://www.britannica.com/place/United-Arab-Emirates/Land#ref45238>

⁹⁵ Meat & Livestock Australia, *Market Snapshot | Beef & Sheepmeat*, accessed 31 March 2023, https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/os-markets/export-statistics/november-2021/2021-mena-market-snapshot-red-meat_111121_distribution.pdf

Input-Output analysis

B

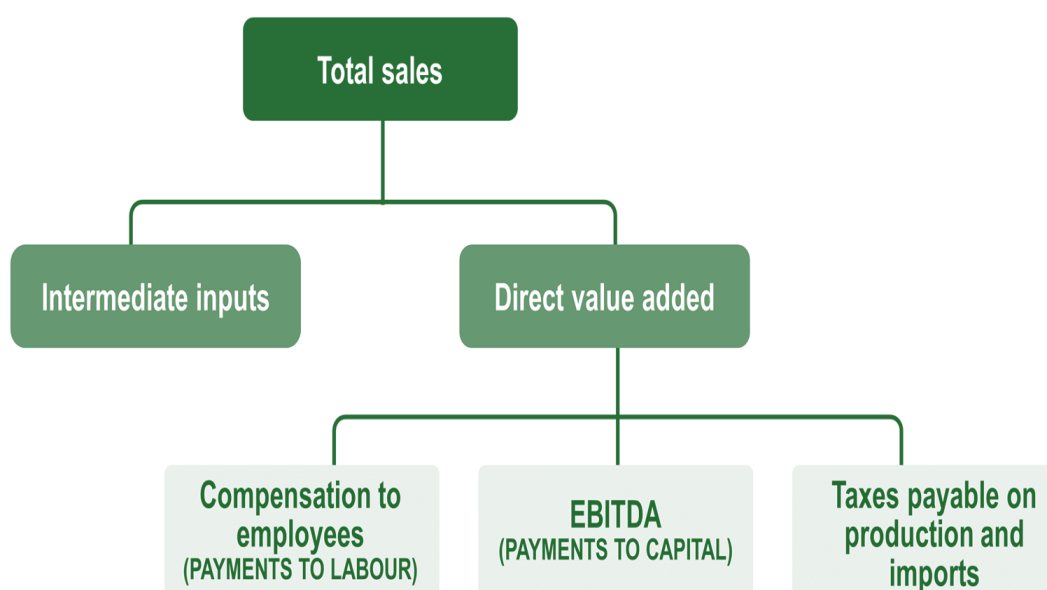
B.1 Direct economic contribution

The standard measure of economic contribution is the extent to which it increases the value of goods and services generated by the economy as a whole – in other words, the extent to which it increases economic activity as measured by gross domestic product (GDP). An economy has a range of factors of production (including labour and capital stock) and access to various intermediate inputs. By using the factors of production appropriately industries add value to intermediate inputs by converting them into a range of goods and services more suited for use by consumers or other industries. An industry or business' contribution to GDP measures the total value added generated and is defined as the income that an industry or business generates, less the cost of the inputs that it uses to generate that income, plus certain taxes paid.

The direct contribution of an industry or a company to the Australian economy can therefore be estimated by determining their payments to the factors of production plus the taxes (less subsidies) payable on production and imports. This is shown graphically in **Figure B.1**.

The box overleaf provides a summary of the definitions used by the ABS as part of the System of National Accounts 1993 (SNA93).

Figure B.1 EBITDA is equivalent to the SNA93 definition of gross operating surplus



Source: ACIL Allen

Box 5.1 ABS definitions of value add

An industry's direct contribution to Gross Domestic Product or Gross State Product is well defined under the standard national accounting framework used by the Australian Bureau of Statistics (ABS), which is known as the System of National Accounts 1993 (SNA93). SNA93 recognises three different measures of value added:

- Value added at Purchasers' Prices. This is defined as output valued at purchasers' prices, less intermediate consumption valued at producer prices. This measure is equivalent to the traditional measure of value added at market prices.
- Value added at Basic Prices. In this measure, the output is valued at basic prices while intermediate consumption is valued at producer prices. In the case of beer production this measure excludes beer excise as they are viewed as production taxes levied on output.
- Value added at factor Cost. This measure excludes all production taxes net of subsidies. In other words, it excludes all production taxes – such as payroll taxes, fringe benefit taxes etc – and not just those that are levied on output.

The measure of value added to be used depends on the nature of the analysis that is to be conducted. When presenting an industry view of GDP for example, the ABS uses value added at basic prices and adds an aggregate estimate of net taxes on products in question to give a total measure of GDP at purchasers' prices (ABS 1999).

B.2 Indirect economic contribution

Indirect effects are a broader notion of the economic contribution that includes supply-side effects of agriculture expenditure beyond the direct component. For example, when a producer buys fertiliser, indirect effects are generated for the businesses supplying the product, the transporter who made deliveries to the supplier, the electricity company and other businesses that provided the inputs required to operate the supplier's business. To fully measure the indirect effects, account should also be taken of changes in incomes which may feed through to further changes in domestic demand.

The intermediate inputs used by an industry (fertilisers used by producers, for example) can be sourced either from within the Australian economy or from foreign economies. If purchased from within the Australian economy, then the portion of value added embodied in the intermediate input is indirectly associated with the activity of the purchaser. The calculation of the indirect contribution quickly becomes difficult as one considers that value-added embodied in the intermediate inputs of the intermediate input. For example, to make the fertilisers used by producers, consider the feedstock used in the fertiliser manufacturing, and the raw materials used in the feedstock, and so on.

Input-output tables and the associated 'input-output multipliers' can be used to estimate the indirect economic contributions. Input-output multipliers are summary measures generated from input-output tables that can be used for predicting the total impact on all industries in the economy of changes in demand for the output of any one industry. The tables and multipliers can also be used to measure the relative importance of the production chain linkages to different parts of the economy.

It should be noted that some of the assumptions underpinning input-output multipliers can be an impediment to credible analysis. Understanding these assumptions is necessary to prevent the inappropriate application of input-output multipliers – for example, in situations where economic constraints are present or when the profile of a business or project differs substantially from the industry average. We do not consider that these conditions apply for the purpose of this analysis and that the use of input-output multipliers to estimate the economic footprint of the live sheep

export industry is appropriate. Further information on input-output tables and the calculation of multipliers can be found in ABS Catalogue number 5246.0.

Lower and upper bounds

In this report we have estimated the likely lower and upper bounds of the indirect economic contribution of the sheep industry's activities. The lower bound estimate, derived from the 'Simple Multipliers,' captures only the value added and employment associated with the supply chain of each purchase stream (see below for details). Consequently, they provide a conservative estimate – or lower level bound – of the indirect economic contribution of intermediate inputs. The difference between these estimates and the direct economic contribution are commonly referred to as the 'production induced' contribution. The estimate from simple multipliers indicates the embodied economic contribution of various production chains.

The upper bound estimate of the impact of the sheep industry, derived using 'Total Multipliers,' captures the effects of inter-industry interactions and captures the impacts of the purchasing decisions made by workers employed throughout the industry's supply chain. This effect is commonly referred to as the 'consumption induced effect.'

B.3 Overview of Input-Output tables

Input-output tables provide a snapshot of an economy at a particular time. The tables used in this analysis were for the 2020-21 financial year to coincide with the year of the analysis.

Input-output tables can be used to derive input-output multipliers. These multipliers show how changes to a given part of an economy impact on the economy as a whole. A full set of input-output multipliers for each region were estimated for the purpose of this analysis.

The input-output multipliers allow rigorous and credible analysis of the economic footprint of a particular facility, industry, or event for the region of interest. Although input-output multipliers may also be suitable tools for analysing the impact of various types of economic change, caution needs to be adopted in their application for this purpose. Misuse of input-output multipliers for the purpose of impact analysis has led to scepticism of their general use in favour of other tools such as computable general equilibrium (CGE) modelling. Notwithstanding this, they are still eminently suitable for understanding the economic linkages between a given facility or industry to gain an appreciation of the wider interactions of the industry beyond its direct contribution.

B.4 Multiplier types

Input-output multipliers estimate the economic impact on a region's economy from a one dollar change in the final demand for the output of one of the region's industries. Generally, four types of multipliers are used:

- Output – measures the impact on the output of all industries in the economy
- Income – measures the effect on the wages and salaries paid to workers within the economy
- Employment – measures the jobs creation impact, and
- Value-added – measures the impact on wages and salaries, profits, and indirect taxes.

The sum of wages and salaries, profits and indirect taxes for a given industry provides a measure of its contribution to the size of the local economy – its contribution to gross regional product (GRP). The value added multiplier can therefore also be considered to be the GRP multiplier (or GSP multiplier or GDP multiplier).

Input-output multipliers are a flexible tool for economic analysis. Their flexibility stems from the different forms of each multiplier type. For each region, multipliers were estimated in the following forms:

- initial effects
- first round effects
- industrial support effects
- production induced effects
- consumption induced effects
- simple multipliers
- total multipliers
- type 1A multipliers
- type 1B multipliers
- type 2A multipliers
- type 2B multipliers.

B.4.1 Multiplier effects

When additional sales to final demand are made, for example through increased exports or sales to the public, production increases to meet the increased demand, and this is the initial effect. Since production increases to exactly match the increased final demand, the increase is always equal to one (noting that the multipliers are defined in terms of a one dollar increase in final demand).

The industry producing the additional output makes purchases to enable itself to increase production, these new purchases are met by production increases in other industries, and these constitute the first round effect. These first round production increases cause other industries to also increase their purchases, and these purchases cause other industries to increase their production, and so on. These 'flow-on' effects eventually diminish, but when added together constitute the industrial support effect.

The industrial support effect added to the first round effect is known as the production induced effect. So far this chain of events has ignored one important factor, the effect on labour and its consumption. When output increases, employment increases, and increased employment translates to increased earnings and consumption by workers, and this translates to increased output to meet the increased consumption. This is the consumption effect.

B.4.2 Multipliers

The simple and total multipliers are derived by summing the effects. The simple multiplier is the sum of the initial and production induced effects. The total multiplier is larger because it also adds in the consumption effect. So far, all the effects and multipliers listed have had one thing in common, they all measure the impact on the economy of the initial increase in final demand.

The remaining multipliers take a different point of view, they are ratios of the above multiplier types to the initial effect. The type 1A multiplier is calculated as the ratio of the initial and first round effects to the initial effect, while the type 1B multiplier is the ratio of the simple multiplier to the initial effect. The type 2A multiplier is the ratio of the total multiplier to the initial effect, while the type 2B multiplier is the ratio of the total multiplier less the initial effect to the initial effect.

Given the large number of multiplier types to choose from, output, income, employment and value added multipliers, and each with numerous variations (simple, total, type 2A, etc.) it is important that the analysis uses the most appropriate multipliers. Usually, the multipliers that include consumption effects (i.e., the added impact that comes from wage and salaries earners spending

their income) are used. These are the total and type 2A multipliers. The total and type 2A multipliers will generally provide the biggest projected impact. Simple or type 1B (which omit the consumption effect) may be used to provide a more conservative result.

B.5 Limitations of Input-Output analysis

Although input-output analysis is valid for understanding the contribution a sector makes to the economy, when used for analysing the potential impacts of a change in production of a particular sector, input-output analysis is not without its limitations. Input-output tables are a snapshot of an economy in a given period, the multipliers derived from these tables are therefore based on the structure of the economy at that time, a structure that it is assumed remains fixed over time. When multipliers are applied, the following is assumed:

- prices remain constant
- technology is fixed in all industries
- import shares are fixed.

Therefore, the changes predicted by input-output multipliers proceed along a path consistent with the structure of the economy described by the input-output table. This precludes economies of scale. That is, no efficiency is gained by industries getting larger – rather they continue to consume resources (including labour and capital) at the rate described by the input-output table. Thus, if output doubles, the use of all inputs doubles as well.

One other assumption underpinning input-output analysis which is worth considering is that there are assumed to be unlimited supplies of all resources, including labour and capital. With input-output analysis, resource constraints are not a factor. It is thus assumed that no matter how large a development, all required resources are available, and that there is no competition between industries for these resources.

It is important to understand the limitations of input-output analysis, and to remember that the analysis provides an estimate of economic contribution of a facility or industry, not a measurement of economic impact if the facility or industry shut down or did not exist.

Price elasticities

C

In the real options modelling ACIL Allen makes use of own-price elasticities to estimate the price impacts of supply changes. Own price elasticity is defined as the percentage change in quantity demanded divided by the percentage change in price. For most commodities these elasticities are negative numbers, indicating that the change in quantity demanded and the change in price are of opposite signs. This makes sense, as it indicates that as price rises the quantity demanded falls. Equally, it indicates that an increase in supply will lead to a price decline.

To estimate reasonable values for elasticities for this analysis, three references have been considered; Griffith et al. (2001),⁹⁶ Mounter et al. (2012)⁹⁷ and Fisher (1979)⁹⁸. In these publications the elasticity estimates for domestic lamb and mutton sales are regularly in the range of -1 to -2. Assuming an elasticity of -1.5 seems a reasonable starting point for the analysis. While the export elasticity for lamb and mutton is lacking in these publications, values for beef exports in Griffith et al. (2001) suggest an elasticity estimate of -2.5 is a reasonable starting point.

The modelling done in this report does not differentiate between domestic and export markets when it comes to estimating price effects. The analysis begins with the working assumption of an own-price elasticity of -2 for lamb and mutton products produced in Australia and modifies this assumption to accommodate the model presented here which has a purely Western Australia focus. Western Australia represents around 13% of Australian sheepmeat supply (2022).⁹⁹

As a first step to modifying the assumed Australian own-price elasticity of supply for use with our Western Australia centric model, the elasticity of -2 is divided by 12.4 per cent to give a revised estimate of -16. With this larger elasticity estimate, the price of lamb and mutton products are less sensitive to the percentage change in Western Australia sheep and lamb products than they would be if using total Australia production as the base for the percentage change in supply calculation.

To account for the partial nature of the real options modelling, none of the scenarios contain a representation of the entire sheep production system, the elasticities in use have been increased further. Currently in the modelling the values used for representation of the current system with or without live export range from -25 to -75. To indicate less price responsiveness in the planned phase out case, each of these elasticities have been doubled and range from -50 to -150.

⁹⁶ Griffith, G., l'Anson, K., Hill, D., Lubett, R., & Vere, D. (2001). Previous Demand Elasticity Estimates for Australian Meat Products. NSW Agriculture.

⁹⁷ Mounter, S., Villano, R., & Griffith, G. (2012). Updating a Model of Meat Demand in Australia to Test for the Impact of MSA. Meat & Livestock Australia

⁹⁸ Fisher, B. (1979). The Demand for Meat - An Example of an Incomplete Commodity Demand System. Australian Journal of Agricultural Economics, Vol 23, No. 3.

⁹⁹ In 2018, Western Australia represented a 12% share of the sheepmeat supply.

It is worth considering the sensitivity of the modelling outcomes to the elasticities chosen. To do this consider the sudden cessation of live sheep exports under four separate elasticity assumptions.

These four assumptions are:

1. Infinite own-price elasticity – under which prices do not respond to changes in supply. The no-price adjustment scenario produces an NPV of \$107.58. Refer Figure 3.11.
2. The standard elasticities used for the analysis described and represented modelling in Figure 3.12, producing an NPV of \$91.97.
3. Half the standard elasticities described above, thereby making prices more responsive to the cessation of live sheep exports (not shown in the main body of the report) and producing an NPV of \$76.37.
4. Double the standard elasticities described above, thereby making prices less responsive to the cessation of live sheep exports (not shown in the main body of the report) and producing an NPV of \$99.77.

Considering elasticity assumption 2 as our baseline, we see that halving the elasticity value changes the NPV by -\$15.6 or -17.0%. At the same time, doubling the elasticities changes the NPV by +\$7.80 or +8.5%. This sensitivity analysis demonstrates that the results are sensitive to the chosen elasticity values.

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