



ANALYSIS OF DOMESTIC FUNDAMENTALS INFLUENCING THE NATIONAL SHEEP FLOCK

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This report was commissioned by LiveCorp and Meat & Livestock Australia

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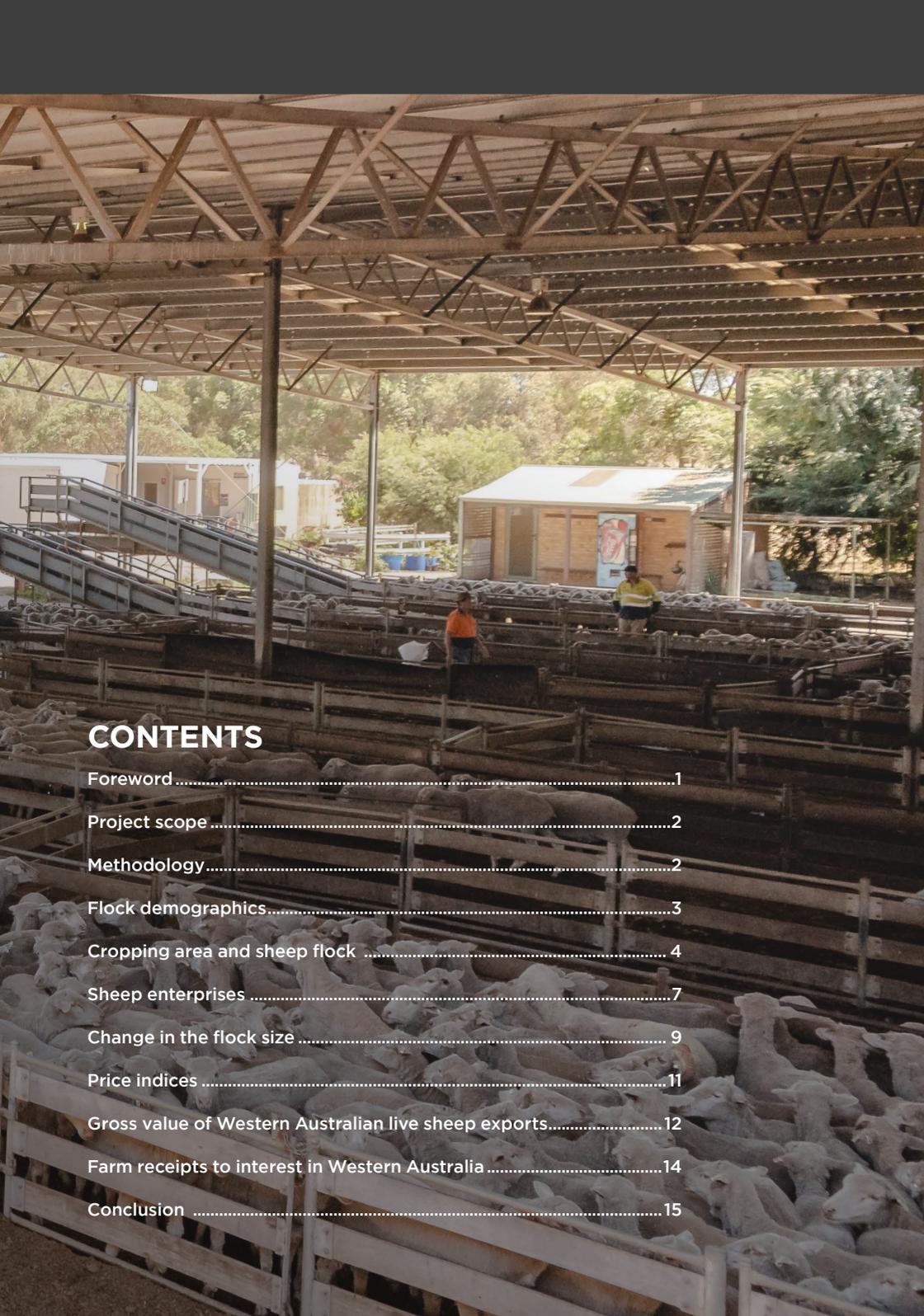
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FOREWORD

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.

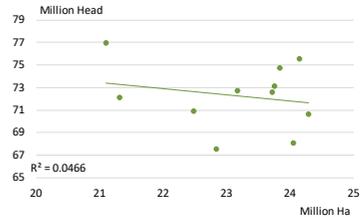
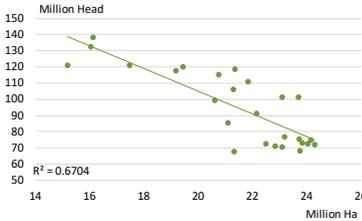
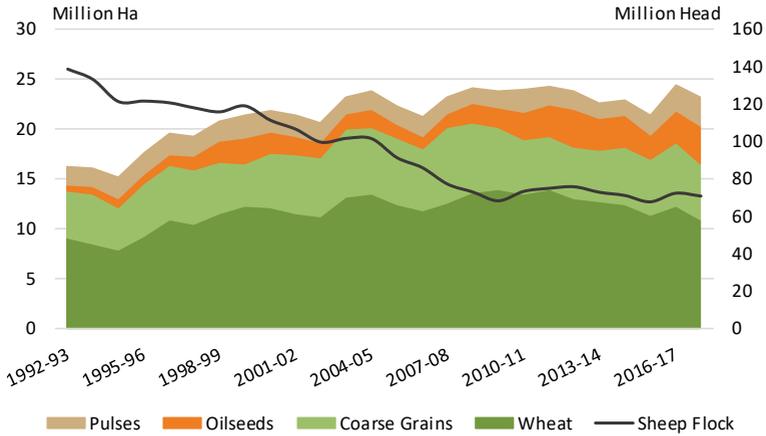
The reduced correlation between the sheep flock and crop area at a national level suggests that for the east coast the move from sheep enterprises to cropping that was evident during 1990 to 2010 may have run its course.

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.





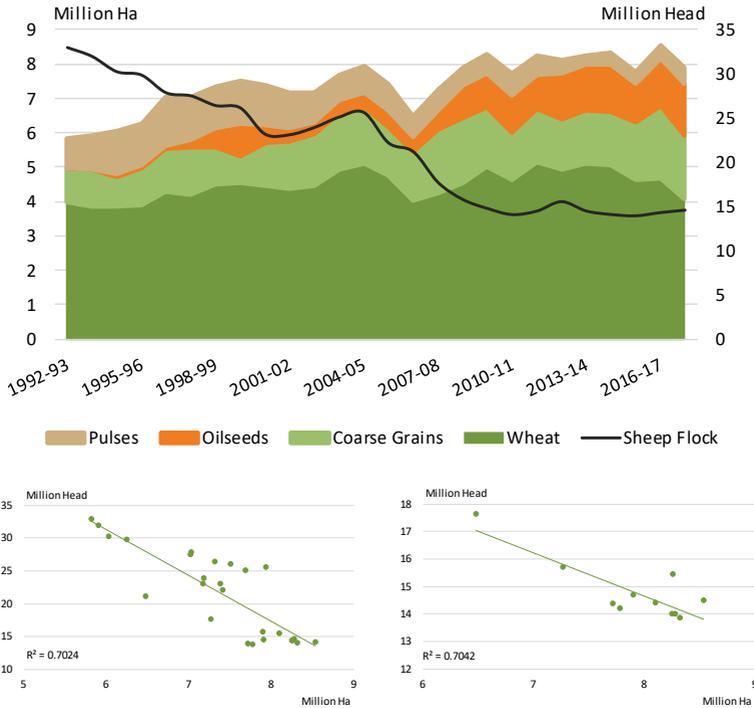
Figure 1. Australian crop area (hectares) and sheep flock numbers. Correlation bottom left 1992-2018 and bottom right 2008-2018.



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

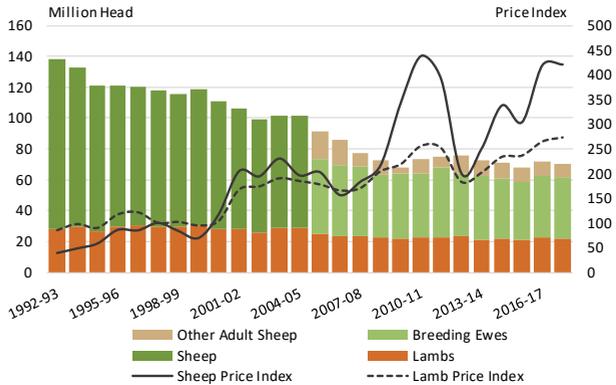
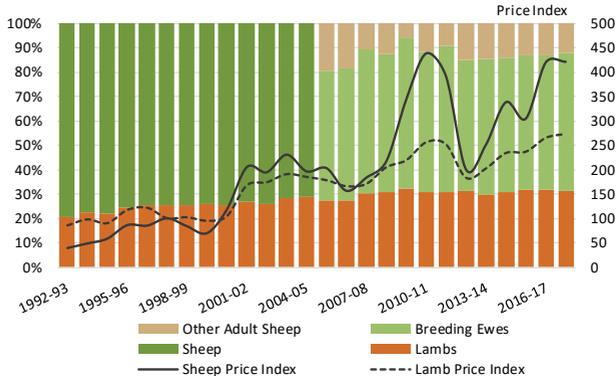


Figure 4. Australian sheep flock categories as a proportion of the total flock, and lamb and sheep price indices over time.⁶

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

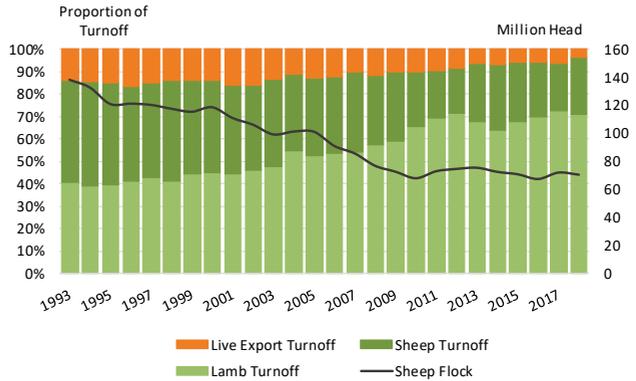
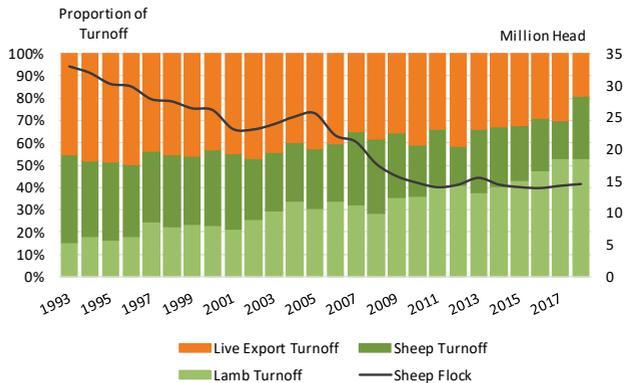


Figure 6. Western Australian sheep flock and turnoff

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

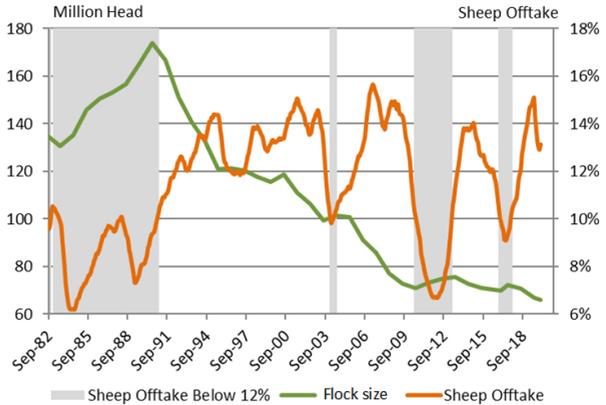
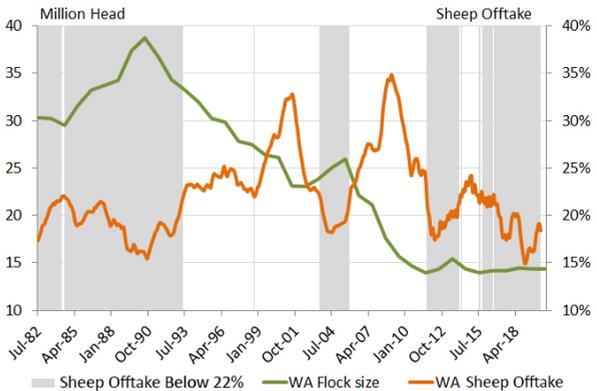


Figure 8. Western Australian sheep flock & turnoff

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

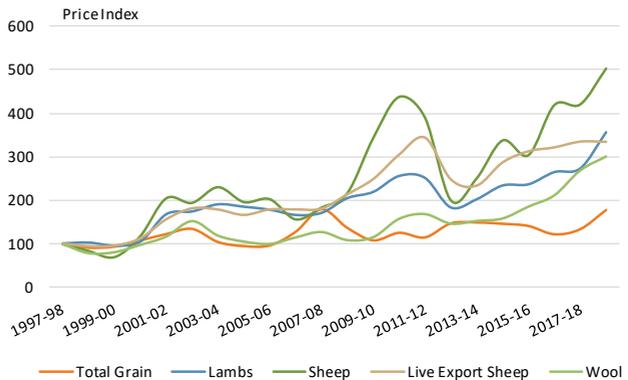
Price indices are used in lieu of absolute prices to compare the relative changes in prices received by Australian producers across a selection of broadacre enterprises. Strictly speaking, these indices are not a substitute for respective enterprise profitability and this is particularly true for grain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

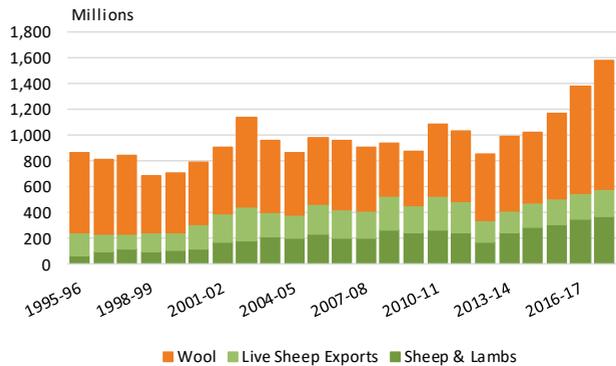




Figure 11. Western Australian enterprise proportion of gross value of production

Source: DPIRD WA, Mecardo



When sheep producers in WA were asked under what circumstance they would increase their sheepmeat enterprise and expand sheep/lamb turnover, 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

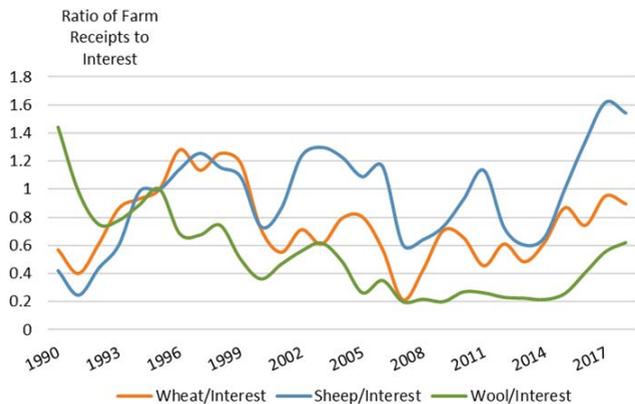
The ability for farmers to service debt is a factor that may influence enterprise decision making. To determine how different enterprise/commodity types in Western Australia (WA) have performed historically, the trend in farm receipts for wheat, sheepmeat and wool production have been compared to farm 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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Mecardo (A Nutrien Ag Solutions Business) is a specialist agricultural market intelligence and advisory business.

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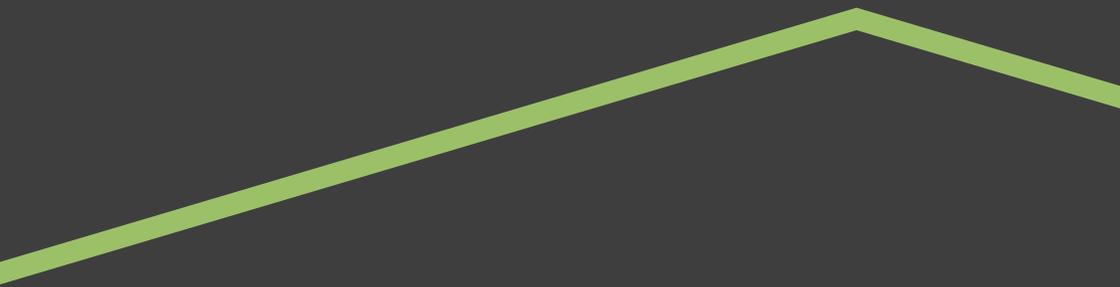
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