



final report

Project code:

Prepared by:

P.PSH.1113

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Date published:

July 30, 2018

PUBLISHED BY Meat and Livestock Australia Limited PO Box 1961 NORTH SYDNEY NSW 2059

Development of a WA sheep Industry Collaborative RD&E Program

This is an MLA Donor Company funded project.

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

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Abstract

This project was commissioned by the Sheep Alliance of WA (SAWA), an organisation of 50 members from across the WA sheep supply chain, whose members had identified a need to provide an independent and detailed business prospectus for investment in a WA sheep industry integrated RD&E program.

They warranted that the work should build on the red meat priorities identified by WALRC and provide a cost benefit analysis for a set of proposed activities that are specific to advancing the performance of the WA sheep industry businesses and where the investment in such would fill an identified research/extension gap and opportunity. It was requested that a central theme to the prospectus would be the opportunities to gain through collaboration.

The prospectus was researched and developed by a team of four independent consultants led by Dr Alex Ball of Rural Analytics, whose mandate was to develop a culture of broad consultation and engagement in order to optimise the collaborative effort and capability of the prospectus to be funded.

The prospectus has been completed and accepted by the SAWA directors and funders. It identified four key themes and included a set of four recommendations and two imperatives that need to be progressed by the WA RD&E community together with industry.

Executive summary

1 Summary

The Western Australian sheep industry is an important contributor to the economic well-being of the State. The industry returns approximately \$1.377 billion from both wool (\$826 million) and sheep (\$551 million) and is highly dependent on production from the Merino breed in Mediterranean production systems.

The industry faces significant on-going challenges particularly in terms of maintaining flock numbers and in meeting market specifications for quality wool and sheepmeat as a result of seasonal variations leading to fluctuations in the quality and quantity of the feedbase. Research, development and extension programs (RD&E) have traditionally been established to address these challenges and provide solutions that improve both the productivity and efficiency of the industry.

The Sheep Alliance of Western Australia (SAWA) on behalf of its membership, together with Department of Primary Industries and Regional Development (DPIRD), Meat and Livestock Australia (MLA) (via the MLA Donor Company (MDC)) and Australian Wool Innovation (AWI) commissioned an RD&E prospectus to identify RD&E themes, gaps, funding mechanisms and key recommendations that would benefit the sheep industry. If components are implemented, the prospectus should lead to greater outcomes from RD&E investment in Western Australia as well as providing a mechanism for greater collaboration and communication between research providers and industry stakeholders.

The prospectus has been developed through extensive consultation with SAWA members, research providers, private consultants, extension service specialists and the key investment partners of DPIRD, AWI and MLA (MDC).

1.1.1 Proposed Investment Themes

The consultation led to the identification and quantification of the following four key RD&E themes.

Theme 1: Quality wool and meat from variable Mediterranean production systems

Theme 2: Improving resource efficiency through selection and management of sheep that are "fit for purpose"

Theme 3: Fostering an innovative and capable sheep industry community

Theme 4: Tools for more informed decision making and efficient labour utilisation

1.1.2 Imperatives

Prior to the development of the prospectus, there was a perception that RD&E projects in Western Australia lacked collaboration and coordination and this was in turn reducing the efficiency of RD&E within the state. Through the consultation process, it emerged that much of RD&E activity in Western Australia was in fact highly leveraged through interstate collaborations in nationally coordinated programs. Whilst this provides greater opportunities for researchers within Western Australia, the national focus on these programs has often led to a lack of awareness and visibility of those programs and, importantly, adoption of outcomes that are highly relevant to the Western Australian industry. It has also reduced the historically strong connections between researchers and the state supported extension networks as well as private consultants and producers. Two key imperatives have been recommended as a result.

Key Imperative #1

A state-based producer/consultant facilitated forum should be initiated that provides the opportunity to review research outcomes and robustly evaluate the opportunities that those outcomes provide for Western Australia. It should include a session on establishing the need for proof-of profit or ground-truthing trials that can translate the research into adoption outcomes, via engagement of grower groups and the private consult networks. The forum should also foster more engagement in the development of research and extension initiatives as well as strengthening the interactions between the research community and the production sectors. A key outcome should be the introduction of young and emerging research capacity and their exposure to leading producers in Western Australia.

Key Imperative # 2

To establish Terms for Reference (TOR) and platform for a collective structure that provides the opportunity for producers, researchers and industry participants to actively explore RD&E opportunities that provide solutions for the industry over the next 10 to 20 years. The structure should be completely apolitical and driven by producer engagement. It should focus on the collective of wool and sheepmeat outcomes and must provide an environment where there is mutual benefit for both the research community and the production sector. *This collective structure could also form the vehicile to extend the concepts in themes 3 and 4.*

It should be noted that this structure could potentially lead to an institution-like format in the future, although this still requires significant further discussion and debate.

In addition to the development of the proposed investment themes and imperatives, the Consultants posed 4 key recommendations, that if implemented would deliver significant industry benefit by way of:

- An increased sheep RD&E effort that is relevant and timely to WA sheep industry conditions and that should lead to greater adoption of key findings as a result;
- Help retain and grow the sheep research and extension capability in WA via large-scale successful sheep RD&E programs;
- A colleagete effort with strong intra-state collaboration of RD&E; and an effective internal and external communication process that ensures exceptional visibility of the outputs.

1.1.3 Recommendation 1

Theme 1 and 2 should be combined into a program of sheep RD&E for Mediterranean environments that could be extended beyond Western Australia to include parts of SA, Northern Victoria and Southern NSW. It could engage MLA, AWI, GRDC and AMPC, as well as DPIRD and key farming groups in Western Australia.

• SAWA, DPIRD, MLA and AWI should convene a working group to develop the recommended program and test its feasibility for both funding and implementation.

1.1.4 Recommendation 2

Either annually or bi-annually a state-based forum of research initiatives and outcomes for the Western Australian sheep industry is held and used as a catalyst for extending information to the private consultancy network, grower groups and other key participants.

• A group including leading producers and consultants should be formed to facilitate a statebased forum for RD&E and that forum should be developed with DPIRD and key research providers in Western Australia.

1.1.5 Recommendation 3

A Terms of Reference (TOR) for a collaborative collective/structure be developed by DPIRD with support from leading producers, consultants and research providers.

- DPIRD develop the TOR and then convene an independent forum to discuss the formation of the apolitical collective structure. An interim independent chair appointed from outside of the West Australian Sheep Industry should be engaged to initiate the process.
- If a collective structure is developed, then one of the priorities would be to scope out innovative blue-sky themes that will meet 10 to 20-year aspirations of the Western Australian sheep industry.
- This collective structure could be the vehicle to further develop themes 3 and 4.

1.1.6 Recommendation 4

Leading producers, consultants and grower groups should engage the research and extension community to determine an appropriate intrastate mechanism(s) that leads to greater awareness and adoption of national research outcomes in mixed farming operations in Western Australia.

• A working group should be established to review national prorgams and determine appropriate proof of concept trials that facilitate adoption in Western Australia

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2 Background

2.1 Why was the Prospectus commissioned?

The Western Australian sheep industry is an important contributor to the economic well-being of the State. The industry returns approximately \$1.377 billion from both wool (\$826 million) and sheep (\$551 million) and is highly dependent on production from the Merino breed in Mediterranean production systems.

The industry faces significant on-going challenges particularly in terms of maintaining flock numbers and in meeting market specifications for quality wool and sheepmeat as a result of seasonal variations leading to fluctuations in the quality and quantity of the feedbase. Research, development and extension programs (RD&E) have traditionally been established to address these challenges and provide solutions that improve both the productivity and efficiency of the industry.

The Sheep Alliance of Western Australia (SAWA) on behalf of its membership, together with Department of Primary Industries and Regional Development (DPIRD), Meat and Livestock Australia (MLA) (via the MLA Donor Company (MDC)) and Australian Wool Innovation (AWI) commissioned an RD&E prospectus to identify RD&E themes, gaps, funding mechanisms and key recommendations that would benefit the sheep industry.

2.1.1 Significance to industry

If the 4 key recommendations are implemented and components of the 4 research themes successfully funded then the prospectus should lead to greater outcomes from RD&E investment in Western Australia as well as providing a mechanism for greater collaboration and communication between research providers and industry stakeholders.

2.1.2 Overarching aims

A new culture and quality in consultative sheep industry project design, mapped to WALRC priorities will deliver:

- Higher quality project proposals with independently assessed BCAs,
- Industry-ready attitude to adoption because industry has an involvement that goes mch deeper than high level priority setting

The simple method of calculating the value proposition is:

- The rate at which projects in the prospectus get funded (well designed, collaborative projects have a greater chance of success);
- Project evaluation to measure adoption rates

3 Project objectives

3.1 Objective 1

To deliver a detailed and quantified RD&E project prospectus in conjunction with all interested research institutions and extension services providers, in a format that is suitable for presenting to a range of funding and service providers.

3.2 Objective 2

To achieve collaboration and support for the final business investment prospectus from all relevant WA institutions and service providers in order to create a culture of building capacity and capability for delivery that is in the best interests of the WA sheep supply chain.

4 Methodology

4.1 Level of engagement and consultation central to success

From the inception of the prospectus, the consultancy team identified that its's development will be both complex and complicated and will require significant engagement and consultation with a wide range of key stakeholders and participants across the Western Australian sheep industry. For these reasons, the following key activities have been undertaken to ensure that the prospectus is well structured and importantly meets the requirements of the Western Australian sheep industry.

- Extensive independent review and mapping of previous and current RD&E plans and programs that are aligned to the Western Australian sheep industry were completed. From this process five notional key theme areas were developed that are consistent with national and state-based RD&E priorities. These themes were used in the development of the on-line survey.
- Development of a current situational analysis of the Western Australia sheep industry that was be used to identify critical gaps in RD&E and as a framework for assessing the impacts of outcomes in each theme areas identified at the forum.
- Extensive consultation through face to face conversations, an on-line survey and a one-day
 forum with key Western Australian sheep stakeholders was conducted to clearly identify the
 outcomes required from the prospectus, road test key assumptions and determine what
 elements are essential for building collaborative programs that can provide the required
 outcomes

4.2 Desktop review of historical and current reports that have relevance to the Western Australian Sheep Industry

Initially the consultants reviewed an extensive range of documents and presentations including previous RD&E plans, strategic plans, funding priorities, project plans, milestone reports, final reports and situational analyses that were all identified as being relevant to the Western Australian Sheep Industry. These resources are listed in part in appendix 1 of the Prospectus. The desktop review enabled a comprehensive understanding of industry and what previous and current RD&E concepts had been determined and in some cases the outcomes of those programmes and projects.

Within each resource (document) the consultants sought to identify evidence that could be used to assess whether the core objectives of the prospectus, and the related themes and initiatives would satisfy the requirements of the Western Australian Sheep industry and importantly to ensure that any learnings from previous plans could be incorporated. It was also important to determine obvious areas where issues had been identified or success had been limited so that these areas could be avoided. The impact and outcomes of this review are presented throughout the prospectus.

A requirement of the prospectus was to provide detail of the alignment between previous RD&E plans, the current RD&E plans including WALRC priorities. This detailed analysis is summarised in section 5 of the Prospectus

4.3 Consultation

4.3.1 On-line survey

Concurrent with the desk top review, a comprehensive on-line survey (using Survey Monkey[®] and comprising approximately 42 questions) was developed and circulated to research providers and SAWA identified stakeholders to provide quantified responses to several critical elements in the development of the prospectus. Questions were structured to determine attitudes to the development of prospectus, the role and function of RD&E in the Western Australian sheep industry, previous RD&E plans, the nature of collaborations, the themes that should be considered, priorities for those themes and initiatives within those themes. Respondents were asked to quantify return of investment requirements from RD&E. The survey also asked for comment on projects or themes that should not be included in the prospectus and whether an institute is required and some key demographics of the future of the industry.

Questions were customised to each of the research provider and stakeholder groups. The general results of the survey, which provides more quantitative data for the development of themes and initiatives and have been included throughout the prospectus, while summary results for key survey questions are also detailed in Prospectus Appendix 2.

Survey respondents were informed prior to completing the survey that their responses would be kept confidential to the consultants and will only be used in this review in a de-identified form, generally through aggregation and synthesis of information. Further details of the demographics of respondents are included in section 6 of the Prospectus.

4.3.2 Demographics and key outcomes from the on-line survey

The on-line survey was held open for approximately 8 weeks including for a 2-week period after the SAWA forum and workshop. At the close of the survey, there was 39 respondents to the survey and they represented a cross-section of demographics from the Western Australian sheep industry as shown in tables 3 and 4.

Respondent Zone	Responses	
Sheep Cereal Zone	38%	15
Medium Rainfall Zone	8%	3
Southern Pastoral Zone	3%	1
Not Applicable	33%	13
Other (please specify)	18%	7
	Answered	39

Table T Demographics of respondents by Sheep Production Zol

 Table 2
 Demographics of respondents by involvement category

Involvement Category	Responses	
Specialist sheep meat producer	3%	1
Specialist wool producer	0%	0
Sheep producer (wool and meat)	26%	10
Sheep feedlot/finisher	0%	0
Grain grower (also running sheep)	3%	1
Sheep processor	3%	1
Live sheep exporter	3%	1
Wool buyer or broker	5%	2
Sheep or wool contractor (shearer etc)	0%	0
Livestock agent	5%	2
Consultant / Vet /Extension specialist	18%	7
Research provider	28%	11
Other	8%	3
	Answered	39

Whilst a summary of responses to key questions on the themes, activities and critical barriers to adoption of those activities are included in Prospectus Appendix 2, the key highlights from responses to critical structural and policy-based questions are as follows: -

- 90% of respondents believed that RD&E can alter the impacts of identified limiting factors of the Western Australian Sheep Industry
- Less than 50% of respondents believed that there was adequate information on previous and current RD&E plans within the Western Australian Sheep Industry
- Only 34% of respondents believed that delivery of industry benefits from previous RD&E plans had met or exceeded their expectations
- 85% of respondents believed that a collaborative RD&E program for the Western Australian Sheep Industry will increase the success of RD&E in that state.
- Over 80% of respondents indicated that a collaborative approach to RD&E for both wool and meat is required for the Western Australian sheep industry. Only 10% believed that they should be separated
- Over 80% of respondents believed that collaboration between RD&E providers improves the efficiency of RD&E. Only 5% strongly disagreed with this statement.
- 45% of respondents believed that an institute is required to implement RD&E in the Western Australian Sheep Industry. 55% indicated that an institute is not required
- More than 80% of respondents believe that national factors or influencers need to be considered in the development of the prospectus
- There were mixed responses to the future direction of the sheep industry in Western Australia. There were proportionally equal opinions that the flock will decline, stay static or increase with most changes being of the order of 10%.

More than 80% of respondents believed that the development of this prospectus will be useful.

4.3.3 Interviews

Interviews were conducted with several research providers (in a group forum) and with a few key stakeholders to determine their attitudes towards the prospectus development and to understand their potential level of engagement with the prospectus, their overall impression of RD&E opportunities and collaboration, and what opportunities may exist for future development of themes and initiatives. Responses to these questions have also been de-identified and have been generalised into themes within the prospectus. These interviews were all conducted face to face and ranged in time length from 45 minutes to 2 ½ hours.

It should be noted that several emails were sent to all contacts that were supplied by SAWA inviting key stakeholders to either a face to face meeting or a teleconference to discuss the development of the prospectus. In addition to the responses outlined above, a few people supplied information in an email format that was used in the development of the prospectus and in informing the collaborative and structural elements.

4.3.4 SAWA Forum and workshop

A very important component of the consultation process used in the development of the prospectus was a facilitated forum that was held in Perth on the 30th of May. This forum was open to and attended by SAWA members, RDC representatives, DPIRD representatives, grower group representatives and key research providers. A total of 32 people participated in the forum over a 7-hour period.

The forum was structured to provide to attendees, a brief rationale of the prospectus, a brief overview of the situational analysis and the preliminary results of the on-line survey. Attendees were then asked to identify key outcomes required by the Western Australian Sheep Industry and themes that might be constructed that could provide those outcomes.

Suggested themes were then prioritised into 5 main areas and attendees then workshopped initiatives within those themes and reported back to the forum on the key initiatives that had been identified. The themes were then reduced to four and initiatives summarised within those themes.

At the end of the forum, a facilitated session was held to discuss options for collaborative RD&E programs and to discuss the value of a Western Australian Sheep Industry Institute.

5 Results

The consultants were commissioned to research and provide two discrete segments to the prospectus:

- 1. A situational Analysis of the WA Sheep Industry that provided the business case for prioritised investment areas; and
- 2. A series of recommended investment themes and associated cost benefit analysis

5.1 Situational Analysis

5.1.1 Western Australian sheep industry snapshot

The snapshot of the Western Australian sheep industry presented here is further developed and expanded in the following sections to show trends over time and provide additional detail on the dynamics of the Western Australian wool and sheep industry.

- In 2016-17, the gross value of production (GVP) of the Western Australian sheep industry was \$1.38 billion
 - \$826 million from wool, and
 - \$551 million from sheep meat and live export.
- Western Australian sheep meat production totalled 86.6 thousand tonnes comprising a 72/28% split between lamb and mutton.
- Domestic consumption accounted for approximately one quarter of production with the remaining three-quarters worth \$366 million exported to over 50 countries. The main markets were China, USA, UAE, Saudi Arabia and Jordan.
- Live sheep exports worth \$203 million were almost entirely delivered to the Middle East with Kuwait and Qatar the main markets.
- There were 14.2 million sheep and lambs in Western Australia at 30th June 2017 comprised of
 - 54% breeding ewes (7.6 million of which 81% were Merino)
 - 32% lambs (4.5 million)
 - ~1.5% rams (0.2 million)
 - o 13% wethers (1.9 million)
- Marking rates in Western Australia have been rising over the last decade and now average just under 90% for all ewes. Three quarters of all lambs are marked in the four months from July to October.
- Merino ewes are mated to Merino rams (71%) and terminal sires (29%). Approximately 11% of all ewes mated are non-Merinos including first cross, maternal and shedding breeds.
- Annual turn-off from the Western Australian flock is around 5.5-6.0 million head per year. Lamb slaughter makes up half this figure with the rest split between sheep slaughter for mutton (16%), live export (29%) and interstate movements (5%).
- Annual wool production in Western Australia is about 70 million kg (greasy) with an average fibre diameter of 19.6 μm. All wool produced is exported or transported interstate for processing or export. Wool exported with Western Australia given as the origin was worth \$593 million in 2016-17.



5.1.2 Gross value of production

Figure 1 Proportion of Western Australian gross value from crops, livestock disposals and livestock products in 2016-17. Values shown are in A\$ million per year. (Based on ABS data.)

- The gross value of agricultural production in Western Australia in 2016-17 was \$8.99 billion, including \$2.83 billion (31%) from livestock disposals and livestock products (Figure 1).
- Wool (\$826 million) and sheep disposals (\$551 million) contributed 9% and 6% respectively of the total GVAP from Western Australia, or 29% and 19% respectively of the gross value of production (GVP) from livestock. Sheep disposals include lamb and sheep slaughter, and live export.



Figure 2 Comparison of trend in sheep industry GVP (2017-18 dollars) and opening flock size. (Based on ABS data.)

- Despite a 50% decline in the size of the Western Australian flock over 20 years, GVP from the sheep industry has been more resilient (Figure 2) because of improved productivity, improved product specification and improving commodity prices.
- While the contribution of sheep disposals to GVP has been rising, wool production still commands the larger share, about 55-60%, predominately due to the dominance of Merino sheep in the Western Australian flock.



Figure 3 Gross value of production per head (in 2017-18 dollars) from wool, and from sheep and lamb disposals. (Based on ABS data.)

- GVP per head has been increasing over the last 20 years (in real terms) (Figure 3).
- GVP per head from wool remained relatively stable until around 2008 before increasing over the last decade. This indicates that increases in wool price, wool quality and wool production per sheep have kept ahead of inflation.
- Sheep disposals include lamb and sheep slaughter, plus live exports. GVP per head (in 2017-18 dollars) from sheep disposals have shown an increase of 5.7% per year over the last 20 years to

2016-17. This increase in GVP per head reflects real increases in the sheep meat price, along with heavier carcases and a greater proportion of lambs in the turn-off.

- While GVP per head has increased, any increases in costs above inflation will erode these gains.
- Lamb price at retail in Australia has out-performed beef, pork and chicken over the last 20 years reflecting increased demand and limited supply partly as a result of strong export demand (Figure 4).



Figure 4 Australian retail meat prices indexed to 1997-98 price. (Based on ABS data.)

- The price received for lamb by farmers over the last 20 years has increased faster than that for wool or wheat (Figure 5).
- The wool price was largely flat for the first 10 years before trending upwards in the second 10 years.



Figure 5 Comparison of national prices received by farmers for lamb, wool and wheat, indexed to 1997-98. (Based on ABARES data.)

5.1.3 Sheepmeat oriented toward Exports

- The national per capita consumption of sheep meat is 8.7 kg carcase equivalents (ceq) (ABARES, March 2018).
- The Western Australian population of just 2.6 million people is estimated to consume about 22.6 thousand tonnes (carcase equivalents) of sheep meat per year.
- Western Australian sheep meat production in 2016-17 totalled 86.6 thousand tonnes made up of 62.7 thousand tonnes of lambs and 23.9 thousand tonnes of mutton.
- Therefore, approximately three quarters of Western Australian produced sheep meat must be exported or sold interstate.
- In 2016-17, 66 million kg (carcase equivalents) of sheep meat with an export value of A\$366 million (FOB) was exported from Western Australia.
- This sheep meat was exported to over 50 countries, though five countries account for over 50% by both weight (Figure 6) and by value (Figure 7).



Sheep meat exports (66 million kg ceq.)





Figure 6 Share of Western Australian (a) sheep meat (by weight) and (b) live sheep (by number) exports in 2016-17. (Based on ABS customised report.)

- China has risen to top spot for sheep meat exports as its population urbanises and demand for sheep meat exceeds domestic production. China has been a market for lower value cuts (e.g. flap and neck) that are used in traditional dishes like hot pot, however as the market matures, demand may increase for high quality cuts (Sheep CRC).
- Western Australia contributes around 85% of all live sheep exported from Australia. Live export is an important market for sheep that fail to reach processor specification for lambs and are not being retained for inclusion in the adult flock.
- In addition, some breeds like Damaras are produced specifically for the live export trade. These
 are well suited to rangelands production but undesirable for local processing due to the risk of
 contamination from shed fibres. Shedding breeds make up just four percent of the Western
 Australian breeding ewe flock (AWI MLA sheep meat and wool surveys).
- In 2016-17, 1.7 million sheep were exported from Western Australia with a total value of A\$203 million (FOB). This approximates to 37 mkg ceq.
- Kuwait and Qatar each take a third of the sheep exported from Western Australia, both by volume (Figure 6) and value (Figure 7), with the remaining third shared between six markets.



Sheep meat exports (A\$ 366 million)





Figure 7 Export markets by value for Western Australian (a) sheep meat and (b) live sheep exports in 2016-17. (Based on ABS customised report.)



• The value of sheep meat exports from Western Australia has been rising, with a big surge from 2013-14 onwards. Growth has occurred for both fresh/chilled and frozen product (Figure 8).

Figure 8 Value of fresh/chilled and frozen sheep meat exports from Western Australia. (Based on ABS customised report.)

- Prior to 2003-04, the value of sheep meat exports from Western Australia was less than US\$100 million per year. Between 2004-05 and 2011-12 but excluding 2010-11, total value was between US\$150 and US\$200 million per year as export volume decreased and export price increased (Figure 9).
- In three out of four years since 2012-13, the average price has been over US\$4/kg ceq giving a total export value of between US\$250 and 300 million per year.
- Over the 16 years presented, the average export value of sheep meat per kilogram has more than doubled from less than US\$2 to over US\$4 per kg (ceq). This mirrors the increase observed in retail lamb price (Figure 4).



Figure 9 Average export value (US\$/kg ceq FOB) versus volume (million kg ceq/year) of sheep meat (lamb and mutton) exported from Western Australia. Curved dotted lines (isopleths) represent points of equal total export value (US\$ million/year). (Based on ABS data.)

5.1.4 Increasing lamb turn-off supported by improving Reproduction rates

- For demonstration purposes only, Table 3 shows a generalised reconciliation for the Western Australian sheep flock. This shows that to maintain the current flock size and turn off, and with other losses of 6%, the marking rate must average 92% across the state flock.
- To grow the flock, either marking rate must increase, or turn off must be reduced (e.g. by retaining older ewes or additional replacements). A reduction in on-farm mortality could make a small contribution.
- Better management can improve reproductive performance in flocks that are under performing. Retaining sheep to grow the flock means forgoing some income from livestock trading.

Western Australia	
Opening number of sheep	14.0 million
Number of ewes joined	7.2 million
Marking rate	92%
Lambs marked (est.)	6.6 million
Turn off	
Lambs slaughtered	2.9 million
Sheep slaughtered	0.9 million
Live exports	1.7 million
Interstate movements	0.3 million
Total turn off (est.)	5.8 million
Losses (~6%)	0.8 million
Closing number of sheep (est.)	14.0 million

 Table 3
 Generalised reconciliation of the Western Australia flock. [Not a forecast]

- Since 2009-10, there appears to have been a lift in marking rates when compared to the previous decade (Figure 10).
 - Average marking rate between 2000-01 and 2009-10 was 79%
 - Average marking rate since 2009-10 has been 86%



Figure 10 Western Australian marking rates reported for all ewes (lambs marked as a percent of ewes mated) in three independent collections. Dotted line indicates highest reported marking rate prior to the 2010-11. (Based on data from ABS, ABARES and MLA/AWI sheep meat and wool survey.)

- The increase in marking rate is attributed to a combination of factors including better management of ewes and lambs.
- At current ewe numbers, this average increase of 7% delivers an additional 500,000 lambs per year. Other benefits of better management include reduced ewe mortality, better lamb growth rates and improved weaner survival.
- Providing consistent year-round supply of lamb is a challenge for the Western Australian sheep industry due to the strong seasonality of lambing and the variable feed base as a result of the Mediterranean climate across most of the Western Australian sheep growing regions. Figure 11 shows that three quarters of all lambs are marked between July and October each year. Despite the seasonality of lambing and marking, lamb slaughter is relatively evenly distributed throughout the year.
- The 'more even' distribution of lamb slaughter is a result of, in part, the level of intensive lamb finishing undertaken, either via pasture-based grain assisted or in feedlots.



Figure 11 The imbalance between (a) the distribution of lamb marking, and (b) the distribution of lamb slaughter. Data reported are an average of the four years 2012-13 to 2016-17. (Based on ABS slaughter data, and MLA/AWI sheep meat and wool survey marking data.)

- Turn-off from the Western Australian flock has levelled off at around 5.5 to 6.0 million head per year, though higher in the drought year (2010-11) as producers off-loaded sheep, and then lower in the following year as rebuilding commenced (Figure 12).
- In 2016-17, lambs accounted for 50% of turn-off, or 76% of domestic slaughter. This is a major reversal from 20 years previously when sheep slaughter exceeded lamb slaughter.



Figure 12 Western Australian turn-off (lamb and sheep slaughter, live export and interstate) (millions/year). (Based on ABS and PIRSA data.)

- The live export market has traditionally been a market for wethers, often older animals from the wool industry.
- In 2015, 90% of the sheep exported from Western Australia (Fremantle) were wethers, with five percent each of ewes and rams (Figure 13).
- Adults accounted for 59% of the sheep exported followed by lambs (30%) and hoggets (11%).



Figure 13 Age (lamb, hogget, adult) of live sheep exported from Fremantle to Middle East/North Africa in 2015. (Based on DPIRD data.)

5.1.5 Change in flock composition – Merino ewes dominate / Wethers for Wool Production Shrink

- Aligned with the increase in lamb turn-off has been a change in the composition of the flock towards more ewes and lambs (as a proportion of the flock) at the expense of wethers (Figure 14).
- Figure 15 shows the decline in number of sheep of each category highlighting the periods of sharp decline in wethers (1991 to 2000) and ewes (2005 to 2010).



Figure 14 Change in the composition of the Western Australian flock. (Based on ABARES data.)



Figure 15 Change in the number of ewes, wethers, lambs and rams in the Western Australian flock. (Based on ABARES AgSurf data.)

(a) Western Australia, 2003 to 2007



Figure 16 Proportion of breeding ewes by breed (a) for Western Australia averaged over the 5 years 2003 to 2007, (b) for Western Australia averaged over the 5 years 2012-13 to 2016-17 and (c) for Australia excluding Western Australia averaged over the 5 years 2012-13 to 2016-17. (Based on MLA surveys (2003 to 2007) and AWI MLA sheepmeat and wool survey data (2012-13 to 2016-17).)

- This change has been driven by a greater emphasis on sheep meat production as wool prices remained relatively low. Figure 16a show that Merino ewes mated to Merino rams account for 77% of all ewes mated in 2003 to 2007. By 2012-13 to 2016-17, this proportion had declined to 63% (Figure 16b) because of increased mating for Merino first cross lamb production and an increased proportion of non-Merino breed ewes in the flock.
- Almost 90% of the breeding ewe flock are Merino with 29% of Merino ewes (26% of all breeding ewes) run with non-Merino rams to produce Merino first cross lambs (Figure 16b).
- The WA breeding ewe flock contains a higher proportion of Merino ewes than is reported for the rest of Australia (Figure 16c).



5.1.6 Flock size stabilises at around 14 million

Figure 17 Australian sheep flock by state since 1997. NSW* includes ACT. (Based on ABS data.)

- Sheep numbers in all states have declined over the two decades to 2009. Since 2009, the national flock has stabilised at around 70 million head (Figure 17).
- The Western Australian flock stabilised a year or two later after heavy destocking in 2010-11 due to widespread drought across southern Western Australia. The new level of around 14 million is 20% of the national flock and 37% of the 1990 peak for Western Australia of 38 million head.



5.1.7 Wool trending finer

Figure 18 Wool production and number of sheep in Western Australia trend downward before stabilising at around 68 mkg and 14 million head from 2010-11 onwards. (Based on ABS and AWI wool production forecasting committee data.)

- The decline in wool production in Western Australia closely follows the change in sheep numbers (Figure 18).
- From 2010-11 onwards both wool production and sheep number have stabilised.
- Over the 20-year period to 2016-17, the average fibre diameter of Western Australian wool tested by AWTA declined from 21.6 μm to 19.6 μm (Figure 19).
- This shift toward lower average micron is partially reflected pan-Australia, but not to the degree found in Western Australia, due to the increased proportion of cross bred and non-Merino sheep in the flock.



Figure 19 Change in average fibre diameter of wool tested. Data for 2017-18 is for July to April only. (Based on AWTA data.)



Figure 20 Comparison of the fibre diameter distribution of Western Australian and rest of Australia wool tested by AWTA, average of 2014-15 through 2016-17 tests. (Based on AWTA data.)

- The fibre diameter distribution of wool produced in Western Australia follows a typical 'bell' curve with a peak at about 19.5 μm (Figure 20). This reflects the predominately Merino genetic basis of the Western Australia flock.
- This distribution differs from that for the rest of Australia where there is a significant amount of broader wool from non-Merino sheep giving a second peak around 28 μm.
- The following figures show changes in six wool characteristics (yield, vegetable matter, bale weight, staple strength, staple length and TEAM hauteur) over the period 1998-99 to 2016-17 for Western Australia and for Australia.
- For most characteristics, the Western Australian values are not greatly different from the national average. Exceptions are yield and staple strength, both tending to be lower for Western Australia.



Figure 21 Trend in wool yield (%) for Western Australia and Australia. (Based on AWTA data.)



Figure 22 Trend in wool vegetable matter (%) for Western Australia and Australia. (Based on AWTA data.)



Figure 23 Trend in bale weight (kg) for Western Australia and Australia. (Based on AWTA data.)



Figure 24 Trend in staple strength (Nkt) for Western Australia and Australia. (Based on AWTA data.)



Figure 25 Trend in staple length (mm) for Western Australia and Australia. (Based on AWTA data.)



Figure 26 Trend in TEAM hauteur (mm) for Western Australia and Australia. (Based on AWTA data.)

5.1.8 Productivity improvements over 20 years deliver \$225 million in ADDITIONAL gross value

 Over the 20 years to 2017, the Western Australian flock has almost halved. However, as shown in Figure 3, gross value per sheep has been rising in real terms. This has in part been driven by increases in productivity including improved marking rate, increased wool cut per head, lower average fibre diameter and heavier lamb and sheep carcases.

Table 4	Contribution	to	gross	value	of	the	Western	Australian	wool	and	sheep	industry	of	production
	improvement	s be	etween	1995-9	96/1	1997	-98 and 2	014-15/201	6-17					

Productivity improvement	Extra value

Increased wool quality and quantity	\$101 million
Lower average fibre diameter (21.6 to 19.6 μm)	
Increased wool cut per head (4.23 to 4.55 kg greasy)	
Increased carcase weights	\$74 million
Lambs 16.7 kg to 21.3 kg	
Sheep 20.0 kg to 24.3 kg	
Increased marking rates – from 79% to 86%, extra 500,000 lambs	\$50 million
60% sent to processors (\$32 million)	
40% sent to live export (\$18 million)	
Total increase in GVP attributed to improved productivity	\$225 million

Note: The 20-year period considered was from 1994-95/1997-98 to 2014-15/2016-17. Averages across initial and final three-year periods were used to smooth out seasonal fluctuations.

- Table 4Error! Reference source not found. shows the estimated additional value generated by improvements over the last 20 years in these key productivity measures. The analysis compares the value generated from production at current levels with the value that would have been generated using the 20-year-old production measures.
- The value of increased marking rate was assessed by splitting the extra lambs marked after allowing for post-marking deaths, between lambs sent to processors and those sold for live export in the same proportion as turn-off in 2014-15 to 2016-17 (60% lamb slaughter, 40% live export).
- The contribution of increased carcase weights was calculated as the value of the reported increase in carcase weight over the 20-year period. Lambs resulting from the increased marking rate were excluded as they have already been valued.
- The extra value from wool was calculated using the increase in wool cut per head, and the average premium/discount of each reported fibre diameter relative to the average Western Market Indicator over the three years 2014-15 to 2016-17.
- This analysis shows that the Western Australian sheep industry GVP would be \$225 million worse off if these productivity improvements had not occurred.

The challenge for industry, RD&E investment and the prospectus is to identify where the future opportunities are and most importantly how to capture them.

5.2 Proposed Investment Themes

5.2.1 Theme 1: Quality wool and meat from variable Mediterranean production systems

This theme is highlighted by activities focussed on improving the production of quality wool and quality sheepmeat and optimising reproductive performance from (largely) Merino flocks in the

variable Western Australian Mediterranean environment. The theme also seeks to address the challenges of further integrating sheep enterprises into cropping systems, especially in relation to management of the feedbase and the role of crops and stubbles.

A series of initiatives are proposed under the following activity headings:

- 1. Managing wool quality
- 2. Improved compliance and production efficiencies of high quality lamb and sheepmeat
- 3. Improved reproductive performance through skills development and targeted research
- 4. Putting a value on the sheep enterprise
- 5. Optimising sheep production and finishing in a mixed farming enterprise

Key outputs / outcomes over the period are expected to be:

- Improvements in staple strength (3 Nkt for a third of tested fleece wool).
- Better understanding of how to integrate shorter shearing intervals.
- Genetic improvement of 1 kilogram in carcase weight, LMY by 1% and IMF by 1% in 50% of Merino flocks.
- ✤ 5% improvement in market compliance for sheepmeat products.
- 2% increase in marking rate in Merino x Merino mating's and a 1% increase for Merino x Terminal sire mating's.
- 6% increase in Western Australian sheep flock, predominately from a 30% increase in sheep numbers on 25% of farms in the wheat belt in Western Australia.
- 10% improvement in productivity (mostly from improvements to marking rate, fleece weight, fibre diameter, and carcase weight) across 20% of the flock.
- Improved utilisation of stubbles and crop grazing.

5.2.2 Theme 2: Improving resource efficiency through SELECTION and MANAGEMENT OF sheep that are "fit for purpose"

The Western Australian Sheep Industry is still strongly reliant on the capacity and adaptation of the Australian Merino to meet modern and future demands of changing production systems and markets. Breeding and running sheep that are fit for purpose in the unique Western Australian environment will be of crucial importance in terms of the productivity, profitability and ease of management.

There are three main activities that have been identified:

- 1. Optimising reproductive potential and lamb performance from high performance Merino flocks. Coupled with optimal reproductive capacity is the need to ensure that lambs born or reared as multiples are managed effectively to achieve compliance with key market requirements for both wool and meat.
- 2. Reducing the impacts of external and internal parasites through the intrinsic capacity of the sheep.
- 3. Matching nutritional requirements of productive sheep in Mediterranean environments to produce quality wool and sheep meat performance.

Key outputs / outcomes over the period are expected to be:

- ◆ 2-3% improvement in flock marking rate from 30% of Merino flocks in Western Australia.
- 10% improvement in compliance rates of lambs born or reared as multiples (40% of lambs marked) in high performance Merino flocks (20% of Merino flocks in Western Australia).
- 10% genetic selection improvement in worm resistance (2% increase in wool cut or carcase weight) in 25% of Merino flocks.
- ✤ 10% reduction in fly management costs associated with breech control
- 5% improvement in carcase weight in multiple born lambs (40%) in high performance Merino flocks (20%).
- 2.5% Improvement in wool weight and 0.25 reduction in micron from multiple born lambs (40%) in high performance Merino flocks (20%).

5.2.3 Theme 3: Fostering an innovative and capable sheep industry community

This theme is primarily focussed on improving the skills, capacity and confidence of sheep producers in Western Australia. In a mixed farming operation, often skills in sheep management have been reduced or neglected and this in turn results in sub-optimal performance of labour efficiency and the sheep enterprise. Improving access to and awareness of skills training and extension coupled with training in innovations that could improve labour allocation (also see Theme 4) are key initiatives, as is improving the image and therefore the attractiveness of participation and investment in the Western Australian sheep industry.

The main activities are:

- 1. Skills development roadmap
- 2. Exploring innovations from non-traditional external sources
- 3. Practical extension and training programs
- 4. Enhancing the image of the Western Australian sheep industry

Key outputs / outcomes over the period are expected to be:

- Matrix of required/desirable skills for wool and sheep producers and a list of training courses/providers matched against skills list.
- Training courses developed to fill identified gaps. Courses prepared, road-tested and ready for commercialisation.
- On-line tool or smart phone App to assist in identifying and planning a personalised training program.
- Understanding of barriers to uptake of existing training/skills development options.
- Enhanced skill level among industry participants leading to better decision making, improved productivity, increased efficiency and higher profitability, and enhanced risk management
- Document describing wool and sheepmeat career paths 'employment with a future'.
- Leadership that presents a vision for the WA sheep industry.
- Enhanced skill level among industry participants leading to better decision making, and greater confidence in adoption of new technology.
- An industry better prepared to benefit from advances made in other industries, and in new technologies.
- Increased desire to make a career in the sheep industry.
- Enhanced community respect for the Western Australian sheep industry.

5.2.4 Theme 4: Tools for more informed decision making and efficient labour utilisation

The identification and implementation of innovations that can be applied to sheep production in terms of technologies and management practices have been minimal in contrast to those that have been achieved in the cropping industries. This is often seen as a key weakness of the sheep industry and as a key reason why sheep production struggles to be competitive with cropping returns and efficiencies. This theme has identified the need to invest in improving sheep production efficiency through proof-of-profit demonstration of existing and emerging tools and technologies as well as scoping for the next generation of tools and/or technologies that can transform sheep productivity, particularly in mixed farming operations.

The two key activities are:

- 1. Demonstration and uptake of existing technologies and tools
- 2. Development of new technologies and decision support tools

Key outputs / outcomes over the period are expected to be:

- Increased awareness of existing decision support and labour-saving technologies
- Availability of new decision support and labour-saving technologies
- Labour use efficiency increased (DSE per labour unit).
- Animal productivity and productivity quality (wool and meat) increased through enhanced animal health and nutrition.
- Reduced cost of production through reduced animal health treatments and more targeted supplementary feeding.
- Reduced workplace health and safety issues.

The outputs and outcomes from each of these themes / activities have then been modelled to give an estimation of the potential impact on Gross Value of Production (GVP). It is important to recognise that the specific numbers are not important (and will certainly be wrong) but the potential magnitude is – large, medium or small impact.

6 Discussion

6.1 Alignment with current sheep industry and government RD&E plans

There are numerous sheep industry related plans that are pertinent to this Western Australian plan development. This review has interrogated those plans and drawn on them heavily. They are:

- AWI Strategic Plan (2016-19)
- MLA Annual Investment Plan (2017-18) / 2018-19 Sheepmeat & Grass-fed beef RD&A priorities
- Western Australian Sheep Industry: Research, Development and Innovation Plan 2018-2025
- Sheepmeat Industry Strategic Plan (2015-2020)
- Wool Industry National RD&E Strategy 2016-2020
- The South Australian Sheep Industry Blueprint: 2015 TO 2020 and beyond
- Sheep Industry Business Innovation Project (Western Australia)

The review of these plans showed that there was significant overlap or consistent priorities/themes between the majority of the plans. The Prospectus contains a chart (**Error! Reference source not ound.**) which provides the capacity to align those priorities across the various plans. There are eight themes that have been identified for an alignment.

It is obvious that there were significant consistencies across these various plans. They include:

- Sheep productivity is central to all
- There is a considerable focus on integrating sheep into a mixed farming (cropping) system
- Product quality and integrity are of paramount importance
- A focus on risks welfare, environment, social licence is evident
- Building capacity into industry participants is crucial
- As is harnessing of (new) technology and precision management to 'make the job easier'

These consistencies are critically important to this Western Australian sheep industry RD&E prospectus, as they reflect the priorities established from significant consultation across the Australian sheep sector. The four identified themes in section 6 all have elements of consistency with the themes listed above. There are strengths and weaknesses arising from this observation. The strengths are that the four themes identified should be very compatible with existing RD&E plans and therefore the implementation of any of the four themes should continue that compatibility and lead to stability of outcomes for the industry. The clear weakness may be that stakeholders see these themes as just more of the same and as shown in the survey, previous plans may not have met the aspirations of many participants in the industry. As identified, it is highly probable that there are more blue-sky orientated themes or themes that come from other industries that might lead to more transformational change for the Western Australian sheep industry. The identification of those themes is recommended as a priority for any collaborative structure that may be formed in Western Australia.

7 Conclusions/recommendations

7.1 Summary of high priority initiatives within themes

The following table provides a summary of those initiatives that the consultants have considered as both high priority and potentially filling a significant gap in current research activities. Comprehensive details and explanations of the initiatives listed below are available in the Prospectus.

Theme	Initiatives							
1. Quality wool and	Training course targeting management to produce quality wool in mixed							
meat from variable	enterprise farms							
Mediterranean	The practical and economic implications of moving to shorter shearing							
production systems	intervals on mixed enterprise farms							
	Value chain analysis of sheep meat production efficiencies to match producer							
	and processor outcomes							
	 Development of a next generation extension package that is focussed on 							
	reproduction in the Western Australian Mediterranean environment							
	(including results on rearing twins and triplets to meet market specifications)							
	A decision support App that helps calculate how much the wool and sheep							
	enterprises are earning for the farm business and enables scenarios to be							
	compared.							
	A review of lamb nutritional requirements relative to desired growth rate and							
	Western Australian feedbase and finishing options to supply those							
	requirements							
	 Optimised sheep production systems and feedbase management in a mixed 							
	farming enterprise							
2. Improving	 Determine wool and sheep meat non-compliance rates from increases in 							
resource efficiency	multiple born and/or reared lambs delivered from high performance Merino							
in Mediterranean	flocks.							
environments	 New technologies utilised to provide phenotypes and genetic information for 							
through developing	measurement and selection for worm resistance in Mediterranean							
sneep that are fit	environments							
for purpose	Understand the interactions between scouring, internal parasite selection							
	and selection for desirable breech characteristics, to minimise labour							
	requirements.							
	Better match nutritional requirements for sheep in Mediterranean							
	environments to produce quality wool and sneep meat.							
3. Fostering an	 Skills audit, gap analysis and matrix of training courses targeted to individual meads 							
innovative and	needs							
industry	 Understanding of barriers to uptake of existing training/skills development antique and how these limitations are be reduced. 							
community	options and now these limitations can be reduced							
community	 Skills-based panel to deliver hypotheticals that address potential industry discussions and in as deliver, contribute to developing risk menogeneous place. 							
	disruptions and in so doing, contribute to developing risk management plans							
	Declages (activities to enhance the integer of the Mastern Australian share							
	 Packages / activities to enhance the image of the western Australian sheep industry 							
4 Tools for more	Illuusuy							
4. TOOIS for more	 continuation / reinvigoration of the Katanning Research Facility as a tashnology domonstration facility. 							
making and labour	Lechnology demonstration facility							
utilisation	 Review and promote labour saving technologies and decision support tools 							
utilisation	suited to WA							

•	Commission / encourage enhancements of existing or totally new
	technologies and decision support tools

7.2 Summary of recommendations

7.2.1 Recommendation 1

Theme 1 and 2 should be combined into a program of sheep RD&E for Mediterranean environments that could be extended beyond Western Australia to include parts of SA, Northern Victoria and Southern NSW. It could engage MLA, AWI, GRDC and AMPC, as well as DPIRD and key farming groups in Western Australia.

• SAWA, DPIRD, MLA and AWI should convene a working group to develop the recommended program and test its feasibility for both funding and implementation.

7.2.2 Recommendation 2

Either annually or bi-annually a state-based forum of research initiatives and outcomes for the Western Australian sheep industry is held and used as a catalyst for extending information to the private consultancy network, grower groups and other key participants.

• A group including leading producers and consultants should be formed to facilitate a statebased forum for RD&E and that forum should be developed with DPIRD and key research providers in Western Australia.

7.2.3 Recommendation 3

A Terms of Reference (TOR) for a collaborative collective/structure be developed by DPIRD with support from leading producers, consultants and research providers.

- DPIRD develop the TOR and then convene an independent forum to discuss the formation of the apolitical collective structure. An interim independent chair appointed from outside of the West Australian Sheep Industry should be engaged to initiate the process.
- If a collective structure is developed, then one of the priorities would be to scope out innovative blue-sky themes that will meet 10 to 20-year aspirations of the Western Australian sheep industry.
- This collective structure could be the vehicle to further develop themes 3 and 4.

7.2.4 Recommendation 4

Leading producers, consultants and grower groups should engage the research and extension community to determine an appropriate intrastate mechanism(s) that leads to greater awareness and adoption of national research outcomes in mixed farming operations in Western Australia.

• A working group should be established to review national prorgams and determine appropriate proof of concept trials that facilitate adoption in Western Australia

8 Key messages

8.1 WA sheep industry RD&E leadership needs to adopt the recommendations

The Prospectus was commissioned in order to produce an independent assessment and provide a clear roadmap for future collaborative RD&E. It provided 4 investment themes and four key recommendations for action by industry that are required in order to bring about investment in the identified themes. The recommendations listed in Section 6 of this report and in the executive summary of the Prospectus are key to the capcity for this work ot leave behind a legacy

8.2 Imperatives

Prior to the development of the prospectus, there was a perception that RD&E projects in Western Australia lacked collaboration and coordination and this was in turn reducing the efficiency of RD&E within the state. Through the consultation process, it emerged that much of RD&E activity in Western Australia was in fact highly leveraged through interstate collaborations in nationally coordinated programs. Whilst this provides greater opportunities for researchers within Western Australia, the national focus on these programs has often led to a lack of awareness and visibility of those programs and, importantly, adoption of outcomes that are highly relevant to the Western Australian industry. It has also reduced the historically strong connections between researchers and the state supported extension networks as well as private consultants and producers.

Two key imperatives have been recommended as a result.

8.2.1 Imperative 1

A state-based producer/consultant facilitated forum should be initiated that provides the opportunity to review research outcomes and robustly evaluate the opportunities that those outcomes provide for Western Australia. It should include a session on establishing the need for proof-of profit or ground-truthing trials that can translate the research into adoption outcomes, via engagement of grower groups and the private consult networks. The forum should also foster more engagement in the development of research and extension initiatives as well as strengthening the interactions between the research community and the production sectors. A key outcome should be the introduction of young and emerging research capacity and their exposure to leading producers in Western Australia.

8.2.2 Imperative 2

Establish Terms for Reference (TOR) and platform for a collective structure that provides the opportunity for producers, researchers and industry participants to actively explore RD&E opportunities that provide solutions for the industry over the next 10 to 20 years. The structure should be completely apolitical and driven by producer engagement. It should focus on the collective of wool and sheepmeat outcomes and must provide an environment where there is mutual benefit for both the research community and the production sector. This collective structure could also form the vehicle to extend the concepts in themes 3 and 4. It should be noted that this structure could potentially lead to an institution-like format in the future, although this still requires significant further discussion and debate.

9 Bibliography

9.1 References

ABARES AgSurf. <u>http://apps.daff.gov.au/agsurf/</u> accessed May 2018

ABARES MLA data <u>http://apps.daff.gov.au/MLA/</u> accessed May 2018

Agrivet Business Consulting (2017). Lamb backgrounding report. DPIRD.

Alexander, T. (2016). Concepts for alternative investment and financing models to expand sheep production in Western Australia. DAFWA.

Anon. (2010). National Sheep meat production RD&E strategy. PIMC R&D Sub -Committee.

Anon. (2011). Wool Industry National Research Development and Extension Strategy. PIMC R&D Sub-committee

Anon. (2015). Meat Industry Strategic plan. MISP 2020. Med Meat Advisory Council.

Anon. (2015). Sheep mat Industry strategic plan 2015-2020. Sheepmeat Council of Australia

Anon. (2015). Western Australian Sheep Industry Strategic plan 2025+. Sheep Industry Leadership Council.

Anon. (2016). AWI-Strategic plan 2016/17 to 2018/19. AWI

Anon. (2016). MDC Accelerating innovation in the red meat industry. MLA.

Anon. (2016). Sheep Industry Business Innovation (SIBI) Milestone report 9. Sheep Industry Leadership Council.

Anon. (2016). The South Australian Sheep Industry Blueprint – 2015-2020 and beyond. Livestock SA and the SA Sheep Advisory Group.

Anon. (2016). Western Australian Sheep Industry Action plan 2025. Sheep Industry Leadership Council

Anon. (2016). Wool Industry – National RD&E strategy 2016-2020.

Anon. (2017). Discussion paper Collaborative development of a coordinated suite of project proposals filling the RD&E gaps for Western Australia. SAWA

Anon. (2017). Terms of Reference (TORs). Development of a business case for the Western Australian sheep industry Centre. SAWA

Anon. (2017). The Western Australian sheep industry RD&E transition plan 2017-2022. SAWA

Anon. (2017). The Western Australian Sheep Industry. DPIRD.

Anon. (2018). 2018-19 Sheepmeat and Grass-fed RD&A priorities. MLA.

Anon. (2018). Grower priorities against AOP. Jan 2018. AWI

Anon. (2018). Livestock Industry Consultation for DPIRD industry priorities process. DPIRD

Anon. (2018). MLA annual investment plan 2017-18 Pillar One and Four. MLA

Anon. (2018). MLA Annual report 2017 Pillar one and four. MLA.

Anon. (2018). RDA reporting for reginal committees. Past and ongoing project work for producer priority areas. MLA

Anon. (2018). Western Australian Sheep Industry Research, Development and Innovation plan 2018-2025. DPIRD.

Clear Horizons (2016). Barriers impacting on the growth of sheep production in Western Australia. Final Report. DAFWA.

Duddy, G. (2017). Investor ready sheep feedlot. A Sheep Industry Business Innovation Project. DAFWA Western Australia

GHD Advisory (2018). DPIRD RD&I Division. Vision and Objectives. DPIRD.

Green, P. Fischer, S. Bryan, K. and Swanepoel T. (2015). Sheep flagship project – Supply side opportunities. P.PSH.0723. MLA.

Herrmann, R. Dalgleish, M and Agar, O. (2017). Sheep meat market structures and systems. Milestones 1-8. MLA

Howard, H. and Beattie, L. (2018). A national producer survey of sheep husbandry practices. MLA E.AWW.1501

Jones E. (2018). Compile of the known Western Australian sheep RD&E projects 2016-2019

Jones, A. & Curnow, M. (2015), 2014 Western Australia Sheep Industry Survey, DAFWA and Sheep CRC

Jones, A. and Curnow, M. (2016). Western Australian sheep producer survey 2014. DAWFA.

Keogh, M. The Australian sheep industry in 2025, Australian Farm Institute (Report prepared for Western Australian SIBI project),

Kirk, G. and Omodei P. (2017). Opportunities for producers to expand their sheep enterprise. DAWFA project AGR 2015003.

Lindsay D. (2018) The recommendations of the "future Directions". Review and the proposal for the Western Australian Livestock Research Institute. WAFF

Lindsay D. (2018). An integrated plan for a high quality comprehensive research program for livestock production in Western Australia. WAFF

Mercado. (2018). Live sheep export. Brief Report. WAFF and Sheep producers Australia.

MLA (2018) Industry projections 2018. Australian Sheep

Norman, G.J. (2016). National livestock export industry sheep, cattle and goat transport performance report 2015. Department of Agriculture and Food Western Australia. MLA Project W.LIV.0291.

Omodei, P. (2016). A financial analysis of increasing sheep flock size or establishing a new sheep enterprise in High rainfall zone 4 of Western Australia. A summary of determining the financial costs of increasing the flock size of three sheep enterprise types. SIBI.

Pattinson, R. Wilcox, C. Williams, S. and Curtis, K. (2015). NSW Wool Industry and Future Opportunities. NSW DPI.

Pritchett, K. (2016). The Western Australian sheep flock – future scenarios. DPIRD.

Thompson, A. and Young, J. (2013). Scoping the benefits of saving labour in sheep enterprises in Australia

Young, J. (2017). Price signals required to alter the seasonal turn-off of lamb. Report of a Midas Analysis. DPIRD.

Young, J. (2017). Seasonality of lamb supply – Have we interpreted the price signals. DPIRD.

Zinga and Associates (2017). Investor ready sheep feedlot appendix. A Sheep Industry Business Innovation Project. DAFWA Western Australia

10 Appendix

10.1 WA Sheep Industry RD&E Prospectus, July 2018

Attached to this report is the Prospectus that was commissioned. The prospectus has been endorsed by the Sheep Alliance of WA directors and project co-funders MLA, AWI and DPIRD.