final report

Project code: P.PSH.0731

Prepared by: J Lane
GHD

Date published: 15 December 2017

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

Sheep Meat Industry Value Chain Information System

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

Executive summary

GHD and Artis Group were engaged by the Department of Agriculture and Food Western Australia (DAFWA) and MLA to scope the system needs to interconnect information across the value chain in the Western Australia sheep meat industry.

Information systems used within the sheep meat industry are many and varied. Examples include flock recording systems, vendor declarations, carcass feedback systems, saleyard reports, and retailer inventories.

These systems in the main operate independently of each other even though information may be common across systems in some way. Electronic data recording and web access offers the opportunity to interconnect systems more easily than was possible previously and to do this across the length of the value chain where appropriate. Potential advantages of doing this are improved efficiencies, reduced costs and better outcomes for the industry as a whole. Potential downfalls of not interconnecting are duplication and poor use of data.

The purpose of this study is to identify the best and most appropriate system that will serve as a platform to interconnect information sources within the sheep meat value chain for the betterment of the WA sheep meat industry as a whole.

Stakeholder feedback

GHD undertook consultation with a selection of private businesses, industry service providers and government agencies to ascertain the opportunities and barriers to the development of an information portal.

Overall, stakeholders were supportive of a platform being developed which brings together publically available information and data from different sources. However, the concept of a data portal allowing the accessing and sharing of data from individual businesses was generally not supported due to a range issues including duplication of services and difficulty of obtaining data.

Data sources

A broad range of potential data sources were identified including data relating to price, throughput, carcass feedback and livestock movements (see below). While some data is readily available and automatically attainable (e.g. historical prices), other data is likely to be more challenging to obtain due to privacy restrictions (e.g. NLIS) or an unwillingness of stakeholders to share (e.g. grid prices).

Data	Source	Format	Attainable	Collection method
Historical price data	NLRS (MLA)	PDF, .XLSX, .CSV, automatic API in development	Yes	Automatic once API developed
Saleyard and abattoir throughput	WAMIA	Web database	Yes	TBD
OTH grid prices	Abattoirs	PDF, webpage	Maybe from some abattoirs	Manual collection
Prices received	Buyers (abattoirs or agents)	Paper, PDF or web portal.	Maybe from some buyers	Manual collection
Carcass feedback	Livestock DataLink	.CSV	Yes, but currently in trial phase	TBD
Live export orders	Livestock exporters and agents	PDF or web format.	Maybe from some buyers	Manual collection
Livestock movements	NLIS database	.CSV or automatic via API	For PIC owners only, not 3rd parties	.CSV download of automatic with API.
eNVD	Safemeat/MLA	API in development	For PIC owners only, not 3rd parties	API in development
Flock records	Commercial flock recording service providers	Cloud based systems	If clients approve	Automatic systems can be developed.

Gap analysis

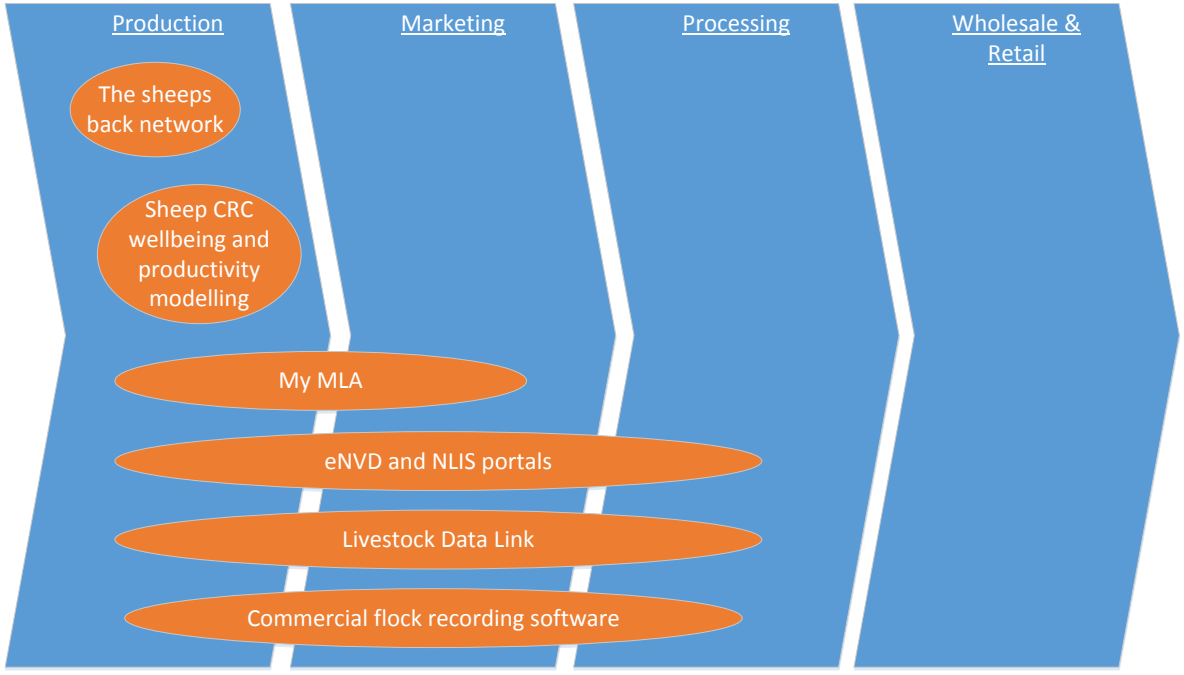
To embark on the development of a data portal specific to the WA sheep meat sector, DAFWA must be certain that the portal will not compete with or duplicate other services currently available or in development.

Research and consultation identified that some industry bodies and private sector suppliers are developing systems and platforms which could represent competition or duplication. In many cases, organisations which hold data are actively seeking to develop portals, platforms and tools to help users better access and interpret the data. These initiatives have a significant head start in development and also benefit from having improved access to existing data.

The gap analysis below depicts how the above initiatives are likely to address the industry needs (identified from stakeholder consultation), and the potential needs which a DAFWA sheep meat portal might fill (indicated in the DAFWA column by ✓✓✓. Where duplication is likely, it may be preferable for the WA portal to simply link users to other available services (indicated by **link**).

Identified need	myMLA	Livestock Data Link	SheepCRC	Commercial flock recording	NLIS/eNVD Portals	The Sheeps Back	DAFWA Sheep Meat Portal
Carcass feedback		✓✓✓ ✓	✓	✓			Link
Production and performance monitoring/modelling			✓✓ ✓	✓✓✓		✓	Link
Access to NLIS and eNVD data and services				✓	✓✓✓		Link
Customised market reports	✓✓ ✓						NLRS API
Supply chain capacity and throughput							WAMIA data input
View and compare commercial prices on offer (OTH, live export etc.).							Buyer input
Producer benchmarking						✓✓✓	Link
WA sheep industry RD&E, news and events	✓					✓✓	Input from DAFWA and industry groups
Aggregation of available data, information and services into one location	✓					✓✓	Overall system

The diagram below shows how the above data and information programs span different points of the supply chain. Note the lack of connectivity through to wholesale and retail.



System options

This study evaluated four potential options

- **Status Quo:** DAFWA focus resources on promoting the use these emerging systems and tools, e.g. helping producers and the supply chain understand the value of data, and how it can be used to lift productivity and profitability. Collaboration with other industry bodies working in this area may result in the WA sheepmeat industry becoming a preferred testing ground for new and emerging livestock data systems and tools.
- **Personalised Data Portal:** Developing a data portal which is capable of accessing a range of databases and information sources, allowing users to view information relating to their own enterprise. This option would be most challenging to implement, as it would be reliant on DAFWA gaining access to data held by third party industry organisations and/or encouraging supply chain participants to share data. The option could also be seen as duplicating the existing and emerging platforms.
- **eConnected Sheepmeat:** Instead of developing a data portal to bring together data from a range of different sources, this option would involve DAFWA developing innovative ways for third parties to access its own IP via a range of Apps, APIs and tools. This approach has been successfully adopted by the eConnected grainbelt project in which DAFWA works collaboratively with private IT developers and grower groups.
- **Content Management System (CMS):** a dedicated DAFWA sheep meat industry website that provides access to relevant information and data for the WA sheep meat industry. The site would bring together different sources of publically available information and data, which would be aggregated rather than personalised. There would be no individual login or direct access to individual property data, however the site would provide links to these external sites and portals (e.g. NLIS, Livestock Data Link, myMLA).

Preferred option

After considering the industry needs, stakeholder feedback, data and information availability and existing services available, GHD and Artis group consider the Option 4 (CMS) the most preferable option for improving the information provision to the WA sheepmeat industry.

The CMS solution is recommended because it equally supports:

- Raw data import and visualisation from data sources
- Content creation/and submission by industry user groups
- Links to external industry related websites
- Social networking and collaboration
- Optional Marketing to groups through various channels such as mobile, email, newsletter

Specifically, the CMS would focus on end-users, allowing such users to interact with the system to create their own pages or mini sites, to add collaboration apps to those pages and to define user and user group access to those pages. The portal elements of the solution would enable specific users to interact with the system via dashboards, reports, web forms, workflows, dynamic lists polls, etc.

Outlined below are the different system inputs and explains where information and data could be sourced, and how it could in inputted.

Content	Source	Method
Market prices and volume saleyards, over the hooks, live exports	NLRS	API
Throughput Monthly throughput volume by saleyards and abattoirs, and aggregated for state.	WAMIA	WAMIA to manually input (or send to DAFWA to update) Future opportunity for API input
Over the hooks grid prices	Abattoirs	Abattoirs provided access to manually update their own grid prices (or send to DAFWA to update)
Other prices offered e.g. live export orders)	Live exporters or agents	Live exporters or agents provided access to manually update their own prices/orders (or send to DAFWA to update)
Content News, events, RD&E etc.	DAFWA and other industry organisations	Content sent to DAFWA to upload to portal. Opportunity to provide some organisations with permission to publish
Social media	Facebook, Twitter, Instagram	API May require DAFWA moderators

Figure 1 below depicts how the system would integrate information and date from different sources, to provide a unified user experience for each user group.

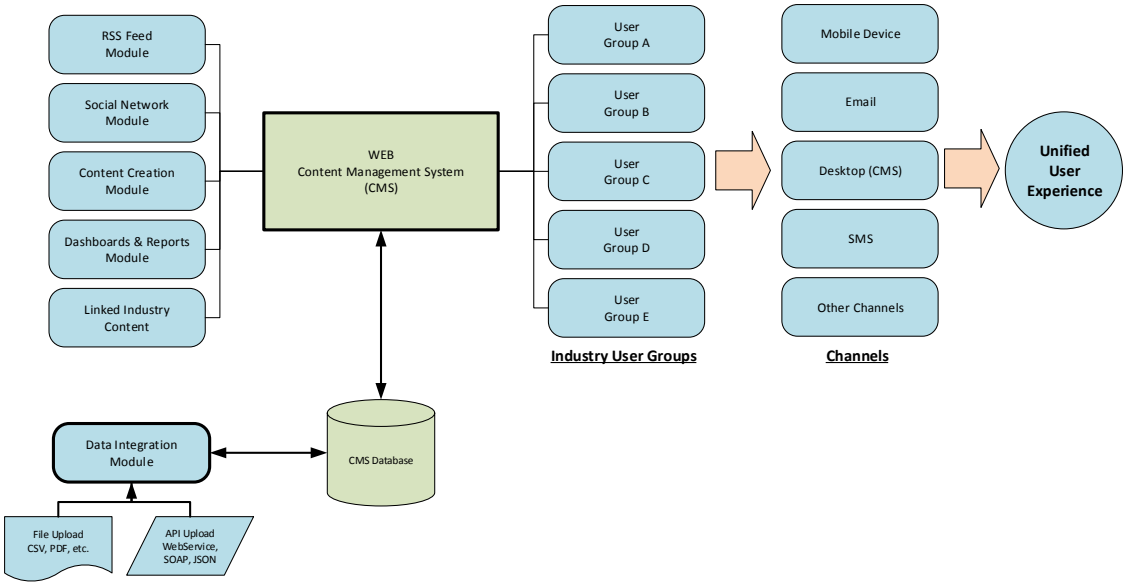


Figure 1 Content Management System (CMS) – System Component and Integration Model

Cost estimate

Artis Group estimate the cost of developing the CMS solution outlined above would be in the order of $50 - $100K. This estimate is based on using a mid-range platform such as Kentico, which would also incur a once off subscription of ~$10-20K[1] and ongoing maintenance fees of around $1,500 per annum[2].

[1] http://www.kentico.com/purchase
[2] http://www.kentico.com/purchase/price-list/maintenance

Management and oversight

A key feature of a CMS portal is the ability to empower different stakeholders to independently supply and update information and data. While providing permission to different stakeholder to independently contribute to the CMS, DAFWA will need to moderate and manage content.

It was suggested during stakeholder consolation that DAFWA may consider charging the Sheep Industry Leadership Council (SILC) with responsibility for moderating and managing content. This approach may help to encourage industry to take ownership and carriage of the resource.

Steps to development

Outlined below is a recommended approach DAFWA could take to developing the preferred option presented in this study.

1. Consider the findings from this scoping report internally
2. Engage with DAFWA's system architecture team to discuss the feasibility of the preferred option.
3. Agree on a preferred option within DAFWA
4. Share the findings of this scoping report and DAFWA's preferred option with key user groups and data sources seeking support and cooperation for the initiative. In particular, seek support from stakeholders and organisations from which information and data will be sought (e.g. NLRS, WAMIA, LDL, abattoirs, live exporters, agents).
5. Tender for website development
6. Ongoing engagement with key user groups during development, providing opportunities for input.
7. Offline testing with key stakeholder groups
8. Public launch
9. Ongoing improvement

Conclusion

This scoping study has identified an industry need to bring together the different publically available information, data and services available to the WA sheepmeat industry, into one location for easy access. However, the concept of a data portal allowing the accessing and sharing of data from individual businesses was generally not supported due to a range issues including duplication of services and difficulty of obtaining access to data.

After considering a range of alternatives, this study concluded that a Content Management System (CMS) website would be the most preferred option for achieving the above means, due to its ability to access content via a range of means including file uploads, open API's (web services), third party user generated content, links to other websites. In this way a CMS system would allow DAFWA to provide permission to certain third party users to publish or upload their own content, information or data to certain parts of the website. This feature has the potential to make the website more interactive and relevant to users, with industry taking more ownership and responsibility for the content.

Importantly the CMS option would provide the flexibility for DAFWA to extend and develop the features of the website. This will be important given the new information and data initiatives which are under development, which could be linked to the website in the future.

Table of contents

Table index

Figure index

Appendices

1. Introduction

1.1 Purpose of this report

GHD and Artis Group were engaged by the Department of Agriculture and Food Western Australia (DAFWA) and MLA to scope the system needs to interconnect information across the value chain in the Western Australia sheep meat industry.

1.2 Terms of reference

This project included the following terms of reference:

- Identify and consult with key stakeholders locally and nationally in relation to service delivery, funding, governance, research and development of interconnected information systems
- Develop a situation statement of the information systems currently available for use by the WA sheep industry; for both electronic and paper based systems, including databases, tools and techniques
- Identify systems to interconnect different information systems through either a single web portal or by other methods
- Identify opportunities to interconnect to, or be part of, systems outside of WA (e.g. MLA's Livestock Datalink platform)
- Describe successful systems that interconnect information across the value chain either in other industries (for example eConnect for the grains industry in WA) or for sheep industries in other geographical locations (such as Farm IQ in New Zealand)
- Describe key governance issues for interconnected systems (e.g. privacy, security, data ownership and use)
- Describe a likely system for the Western Australian sheep industry and the key development steps to realise this.

1.3 Background

Information systems used within the sheep meat industry are many and varied. Examples include flock recording systems, vendor declarations, carcass feedback systems, saleyard reports, and retailer inventories.

These systems in the main operate independently of each other even though information may be common across systems in some way. Electronic data recording and web access offers the opportunity to interconnect systems more easily than was possible previously and to do this across the length of the value chain where appropriate. Potential advantages of doing this are improved efficiencies, reduced costs and better outcomes for the industry as a whole. Potential downfalls of not interconnecting are duplication and poor use of data.

The purpose of this study is to identify the best and most appropriate system that will serve as a platform to interconnect information sources within the sheep meat value chain for the betterment of the WA sheep meat industry as a whole.

The Sheep Industry Business Innovation Project

This is project was funded from Sheep Industry Business Innovation (SIBI), a $10 million initiative which aims to support the sheep industry to capitalise on growing markets for sheep products.

The SIBI project assists the industry to build capacity to supply new markets for sheep meat and live exports, particularly in nearby Asia and the Middle East, generating flow-on benefits to producers, industry, the regions, communities and the State economy.

1.4 Scope and limitations

For the purpose of this study, the sheep meat industry is taken to include all sectors of the industry; sheep production, sheep meat processing, live sheep export, and sheep meat retailing.

2. Data use in the meat and livestock industry

The emergence of a range of technologies including cloud computing, remote sensing and radio frequency identification (RFID) has allowed for more data to be collected and held in more centralised databases. The establishment of these large databases and the emerging opportunities to use this information to improve decision making is sometimes refered to as “big data”.

The meat and livestock industry has for many decades been steadily becoming more reliant on data and quantitative information (rather than qualitative measures) to inform production and marketing decisions. The industry now collects data in many ways, such as flock recording systems, vendor declarations, carcass feedback systems including livestock data link (LDL), saleyard reports and product inventories. These systems in the main operate independently and sometimes in competition with each other. As a result, there currently is little opportunity to consolidate information into a useful form.

Electronic recording together with web access makes consolidation of data practicable at an industry level. Interconnection of systems across the length of the value chain would also be possible where appropriate. This potentially could enable better use of data already collected to operate supply chains and businesses more effectively than is currently possible.

MLA is seeking to increase the availability of data and information to help supply chain businesses improve decision making (Figure 2) as highlighted in a recent ABARES conference presentation (Appendix A).

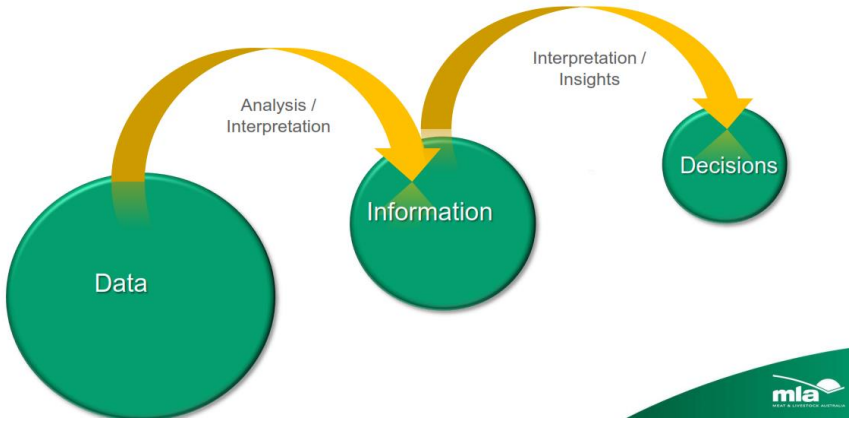


Figure 2 Data use in meat and livestock decision making

Broadly MLA believes data can help improve decision making to achieve the following goals:

- Understand, predict and improve management and products to meet diversity of consumer needs
- Bolster supply chain responsiveness, resilience and adaptability
- Increase value and returns by improving quality and/or component utilisation
- Less wastage of resources in the supply chain.

3. Potential data inputs

This section provides a review of potential data inputs which may be available for integration into a WA sheep meat portal. Inputs are described in the following terms:

- Practical use for businesses
- Holder of the data

- Current systems
- Data format

This information is used to determine if data is useful and attainable, and if so how it might be incorporated into a portal.

3.1 Historical price data (via NLRS)

The National Livestock Reporting Service (NLRS) is a service offered by MLA that registers market information through a network of livestock market officers across Australia. The NLRS independently collects market data from the key auction and direct markets, in addition to slaughter statistics and skin prices.

Data collection happens weekly through 28 livestock market officers (LMOs) who attend 62 physical markets across Australia. Analysts personally collect the data used to compile reports on direct sales, slaughter statistics, and skin prices from reliable industry sources.

The most relevant NLRS reports for WA sheep and lamb producers are summarised in Table 1 below with examples provided in Appendix C.

Table 1 Relevant NLRS reports

Type	Region	Frequency	Data
Physical markets	Muchea Katanning	Each sale (usually weekly)	• Yardings (including change in numbers) • commentary • lots by weight category • fat score • price ($/head, c/kg carcase weight - CW) • price change • skin value
Over the hooks	WA	2-4 weekly reports	• Category • weight range • fat depth • price (low, high, average)
AuctionsPlus	National	Monthly	• Yardings (including change in numbers) • Commentary • lots by weight category • fat score • shearing season • price (low, high, average)
Eastern States Daily Indicators	Eastern states	Daily	• Indicator prices for re-stocker lambs, merino lambs, light lamb, trade lamb, heavy lamb, mutton • Daily, weekly and yearly change
WA Weekly Indicators	WA	Weekly	• WA trade lamb indicator (chart) • OTH heavy trade lamb indicator (chart) • Sheep and lamb yardings • Sheep and lamb slaughter • Combined saleyard and OTH indicator • Live export weather price
Livelink	Monthly	Usually monthly	• Exports by destination • Exports by port • WA export wether price

Table 2 summarises the usefulness and availability of NLRS data.

Table 2 Historical prices data summary

Data	Historical sale prices and volume
Description	Prices received and volume from local saleyards and over the hooks, AuctionsPlus and live export markets.
Practical use	Assist with livestock marketing decisions.
Holder of the data	NLRS
Current system	Manual reports collected from saleyards and abattoirs and uploaded onto MLA website and app. Reports used by both producers and rural media.
Data format	Data can currently be downloaded in either PDF, .xlsx or .CSV format. MLA intends to build an application program interface (API) to support the distribution of data automatically. At the time of writing, MLA is at the tender stage for this project (pers. comm. NLRS). MLA is also planning to build a new data platform/online web dashboard called myMLA where producers/stakeholders can customise their own data reports that can be tailored to the individual's production system (e.g. cattle, sheep or goats) utilising the information collected and distributed by MLA. This project is due to be completed in November 2016 (for more information on myMLA see section 5.1.2).

3.2 Saleyard and abattoir throughput (via WAMIA)

The Western Australian Meat Industry Authority (WAMIA) is a statutory authority established under the Western Australian *Meat Industry Act 1976*. The statutory functions of WAMIA include the following:

- *to survey and keep under review the establishments and facilities available in the State for the sale of livestock and the slaughter of animals, and for the processing of carcases, for human consumption*
- *to review the operation of abattoirs and processing works, including … recording in respect of each establishment its effective capacity and actual performance*
- *to encourage and promote improved efficiency throughout the meat industry*

To help achieve these functions, WAMIA maintains a database of WA saleyards and abattoirs, with throughput updated monthly. The database can be used to produce reports which are used by a number of Government and Industry organisations. The WAMIA data summary is shown below.

Table 3 Throughput data summary

Data	Saleyard and abattoir throughput
Description	Weekly saleyard and abattoir throughput of sheep and lambs
Practical use	Understanding supply chain capacity
Holder of the data	WAMIA
System	Database
Data format	Excel, CSV

3.3 Over the hooks grid prices (via abattoirs)

Abattoirs typically offer prices to suppliers based on a grid of prices accounting for livestock category, weight, fat score and other factors (e.g. MSA accreditation). With some exceptions (e.g. Beaufort River Meats), grid prices are generally not made publically available on abattoir websites to avoid competitors accessing this information and to allow abattoirs the flexibility to offer different prices to different suppliers.

WAMMCO makes grid prices available to suppliers after logging into their website. Most other abattoirs will have grid prices available upon request. Table 4 below summarises how WA sheep and lamb abattoirs make grid prices available.

Table 4 Abattoirs grid pricing availability

WA sheep abattoir	Grid pricing
Beaufort River Meats	Website
Corrigin Meatworks (Windmill Meats)	Upon request
Dardanup Butchering Co	Upon request
Fletcher International WA	Upon request
Geraldton Meat Exports	Upon request
Goodchild Abattoirs Pty Ltd	Upon request
Great Eastern Abattoir	Upon request
Hagan Bros	Upon request
Hillside Meat Processors Pty Ltd	Upon request
Karnet Prison Farm	Upon request
Kellerberrin Abattoir and Butchery	Upon request
Kimberley Free range Beef Gin Gin	Upon request
Murdoch University	Upon request
Sharklake Food Group	Upon request
TE Cullen & Son	Upon request
V & V Walsh	Upon request
WA College of Agriculture - Cunderdin	Upon request
WA College of Agriculture - Denmark	Upon request
WA College of Agriculture - Morawa	Upon request
WA College of Agriculture - Narrogin	Upon request
WAMMCO International	Website supplier login

Table 5 below summarises the usefulness and availability of OTH grid prices

Table 5 OTH grid prices data summary

Data	OTH grid prices
Description	Prices (c/kg CW) offered by abattoirs for different categories of livestock
Practical use for WA producers	Marketing decisions
Holder of the data	Abattoirs
Current system	Varied between abattoirs, data is typically presented in a PDF document and made available to download from website or available upon request
Data format	Typically .PDF file

3.4 Prices received (via abattoirs and agents)

Buyers (abattoirs and livestock agents) use a range of different accounting systems to report back to suppliers the prices received for livestock. Typically, information will be made available via a number of different means including:

- paper statements in the mail
- emailed statements
- web portal

Depending on the buyer, information can be presented in different formats and with different levels of detail (e.g. dressing percentages, fat score etc.). See Table 6 below.

Table 6 Prices paid data summary

Data	Prices received
Description	Account summary of prices received from abattoirs or agents ($/head and/or c/Kg)
Practical use for WA producers	Accounting, benchmarking, marketing
Holder of the data	Buyers (abattoirs or agents)
Current system	Various systems provide accounting statements to producers, via paper, email or web portal.
Data format	Paper, electronic document or web.

3.5 Carcass feedback (via Livestock Data Link)

Abattoirs generally do not provide detailed carcass feedback to suppliers, other than basic information contained in account statements. Livestock Data Link (LDL) is a new MLA initiative which allows participating abattoirs and producers to access carcass information which clearly shows the details and cost of non-compliance of delivery with specifications.

LDL uploads carcass data and makes it available via a web portal. Producers can also download the data in .CSV file format. LDL is a web-based supply chain feedback system which:

- Presents carcass feedback in a user-friendly format that encourages producers to use the information to improve their over-the-hook performance.
- Demonstrates to producers in dollar terms the non-compliance or opportunity cost of not meeting market specifications
- Provides producers with the ability to benchmark individual animals and consignment carcass performance at a flock/herd, regional, state and national level
- Enhances the capacity to evaluate and monitor carcass performance to support business decisions. [3]

LDL works by abattoirs applying a target market to each animal before slaughter. Carcass data is uploaded into the NLIS Database along with the allocated target market. The carcass data is then analysed against the LDL grid which is based on the discounts and penalties which apply for not complying with the processor market specifications.

Producers can access LDL by logging onto the web portal (www.ldl.mla.com.au) using their NLIS User ID and password (obtained via www.nlis.mal.com.au). After selecting the processor grid they have entered into, the system compares the carcass specifications against the grid and provides information on non-conformance and lost opportunity.

Producers can download the data via a CSV file (basic table format) which can then be uploaded to on-farm flock management systems. Initial discussions with MLA suggest the system would most likely be able to automatically transfer this information into a WA sheepmeat data system.

For slaughtered sheep LDL will provide results for individual animals identified by their PIC of origin. If sheep have an electronic NLIS tag, carcass results will be linked to individual device numbers.

MLA is currently trialling LDL at thirteen (13) processing plants across Australia, including one WA sheepmeat abattoir. In the future MLA plans to expand the system to include information about animal health and disease information.

[3] http://www.beefcentral.com/news/ldl-project-will-counter-100m-annual-losses-in-carcase-compliance/

What LDL doesn't do:

- Provide information about prices received (this is communicated to growers via other abattoir reporting systems)
- Allow producers to compare prices, discounts or specifications from multiple abattoirs

Table 7 Carcass feedback data summary

Data	Carcass feedback
Description	Fat score, fat colour, weight range, dentition and other compliance information for each animal slaughtered.
Practical use for WA producers	Help understand and reduce the cost of non-compliance
Holder of the data	Abattoirs, Livestock Data Link
System	LDL makes data available via a web portal with grower login, as well as access to data via .CSV download.
Data format	Currently .CSV file, however in the future data may be transferable via an API.

3.6 Live export orders (via live exporters and agents)

When live exporters have a shipment planned they will generally inform livestock agents of the required specifications, volume and price. Livestock agents typically make this information available to their customers via an export order. In some cases, export orders are made available on agent websites, in other cases producers are instead encouraged to inquire with agents.

Table 8 Live export orders data summary

Data	Live export orders
Description	Information about upcoming export shipments (livestock specifications, volume required, price)
Practical use	Marketing
Holder of the data	Livestock exporters and agents
System	Orders published via agent websites, newspapers or otherwise distributed to producers
Data format	Paper, electronic document or web.

3.7 Livestock movements (via NLIS)

The National Livestock Identification System (NLIS) is a system of animal identification and traceability which helps to protect the industry from exotic disease and food safety incidents. The NLIS sheep database records mob-based animal movements between Property Identification Codes (PICs). Producers have the opportunity to use individual electronic tags, however this is not a mandatory requirement.

An NLIS portal has recently been developed which allows producers to access and update their livestock data, including recording mob based movements to and from their property.

NLIS data can only be obtained by PIC owners. Any request for data from a third party must be approved by the NLIS board. The board is very aware of the opportunities for using the NLIS data for purposes other than emergency animal disease response (e.g. improving supply chain efficiency), however to date requests for access by third parties have generally been rejected. Therefore, sharing of NLIS data would need to be voluntarily provided by PIC holders.

Table 9 NLIS data summary

Data	Livestock movements
Description	Flock based livestock movements between Property Identification Code (PIC)
Practical use for WA producers	Evaluating supply chain capacity and efficiency
Holder of the data	NLIS database
System	Web portal allowing PIC owners to view and download their own data.
Data format	.CSV download and API transfer available in some cases

3.8 Flock records (via commercial flock recording systems)

A number of commercial flock record keeping systems are available to help producers collect, aggregate and manage data for their livestock. These systems have typically moved towards cloud based platforms, which in many cases can interface with other data sources such as NLIS or eNVD, either directly via an API or indirectly via data uploads. Commercial flock recording systems are overwhelmingly designed for animals with individual identification, however there are some mob-based applications. More information on commercial flock recording systems is provided in section 5.1.4.

Table 10 Flock recording systems data summary

Data	Flock and individual animal records
Description	Production information such as fertility, breeding values, weight gain, carcase characteristics, wool production/quality, prices received etc.
Practical use	Selective breeding, production and marketing
Holder of the data	Various commercial suppliers hold data on behalf of clients
System	Typically cloud based or hybrid
Data format	API's could be developed for automatic transfer.

3.9 eNVD data (via eNVD database)

MLA is currently developing and trialling the eNVD system for seamlessly transferring electronic livestock integrity data from the livestock producer through the supply chain to the intended receivers. The information is verified against industry systems data (e.g. PIC, LPA accreditation, NLIS statuses) to deliver improved data integrity. The trial will continue until SAFEMEAT determines, based on trial outcomes, to progress with a national roll-out of the eNVD system. Information will be stored at a central database managed by MLA, alongside the NLIS database. Information will consist of all compulsory eNVD fields, and the optional RFID field.

The key benefits of the eNVD system compared with the current NVD system are:

- Reduce the cost of reprocessing inaccurate or incomplete paper NVDs at saleyards, feedlots and processors.
- Enable producers to have access to the latest versions of vendor declarations to meet market requirements.
- Improve industry integrity and traceability of vendor declarations and animal movements.
- Reduce the time taken to complete an NVD, without having to complete the form in triplicate.
- Remove the logistical issue of storing and retrieving old paper NVDs.

Table 11 eNVD data summary

Data	eNVD
Description	Fields include origin (PIC), stock number, age, chemical treatments, month of shearing, LPA QA status, destination
Practical use	Completing and submitting eNVDs for own consignments Evaluating aggregated information on livestock movements through the supply chain
Holder of the data	Safemeat/MLA
System	Current paper based, however central database in development
Data format	Paper, electronic document or web.

3.10 Summary of data sources

Below is a summary of the identified data sources including the sources, format, attainability and collection method.

Data	Source	Format	Attainable	Collection method
Historical price data	NLRS (MLA)	PDF, .XLSX, .CSV, automatic API in development	Yes	Automatic once API developed
Saleyard and abattoir throughput	WAMIA	Web database	Yes	TBD
OTH grid prices	Abattoirs	PDF, webpage	Maybe from some abattoirs	Manual collection
Prices received	Buyers (abattoirs or agents)	Paper, PDF or web portal.	Maybe from some buyers	Manual collection
Carcass feedback	Livestock DataLink	.CSV	Yes, but currently in trial phase	TBD
Live export orders	Livestock exporters and agents	PDF or web format.	Maybe from some buyers	Manual collection
Livestock movements	NLIS database	.CSV or automatic via API	For PIC owners only, not 3rd parties	.CSV download of automatic with API.
eNVD	Safemeat/MLA	API in development	For PIC owners only, not 3rd parties	API in development
Flock records	Commercial flock recording service providers	Cloud based systems	If clients approve	Automatic systems can be developed.

4 Stakeholder feedback

GHD undertook consultation with a selection of private businesses, industry service providers and government agencies to ascertain the opportunities and barriers to the development of an information portal.

Consultation was undertaken via an online survey, followed by a more in-depth telephone interview and this section provides a summary of stakeholder feedback received.

4.1.1 Response

A total of 15 responses were received from a range of different supply chain stakeholders and data service providers (see Figure 3 - note that some respondents identified as more than one stakeholder category).

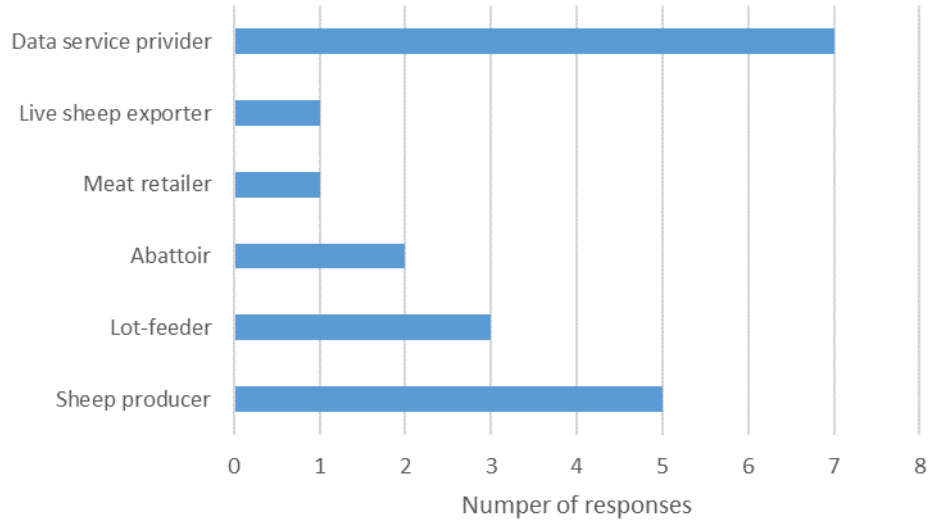


Figure 3 Stakeholders engaged

Note that stakeholder consultation was targeted towards a small number of stakeholders with an understanding and interest in this area, and the sample was not intended to be statistically representative.

4.1.2 Data and information

Businesses involved in the sheep meat supply chain were asked to rate how useful certain pieces of information are to their businesses (Table 12) and then identify which information or data should be included in a future data portal (Figure 4). Information of most use was for market reports, prices and carcase feedback.

Table 12 How useful is the following data to your sheep meat business?

Data	1. (not at all useful)	2. (not very useful)	3. (somewhat useful)	4. (extremely useful)
Live export orders	1		2	2
Market reports		1	3	1
Electronic LPA	1	1	2	1
Flock records/NLIS data	1	2	1	1
Prices paid/received (by you)		1		4
Over the hooks grid price schedules		1		4
Carcass feedback		1		4
Disease/animal health surveillance		1	4	
Supply chain capacity		2	2	1

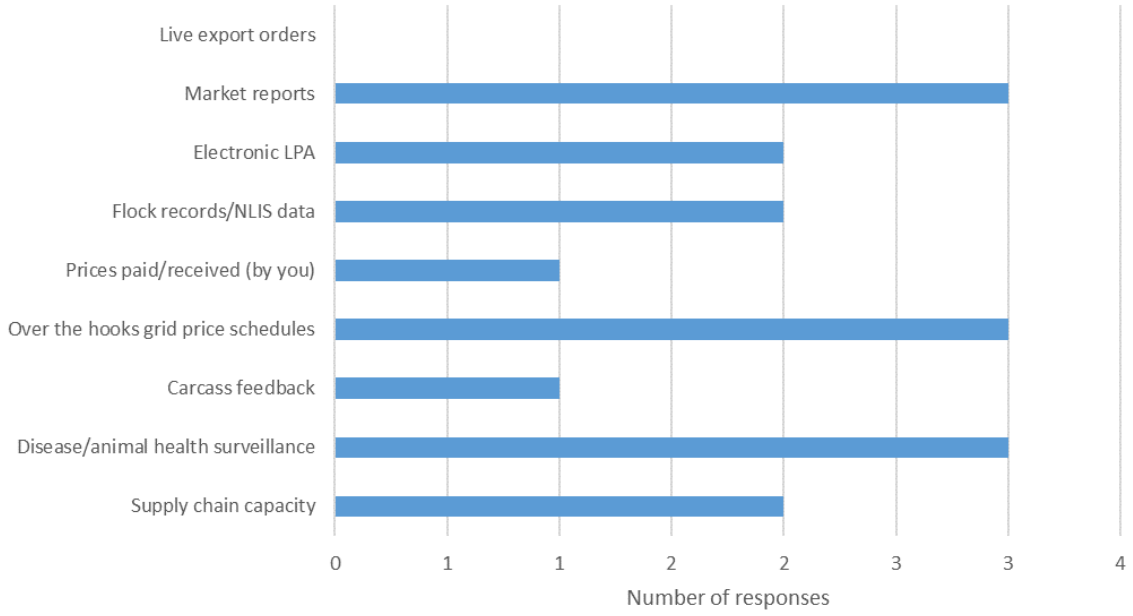


Figure 4 Which information do you think should be made available electronically via a web portal?

4.1.3 Support for the concept and perceived benefits

The majority of stakeholders were generally supportive for the concept of a data portal (Figure 5), however many of these stakeholders also believed there were considerable barriers to its success (see Section 4.1.4).

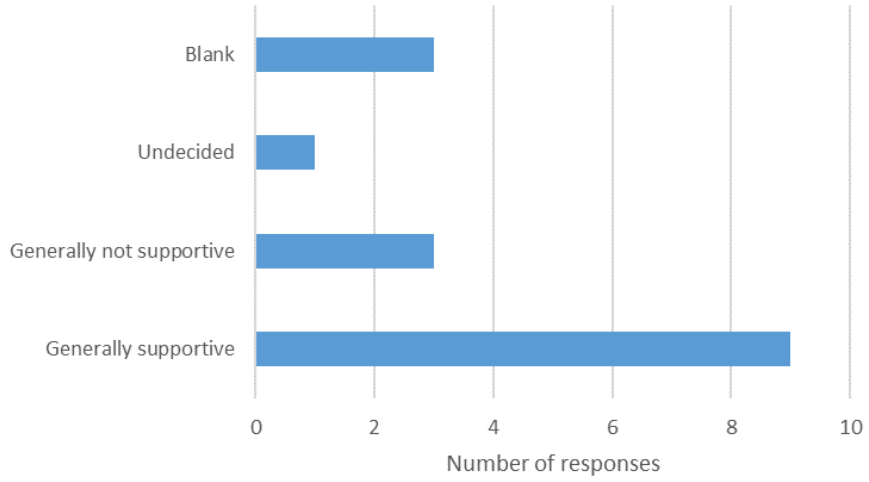


Figure 5 Overall support for the concept

Stakeholders generally believed a portal would be beneficial in improving supply chain efficiency, saving time by having a range of data and information in the one location, and helping to improve marketing decision making (Figure 6).

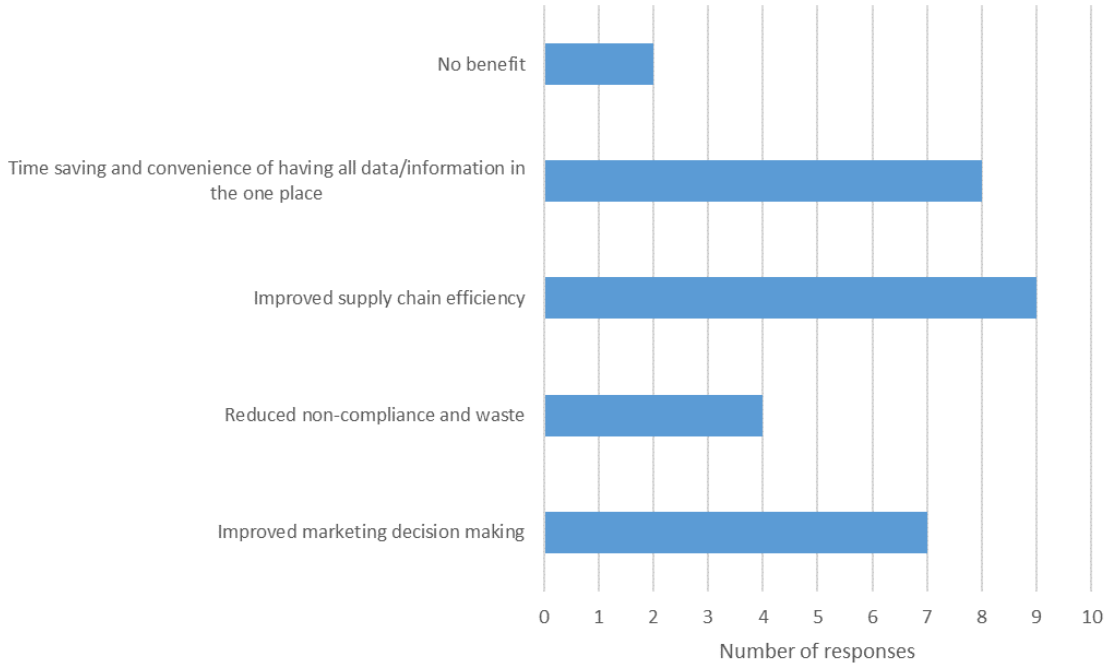


Figure 6 Perceived benefits

Additional stakeholder comments regarding perceived benefits are listed below:

- There are many benefits from improved data use
- Time saving is the main benefit by having all the information in the one place
- It is very difficult to obtain aggregated information about the industry. We are still reliant on google. The ABS and ABARES websites are very difficult to navigate

- The information would be useful by saving the time currently spent looking at a number of websites. But private information concerning the business would not be revealed
- Our current antiquated systems practices must move with the times. Growers need access to a "whole of market" view, not narrowed by third party relationships
- Sometimes buyers cannot rely on agents to get the message out about prices on offer. Every year is different exemplified by the current undersupply of stock
- It would be very helpful to have all information in the one place, with links to other services. I'm not sure we need the Rolls Royce model with individual businesses' data, but at an aggregated level it would be very useful
- Portal could be overseen by the Sheep Industry Leadership Council (SILC)
- NLIS has done some internal analysis showing how NLIS data could be used to improve supply chain efficiency, e.g. avoiding un-necessary freight (to and from saleyards), delayed joining to avoid oversupply etc.

4.1.4 Perceived barriers

Many stakeholders were sceptical about the willingness of businesses to share information and data via the portal. Other major barriers identified included cost, system incompatibilities, time required to input/interpret data as well as the overall lack of demand from industry for the service (Figure 7).

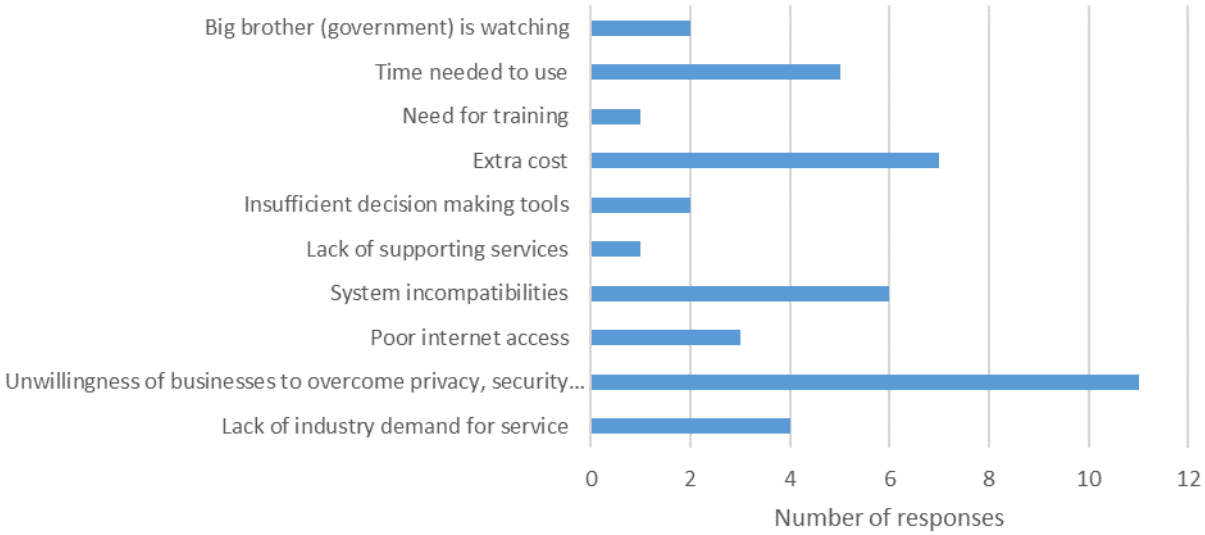


Figure 7 Perceived barriers to success

Additional stakeholder comments regarding barriers to success are listed below, grouped into broad themes.

Duplication

- It would be counter-productive for DAFWA to develop this portal when there is much duplication in the market (e.g. private service providers, MLA, CRC, CSIRO, ABRI, UNE Spatial Livestock Program).
- Duplication with other industry platforms in development
- Duplication of existing data collection
- Duplication. The industry is already fragmented enough without another data silo. Better to work collaboratively with other service providers and help producers realise the value of data.
- It is difficult to get producers engaged. Many producers don't even know how many sheep they have. You need to demonstrate the value of data to them, and cut down the steps required. The simple task of downloading/uploading data is too much for many producers.
- Without individual animal ID, any system is going to be substandard. You cannot get a good picture of productivity by looking at a mob of sheep. You need to identify and eliminate the underperforming sheep.
- The Sheep CRC is well down the track in developing a similar platform which will allow producers to import individual flock data, sheep genetics etc., and run a range of risk and productivity model scenarios.
- Potential duplication. The myMLA platform is under development where producers/stakeholders can customise their own data reports which can also be tailored to the individual's production system (e.g. Cattle or sheep or goats) and the information collected and distributed by MLA will then be available. This is not essentially a 'portal' as such however the tailoring of the information will be a key for producers and industry stakeholders to get up-to-date information relavent to their production system without having to sift through a large list of current reports or rely solely on an email distribution.
- a typical duplication exercise by a government department as we already supply the respective information to the Western Australian Meat Industry Authority (WAMIA) and to the National Livestock Identification System (NLIS). I see no point in abattoirs sending the same information to a third party. The information you require can easily be sought from WAMIA, therefore no need for us to be part of another data collecting exercise.

Internet speed/tech issues

- Slow internet speed may prevent the implementation of a fully cloud based system
- Need to liaise closely with DAFWA's enterprise architecture group, to ensure they know exactly what you have planned and their systems can handle it (particularly if you are going to store data).

Difficulty obtaining data

- Negotiating data ownership/IP is difficult.
- It will be difficult to get abattoirs to share information.
- Any system is limited by the abattoirs not willing to provide electronic carcass feedback direct to producers. We are continually trying to get abattoirs to move away from paper/pdf reporting - they all say they are going to, but it never happens.
- Legal restrictions on NLIS releasing data to a third party.
- Not practical to make export orders available on the portal. Current undersupply means most exporters are not filling orders (always looking to buy). Trade has changed, moving towards smaller and younger sheep, and also much more air freight happening.
- Not sure how you will get the systems integrated. Cost of data entry could be high. Privacy issues will be difficult.
- The landscape is rapidly changing in terms of data use and sharing in agriculture. Some producers and industry organisations are trying hard to retain or control data, because they have been told that it is valuable and not to give it away. This has resulted in data silos being created. I think industry (MLA and others) should focus on developing clear data standards, which can be used by a range of different organisations (public and private) to share data.

4.1.5 Industry developments in systems and data sharing capability

Stakeholders provided a range of additional comments and information about advances in systems and data sharing within their organisation or sector.

- Some abattoirs are looking to develop a web portal for growers to see OTH prices on offer, prices received, specifications, compliance etc.
- NLIS data can be obtained by PIC owners via the NLIS portal (downloadable via CSV file or electronically via an API). Any request for data from a third party, must be approved by the NLIS board. The board is very aware of the opportunities for using the NLIS data for purposes other than emergency animal disease response (e.g. improving supply chain efficiency), however to date these requests have generally been turned down. The board believes that by advancing one area of the supply chain, other areas may be disadvantaged, which may dissuade some users from entrusting NLIS with their data. However, there is nothing stopping an individual from voluntarily publishing their NLIS data or making it available to a third party.
- NLRS is currently building an API to support the distribution of data automatically (currently at the tender stage for this project). However see above for the type and format of information currently available.
- WAMIA collects monthly head killed from abattoirs and makes it available in an aggregated format. This data could be provided to a portal, although WAMIA is moving towards a cloud based database (in about 6 months) allowing abattoirs to enter data online (rather than via post/email). WAMIA does not provide data by livestock category or abattoir. This is not required by law, and has not been advocated, but if required it is likely an abattoir would need to agree.

- Sapien Technologies has a cloud based database and platform which can perform many of the functions required with over 5 million animals in the database. The platform can interface with the NLIS database (via an API) and also the eNVD database (bobby calf trial). There is also a mobile phone app to allow producers to complete eNVDs. Information can also be shared with abattoirs, pregnancy testers etc.
- Stockbook allows users to monitor individual sheep (with NLIS tags) and also has the ability to integrate data from outside sources (e.g. carcass feedback) via CSV file.
- Flock recording systems typically require individual animal ID, however some flock based systems are being developed, as are systems for use in QA programs.
- eGrains focusses on providing data and information held within DAFWA to producers and software developers, rather than establishing and maintaining a data warehouse. A survey of grower needs found that some of the most valuable data resides in DAFWA so DAFWA develops APIs to make the information available to producers and software developers. This is much easier than trying to negotiate data ownership issues, especially when obtaining data from outside sources. It was difficult enough to work through the IP issues of DAFWA's own data (e.g. as a result of 3rd party providers being involved in developing tools etc.). A key part of eConnect is the network of demonstration sites, which allow producers, producer groups, DAFWA and commercial software developers to test and collaborate on innovations.

4.1.6 Summary of stakeholder feedback

Overall, stakeholders were supportive of a platform being developed which brings together publically available information and data from different sources. However, the concept of a data portal allowing the accessing and sharing of data from individual businesses was generally not supported due to a range issues including duplication of services and difficulty of obtaining data.

5 Gap analysis

To embark on the development of a data portal specific to the WA sheep meat sector, DAFWA must be certain that the portal will not compete with or duplicate other services currently available or in development.

Research and consultation identified that some industry bodies and private sector suppliers are developing systems and platforms which could represent competition or duplication. In many cases, organisations which hold data are actively seeking to develop portals, platforms and tools to help users better access and interpret the data.

Some potential sources of competition/duplication are outlined below.

5.1.2 myMLA

MLA currently manages a range of databases which mostly operate in isolation, including:

- NLIS
- NLRS
- Livestock DataLink
- eNVD (currently with safemeat however due to migrate to MLA)
- MLA membership

MLA has identified an opportunity to use some or all of these databases to provide personalised information to producers. Initially this will take the form of myMLA. This platform will allow users to personalise their myMLA webpage, to provide market reports, research and events which are relevant to their business. Over time additional information is likely to be added to the myMLA platform, drawing on data which is held in other industry databases.

5.1.3 Sheep CRC wellbeing and productivity platform

The Sheep CRC is developing a range of models to improve animal wellbeing and productivity, which will be made available via a web platform which interfaces with a range of other data sources. The platform under development is capable of importing data from the sheep genetics database as well as individual animal information from flock recording systems. In the future the platform will have the ability to import carcass feedback data from abattoirs as well as other sources.

Producers will be able to run a range of models to interrogate and interpret data to help manage risks (e.g. heat and cold stress), maximise production and inform culling and management decisions.

The platform will be available nationally and initially will be free for all producers to use. Following development of the web platform, the Sheep CRC plans to make the platform available on handheld devices via an app.

5.1.4 Commercial flock recording systems

There are a range of commercial flock recording systems and software on the market. The largest and most advanced commercial providers have been developing their own cloud based (or hybrid) platforms capable of collecting, storing and interrogating data from a range of sources. Wherever possible, these platforms are being developed to interface with a range of industry databases and data sources (e.g. NLIS, abattoirs, sheep genetics, Livestock Data Link, eNVD) to seamlessly share data.

Commercial flock recording systems are overwhelmingly designed for animals with individual identification, however there are some mob-based applications.

5.1.5 NLIS and eNVD portals

NLIS has recently developed a portal which allows users to view and update their livestock data. A similar portal is likely to be developed as part of the eNVD project. These portals are likely to be the main access point for producers and other supply chain businesses.

5.1.6 The Sheep's Back Network

The Sheep's Back (TSB) is a network of over 1000 people interested in the WA sheep and wool industry. TSB is funded by Australian Wool Innovation and is part of a national network of similar groups aiming to provide up to data and timely information to help farmers maximise the efficiency of their enterprise (http://sheepsback.com.au/). The stated objectives for TSB are:

- To understand current issues facing producers, arm members with timely solutions and to communicate these to stakeholders.
- Deliver appropriate new technologies with regard to reducing cost of production and improving farm profitability which are consistent with the outcomes required by AWI.
- To be recognized as a network of leading sheep producers who receive timely, independent, practical information and appreciate the peer contact and support that the project provides.
- Illustrate with benchmarking figures the importance of sheep and wool to the sustainability of farming enterprises.
- Expand membership of the network to 1300 by 30 June 2017.

5.1.7 Summary

The above examples represent some of the initiatives under development to help sheep producers easily access and interpret data for their property. These initiatives have a significant head start in development and also benefit from having improved access to existing data.

Table 13 depicts how the above initiatives are likely to address the industry needs (identified from stakeholder consultation), and the potential needs which a DAFWA sheep meat portal might fill (indicated in the DAFWA column by ✓✓✓). Where duplication is likely, it may be preferable for the WA portal to simply link users to other available services (indicated by **link**).

Table 13 Gap analysis of industry needs and services under development

Identified need	myMLA	Livestock Data Link	SheepCRC	Commercial flock recording	NLIS/eNVD Portals	The Sheeps Back	DAFWA Sheep Meat Portal
Carcass feedback		✓✓✓ ✓	✓	✓			Link
Production and performance monitoring/modelling			✓✓ ✓	✓✓✓		✓	Link
Access to NLIS and eNVD data and services				✓	✓✓✓		Link
Customised market reports	✓✓ ✓						NLRS API
Supply chain capacity and throughput							WAMIA data input
View and compare commercial prices on offer (OTH, live export etc.).							Buyer input
Producer benchmarking						✓✓✓	Link
WA sheep industry RD&E, news and events	✓					✓✓	Input from DAFWA and industry groups
Aggregation of available data, information and services into one location	✓					✓✓	Overall system

Figure 8 below shows how the above data and information programs span different points of the supply chain. Note the lack of connectivity through to wholesale and retail.

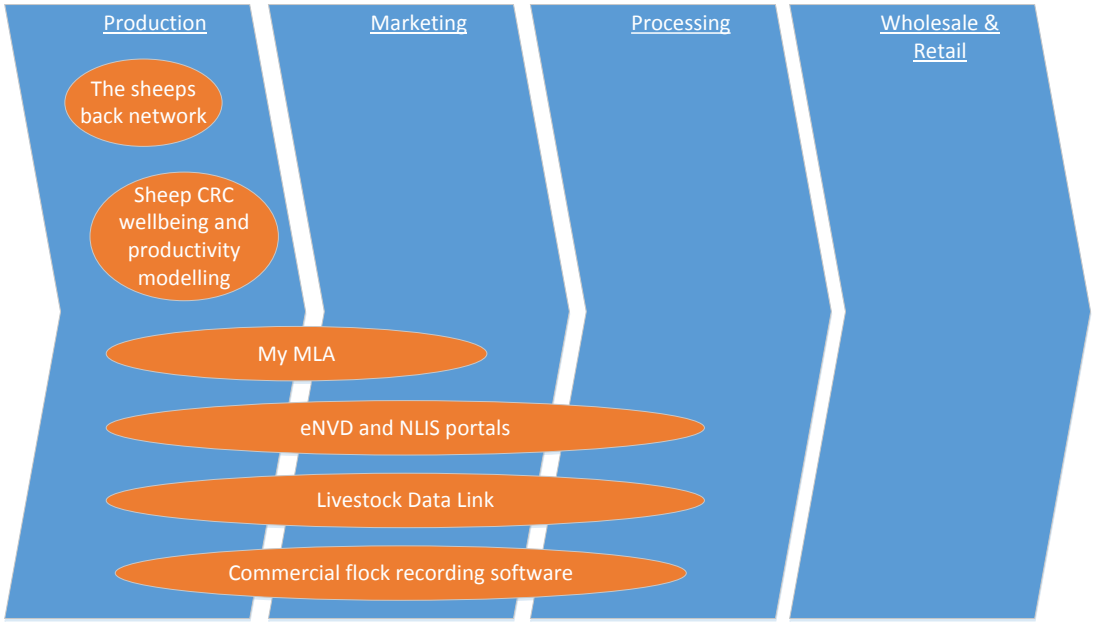


Figure 8 Data and information programs along the supply chain

6 Design considerations

This section describes some of the key design and governance issues for a WA sheep data system. Addressing these issues in the system design will be critical to ensuring the system has the confidence of users and does not leave administrators legally exposed.

6.1 Privacy

Management of personal information

At a minimum any system would need to comply with the Federal Privacy Act 1988, which regulates how personal information[4] must be managed to protect the privacy of individuals. The Act includes thirteen (13) Australian Privacy Principles which cover

- the open and transparent management of personal information including having a privacy policy
- an individual having the option of transacting anonymously or using a pseudonym where practicable
- the collection of solicited personal information and receipt of unsolicited personal information including giving notice about collection
- how personal information can be used and disclosed (including overseas)
- maintaining the quality of personal information
- keeping personal information secure
- right for individuals to access and correct their personal information

Managing confidential data

A portal which is designed to manage confidential data (i.e. that which is not publically available) will need to have carefully developed policies and safeguards. Confidential data is data given in confidence or data agreed to be kept confidential (i.e. secret, between two parties) that is not in the public domain such as information on business, income, health, medical details, and political opinion.[5]

Anonymising data

Before data obtained can be published or shared it may need to be anonymised so that individuals, organisations and businesses cannot be identified. Anonymisation may be needed for ethical reasons to protect people's identities, for legal reasons to not disclose personal data, or for commercial reasons.

Data can be anonymised by:

- removing direct identifiers, e.g. name or address
- aggregating or reducing the precision of information
- using pseudonyms
- restricting the upper or lower ranges of a variable to hide outliers

Obtaining permissions

To comply with the above requirements any system will need to have a clear privacy policy which explains to users how information will be shared and seeks their permission for the sharing of certain information.

[4] "personal information" means information or an opinion about an identified individual, or an individual who is reasonably identifiable: (a) whether the information or opinion is true or not; and (b) whether the information or opinion is recorded in a material form or not.
[5] http://www.ands.org.au/guides/ethics-consent-and-data-sharing

6.2 Security

Any system developed will need to be sufficiently secure to protect users against information being illegally accessed or stolen by third parties or other users. The system must also be robust enough to avoid information being accidentally lost, through system failure. Either of these situations may leave administrators liable for large damages.

6.3 Data ownership and use

While a portal may bring to together data from different sources, the ownership of this data is likely to remain with the original source. Data ownership, IP and terms of use will be key considerations for DAFWA to negotiating data access.

In some cases, data for individual businesses is held in industry or government databases (e.g. NLIS, WAMIA etc.). In some cases this data is not publically available and will not be provided to a third party. In these cases there may be opportunities for individual businesses to actively transfer data, or provide permission for their data to be shared.

6.4 System capability

DAFWA has been reorientating its system architecture to facilitate more service delivery functions, similar to those services provided by the eConnected Grainbelt project. Depending on the options chosen, the capacity to manage the collection and storage of large amounts of data will be a key consideration.

6.5 Management and oversight

The processes required for management and oversight of any system will depend on the option(s) chosen. The options are discussed in section 7.

7 System options

Based on the information compiled above and stakeholder feedback, GHD and Artis Group have identified the following three options in developing a system to address industry needs.

7.1 Option 1: Status Quo (promotion of existing services)

Given the emerging data systems and tools identified in Section 5 (myMLA, Livestock Data Link, SheepCRC, commercial flock recording systems, NLIS/eNVD portals), it is worth considering the need for a WA system.

Under the status quo scenario DAFWA could focus resources on promoting the use these emerging systems and tools, e.g. helping producers and the supply chain understand the value of data, and how it can be used to lift productivity and profitability. Initially this could be achieved by simply providing information on the DAFWA website and links to other relevant websites and portals.

Consultation found that organisations such as MLA, the SheepCRC and commercial flock systems would welcome closer collaboration with DAFWA. This collaboration may result in the WA sheepmeat industry becoming a preferred testing ground for new and emerging livestock data systems and tools.

7.2 Option 2: Personalised data portal

This option would involve DAFWA developing a data portal which is capable of accessing a range of databases and information sources, allowing users to view information relating to their own enterprise (Figure 9).

This option would be most challenging to implement, as it would be reliant on DAFWA gaining access to data held by third party industry organisations (NLIS, LDL etc) and/or encouraging supply chain participants to share data. The option could also be seen as duplicating the existing and emerging platforms, as outlined in section 5.

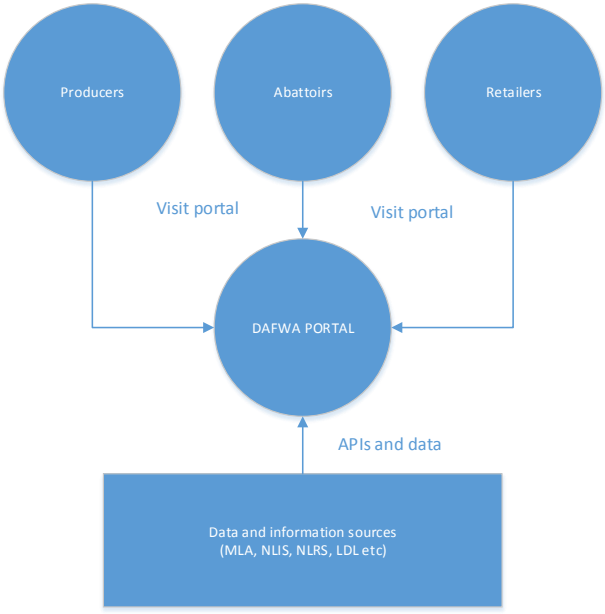


Figure 9 Conceptual diagram: Personalised data portal

7.3 Option 3: eConnected sheepmeat model

Instead of developing a data portal to bring together data from a range of different sources, this option would involve DAFWA developing innovative ways for third parties to access its own IP. This approach has been successfully adopted by the eConnected grainbelt project (see section 12.1)

By collaborating with third parties (e.g. software developers, industry bodies, grower groups etc.) DAFWA could make available a range of agency held data, models and material. The development of APIs and other measures could allow third parties to access information direct from DAFWA and make it available to the supply chain via apps, tools and websites.

This option would have the following benefits:

1. Ensuring outputs are targeted to industry needs.
2. Avoiding data access difficulties
3. Avoiding duplication
4. Avoiding the need for developing data warehouses

Before adopting this option, DAFWA would need to undertake an internal search of available data and models to determine if there is sufficient material of value to industry. Note that this option is not mutually exclusive from the other options presented. DAFWA could certainly develop a data portal while also seeking to leverage its internal IP to produce different products (API's, apps and web tools).

Figure 10 Conceptual diagram: eConnected sheepmeat

7.4 Option 4: Content Management System (CMS)

This option would be a dedicated DAFWA sheep meat industry website that provides access to relevant information and data for the WA sheep meat industry. The site would bring together different sources of publically available information and data, which would be aggregated rather than personalised. There would be no individual login or direct access to individual property data, however the site would provide links to these external sites and portals (e.g. NLIS, Livestock Data Link, myMLA).

Potential inputs

- Historical price data (via NLRS API) for WA saleyards, over the hooks, live exports etc.
- Saleyard and abattoir throughput (via WAMIA)
- Industry events (via DAFWA, MLA, SILC etc.)
- RD&E (via DAFWA, MLA, SILC etc.)
- Social media (twitter, facebook, instagram) widgets showing posts with certain hashtag (e.g. #washeep)
- Links to other relevant information or data services:
  - NLIS portal
  - Livestock Data Link
  - myMLA
  - Contact information for relevant services

This option would be a relatively simple way to bring together data and information from a range of fragmented sources into one convenient location. This option would make available data and information which while being publically available, is not particularly accessible for stakeholders (e.g. WAMIA throughput). Importantly this option is less likely to duplicate or compete with other services, instead it would simply direct users to those services as a “one-stop” shop.

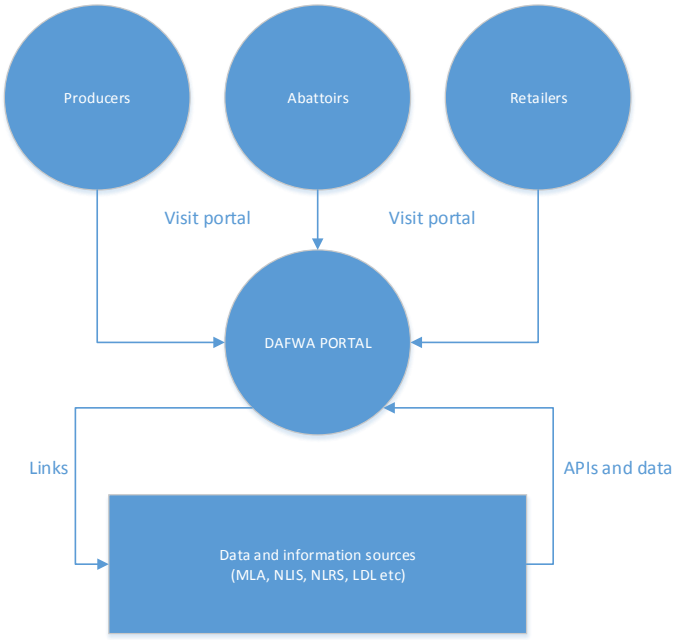


Figure 11 Conceptual diagram: CMS

8 Preferred option

After considering the industry needs, stakeholder feedback, data and information availability and existing services available, GHD and Artis group consider the Option 4 (CMS) the most preferable option for improving the information provision to the WA sheepmeat industry.

The CMS solution is recommended because it equally supports:

- Raw data import and visualisation from data sources
- Content creation/and submission by industry user groups
- Links to external industry related websites
- Social networking and collaboration
- Optional Marketing to groups through various channels such as mobile, email, newsletter

Specifically, the CMS would focus on end-users, allowing such users to interact with the system to create their own pages or mini sites, to add collaboration apps to those pages and to define user and user group access to those pages. The portal elements of the solution would enable specific users to interact with the system via dashboards, reports, web forms, workflows, dynamic lists polls, etc.

9 System development

This section provides more detail to assist the potential development of the preferred CMS system, including the necessary requirements and functions.

9.1 System components and functions

9.1.2 System requirements

The system will need to meet the following requirements:

- Ability to integrate with data from other industry data providers via file uploads
- Ability to integrate with data from other industry data providers via open API (web services)
- Ability to approve and publish user generated content
- Ability to publish links and navigate to other industry websites and content
- Ability to leverage data from other providers and display in dashboards and reports
- Ability to extend the system by adding ‘new feature’ modules
- Ability to provide different user experiences [form layouts, module access, etc.] depending on the current user

9.1.3 System components

The system will include the following components:

- CMS Platform
- Social Network for collaboration
- Custom modules such as Forms, Dashboards and Reports
- User Content

9.1.4 Supported data types

The system will need to support the following data types:

- RSS Feeds (news, etc.)
- Links to 3rd Party content such as industry websites and content
- User created content (pages, news)
- Data from structured files such as CSV and 3rd party providers

9.1.5 User groups

Table 14 below provides a breakdown of the different groups using the system, the information they will be seeking to access and the information they will be permitted/encouraged to provide.

Table 14 Information accessed and shared by users groups

User groups	Information accessed	Information provided
DAFWA	• Monitoring of industry issues and needs	• services, RD&E and events • news and content
Other industry bodies (e.g. MLA)	• Monitor industry issues and needs	• services, RD&E and events • news and content • Market prices (via NLRS)
Producers	• Market information • Throughput data • News, events, RD&E • Links to other services (NLIS, eNVD, LDL, sheepCRC etc) • Benchmarking data	• Benchmarking data
Producer groups	• Monitor industry issues and needs • News, events, RD&E	• services, RD&E and events • add news and content
Abattoirs	• Market information • Throughput data • Grid prices • News, events, RD&E • Links to other services (NLIS, eNVD, LDL, sheepCRC etc)	• Grid prices • Throughput (via WAMIA)
Saleyards	• Market information • Throughput data • Grid prices • News, events, RD&E • Links to other services (NLIS, eNVD, LDL, sheepCRC etc)	• Throughput (via WAMIA)
Live exporters	• Market information • Throughput data	• Prices offered (e.g. live export orders)

User groups	Information accessed	Information provided
	• Grid prices • News, events, RD&E • Links to other services (NLIS, eNVD, LDL, sheepCRC etc)	
Agents	• Market information • Throughput data • Grid prices • News, events, RD&E • Links to other services (NLIS, eNVD, LDL, sheepCRC etc)	• Prices offered (e.g. live export orders)
Retailers	• Market information • Throughput data • News, events, RD&E	• News and content

Table 15 below summarises different system inputs and explains where information and data will be sourced, and how it will in inputted.

Table 15 System inputs, sources and methods

Content	Source	Method
Market prices and volume saleyards, over the hooks, live exports	NLRS	API
Throughput Monthly throughput volume by saleyards and abattoirs, and aggregated for state.	WAMIA	WAMIA to manually input (or send to DAFWA to update) Future opportunity for API input
Over the hooks grid prices	Abattoirs	Abattoirs provided access to manually update their own grid prices (or send to DAFWA to update)
Other prices offered e.g. live export orders)	Live exporters or agents	Live exporters or agents provided access to manually update their own prices/orders (or send to DAFWA to update)
Content News, events, RD&E etc.	DAFWA and other industry organisations	Content sent to DAFWA to upload to portal. Opportunity to provide some organisations with permission to publish
Social media	Facebook, Twitter, Instagram	API May require DAFWA moderators

Figure 12 depicts how the system would integrate information and date from different sources, to provide a unified user experience for each user group.

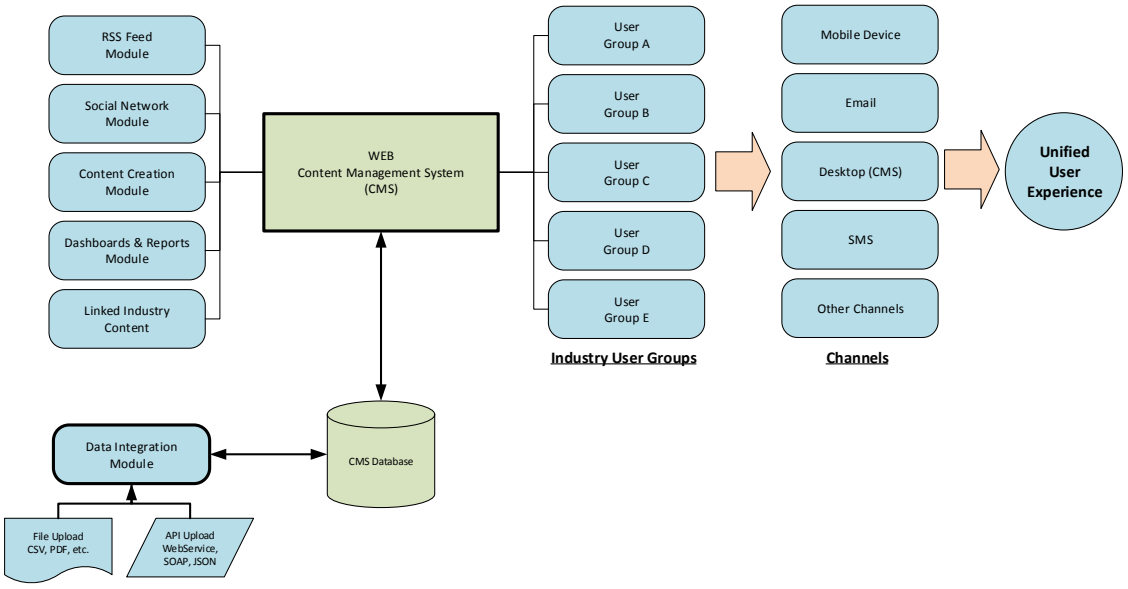


Figure 12 Content Management System (CMS) – System Component and Integration Model

9.2 Cost estimate

Artis Group estimate the cost of developing the CMS solution outlined above would be in the order of $50 - $100K. This estimate is based on using a mid-range platform such as Kentico, which would also incur a once off subscription of ~$10-20K[6] and ongoing maintenance fees of around $1,500 per annum[7].

9.3 Management and oversight

A key feature of a CMS portal is the ability to empower different stakeholders to independently supply and update information and data. While providing permission to different stakeholder to independently contribute to the CMS, DAFWA will need to moderate and manage content.

It was suggested during stakeholder consolation that DAFWA may consider charging the Sheep Industry Leadership Council (SILC) with responsibility for moderating and managing content. This approach may help to encourage industry to take ownership and carriage of the resource.

9.4 Steps to development

Outlined below is a recommended approach DAFWA could take to developing the preferred option presented in this study.

10. Consider the findings from this scoping report internally
11. Engage with DAFWA's system architecture team to discuss the feasibility of the preferred option.
12. Agree on a preferred option within DAFWA
13. Share the findings of this scoping report and DAFWA's preferred option with key user groups and data sources seeking support and cooperation for the initiative. In particular, seek support from stakeholders and organisations from which information and data will be sought (e.g. NLRS, WAMIA, LDL, abattoirs, live exporters, agents).
14. Tender for website development
15. Ongoing engagement with key user groups during development, providing opportunities for input.

[6] http://www.kentico.com/purchase
[7] http://www.kentico.com/purchase/price-list/maintenance

16. Offline testing with key stakeholder groups
17. Public launch
18. Ongoing improvement

10 Conclusion

This scoping study has identified an industry need to bring together the different publically available information, data and services available to the WA sheepmeat industry, into one location for easy access. However, the concept of a data portal allowing the accessing and sharing of data from individual businesses was generally not supported due to a range issues including duplication of services and difficulty of obtaining access to data.

After considering a range of alternatives, this study concluded that a Content Management System (CMS) website would be the most preferred option for achieving the above means, due to its ability to access content via a range of means including file uploads, open API's (web services), third party user generated content, links to other websites. In this way a CMS system would allow DAFWA to provide permission to certain third party users to publish or upload their own content, information or data to certain parts of the website. This feature has the potential to make the website more interactive and relevant to users, with industry taking more ownership and responsibility for the content. To further build industry ownership, DAFWA may consider allowing the Sheep Industry Leadership Council (SILC) to oversee the initiative.

Importantly the CMS option would provide the flexibility for DAFWA to extend and develop the features of the website. This will be important given the new information and data initiatives which are under development, which could be linked to the website in the future.

11 Acknowledgements

GHD and DAFWA wish to thank the following stakeholder for providing input into this study.

Table 16 Stakeholders consulted

Stakeholder	Organisation
Ian Randles	PGA western beef & sheep producers committee
Bindi Murray	PGA western beef & sheep producers committee
Andrew Slade	PGA western beef & sheep producers committee
Thys Gorter	Livestock agent
Neville McDonald	Sheep lot feeder)
Greg Cross	Fletchers
Nathan Walmsley	Australian Meat Industry Council
Doug Piper	MLA
Harold Sealy	Wellards
Damon Holmes	National Livestock Reporting Service
Andrew Morton	NLIS
Verity Gilbertson	Livestock Data Link (MLA)
Rebecca Austin	MLA
Tim Maling	eConnect (WA Grains) (DAFWA)
Dave Saunders	WAMIA
Lu Hogan	SheepCRC
Mark Morton	Practical Systems
Claire Wilde	Sapien Technology

Appendix A From Big Data to Big Decisions, Dr Alex Ball and Sam Gil, ABARES Conference 2016

Appendix B Examples of similar systems

This section provides a description of similar systems that interconnect information sources across value chains, in both the sheep meat and other agricultural sectors.

12.1 eConnected Grainbelt (WA Grains Industry)

eConnected Grainbelt is an initiative promoted by Royalties for Regions. The project is designed to help WA grain growers and/or their consultants to improve decision making in order to optimise productivity and profits.

The idea is to provide a platform that can connect a range of data sources and bring them to a central location to allow growers and consultants to make better informed decisions. The project will identify what data growers currently use to make informed decisions and what data gaps exist.

Table 17 Proposed decision support tools

Proposed tool	Description
Modelled soil water	Real-time charts would be provided of plant available soil water for ten generic soil types, with or without a crop cover, to aid seasonal decision making, such as sowing date and nitrogen application.
Potential yield forecasts	Potential yield would be estimated using plant available soil water at the start of the season and total growing season rainfall.
Disease risk tools	e.g. Field pea blackspot sowing guide: A location and season specific weekly forecast would be produced that suggests a window of sowing dates, accounting for varietal resistance and chemical options, yield potential, agronomic constraints (frost & terminal drought) and risks of spores showers.
Farm asset calculator	This tool would use historical paddock management and production information to predict future production value, of potential use in demonstrating farm value to buyers, lenders, insurers, leasees, etc.
Benchmarking tool	This tool would allow growers to compare the performance of their paddocks with others, anonymously.
Forward selling tool	This tool would provide continuously updated estimates of total production to assist with forward selling decisions.
Real-time scheduling	A tool to assist with scheduling operations and to compile a record of activities for use by other tools.
Others tools	Consultation with the grains industry, including potential development partners, may lead to the development of a range of other tools.

The project team are working with 14 grower groups and their consultants across the grain belt on 11 different eDemonstration sites. The sites include:

- Yuna Farm Improvement
- Mingenew Irwin group
- West midlands group

- Far Eastern Agriculture
- MADFIG
- Corrigin Farm Improvement
- Wheatbelt NRM Inc
- Facey Group
- Shire of west Arthur
- SEPWA
- Southern Dist (A)

12.2 Farm IQ (New Zealand)

The FarmIQ programme was developed to create a consumer-driven, integrated value chain for red meat, delivering sustainable benefits to all participants: farmers, processors and marketers. It was estimated at the outset that Farm IQ would grow New Zealand's GDP by an additional $1.1 billion by the conclusion of the seven-year programme – and an additional $8.8 billion by 2025. Farm IQ has more than 500 farmers actively participating, exceeding initial expectations.

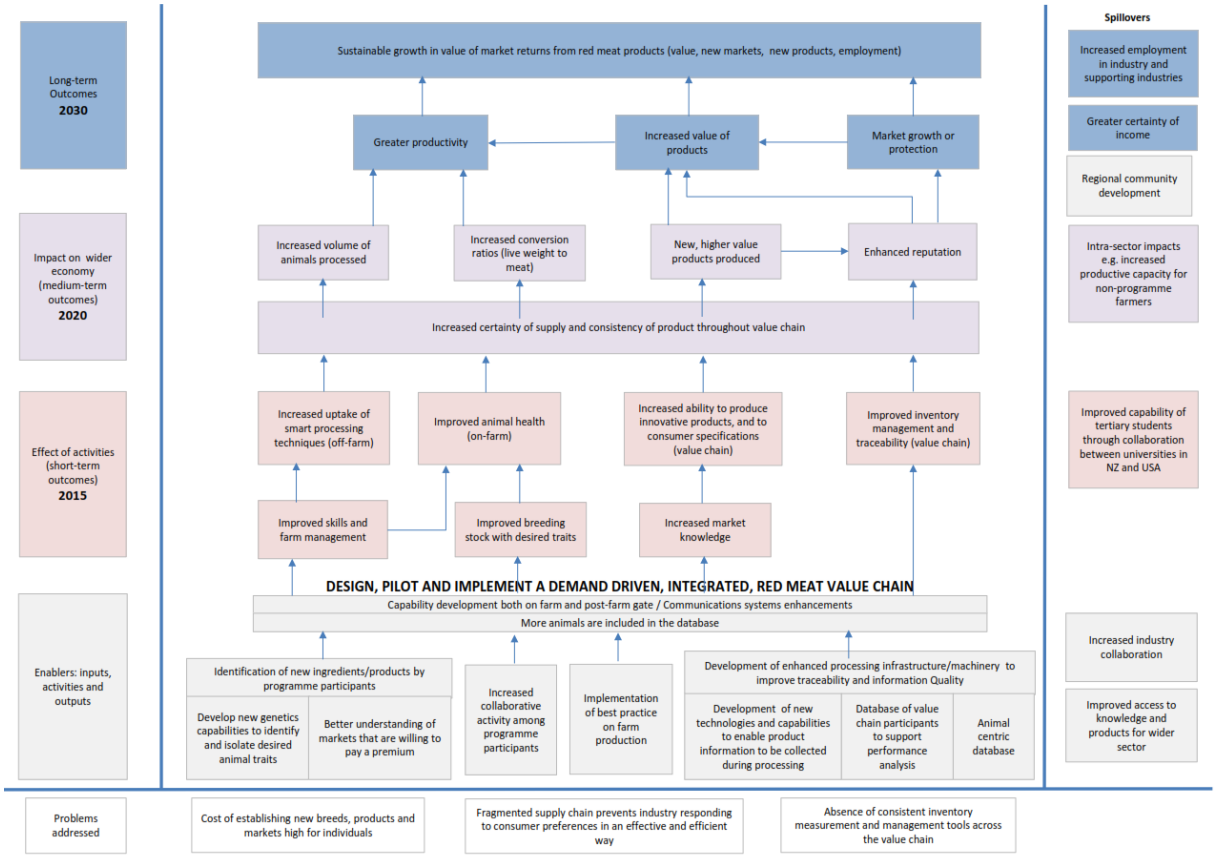


Figure 13 Farm IQ program logic and development timeline[8]

12.3 myMLA

MLA is in the process of producing a personalised user web platform known as myMLA, which will provide information to producers tailored to their enterprise, based on their livestock type and location.

The platform will allow users to personalise their page with relevant market information (e.g. nearby sale results), relevant research and development findings, upcoming events in their region etc.

Over time there is scope for myMLA to interface with the NLIS database, Livestock DataLink, eNVD and other sources.

Appendix C – MLA Sheep and Lamb Reports

[8] http://www.mpi.govt.nz/document-vault/2583

Detailed saleyard report - sheep and lamb

Market information provided by MLA's National Livestock Reporting Service

Katanning

report date 11 May 2016

Yarding	12168	**Lambs**	5000	**Sheep**	7168	**comparison date**	04/05/2016
Change	-4367	**Change**	-3500	**Change**	-867		

Numbers were up for a total yarding of 12,168 mixed quality sheep at Katanning with store lambs dominating the numbers.

Light weight lambs eased selling from $60 to $79 while trade weight lambs remained firm selling from $91 to $107 and heavy weight lambs sold from $107 to a top of $115/head. Lambs suitable for airfreight made $60 to $89/head. Store crossbred lambs to feeders made $35 for the light weight lambs and up to $110/head for the better quality lines. Merino store lambs sold from $34 for light weights to $88/head for the heavier better framed types.

Young quality red tag ewes sold to $84/head to restockers. Light ewes sold for $35 to $54/head, light ewes to slaughter made $60 to $87 with a fleece and prime three and four score mutton sold from $62 to $94/head for the heavier mutton. Wethers made $40 for young light types and up to $105/head for the heavier better quality lines. Ram lambs sold for $20 for very light weights and up to $103 for the heavier better lambs while older rams sold to $50 to restockers but only realised $5 to $20/head to processors.

Category Weight	% Yard	Sale Prefix	Fat Score	$/Head				Estimated Carcase Weight c/kg				Skin ($)	
				Low	High	Avg	Change	Low	High	Avg	Change	Low	High
Lamb													
0-12	0	FD	2	35.00	35.00	35.00	N/Q	283	283	283	N/Q	1.00	1.00
12.1-16	4	FD	2	44.00	80.00	63.60	-5	300	494	386	-37	1.00	6.00
	0	MR	2	60.00	75.00	71.30	N/Q	347	406	391	N/Q	8.00	10.00
	5	RM	2	34.00	70.00	53.10	-4	236	413	358	18	1.00	6.00
	0	DP	2	45.00	45.00	45.00	N/Q	300	300	300	N/Q	0.00	0.00
	3		2	60.00	79.00	70.50	-3	381	481	432	-7	1.00	5.00
	1		3	60.00	75.00	68.20	-10	375	438	415	-71	0.00	6.00
	0	LE	3	45.00	45.00	45.00	N/Q	307	307	307	N/Q	2.00	2.00
	1	FD	3	35.00	78.00	54.00	-16	250	456	338	-62	0.00	5.00
16.1-18	2	FD	2	70.00	89.00	84.40	-4	388	506	470	-16	1.00	6.00
	1	RM	2	65.00	88.00	79.80	-1	339	488	428	-19	4.00	8.00
	0		2	72.00	85.00	79.50	N/Q	388	453	431	N/Q	4.00	6.00
	0	DP	2	69.00	69.00	69.00	N/Q	406	406	406	N/Q	0.00	0.00
	3		3	72.00	99.00	82.80	-6	388	517	468	-22	0.00	6.00
	0	LE	3	75.00	75.00	75.00	N/Q	418	418	418	N/Q	4.00	4.00
	0	DP	3	80.00	81.00	80.70	N/Q	444	450	448	N/Q	0.00	0.00
	5	FD	3	70.00	97.00	89.50	-2	388	511	479	-15	1.00	6.00
	0	RM	3	78.00	78.00	78.00	N/Q	388	388	388	N/Q	12.00	12.00
18.1-20	8	FD	3	91.00	104.00	100.60	3	453	511	485	N/C	1.00	7.00
	2		3	95.00	108.00	102.90	N/C	470	535	496	-9	1.00	6.00
20.1-22	3		3	104.00	115.00	108.20	1	446	500	471	-22	1.00	8.00
	0	FD	3	105.00	109.00	105.90	N/Q	462	468	463	N/Q	6.00	8.00
22.1-24	0	FD	3	110.00	110.00	110.00	N/Q	433	433	433	N/Q	6.00	6.00
	0		3	107.00	107.00	107.00	N/Q	421	421	421	N/Q	6.00	6.00
				34.00	**115.00**			**236**	**535**			**0.00**	**12.00**
Young Ewe													
0-14	0	MR	2	50.00	50.00	50.00	N/Q	321	321	321	N/Q	5.00	5.00
14.1-18	1	MR	2	64.00	82.00	70.40	13	393	460	419	N/Q	5.00	5.00
	0	DP	2	57.00	57.00	57.00	N/Q	317	317	317	N/Q	0.00	0.00
	0	RM	2	48.00	48.00	48.00	N/Q	287	287	287	N/Q	5.00	5.00

Figure 14 MLA physical market report (example)

Over the hooks indicator - sheep and lamb

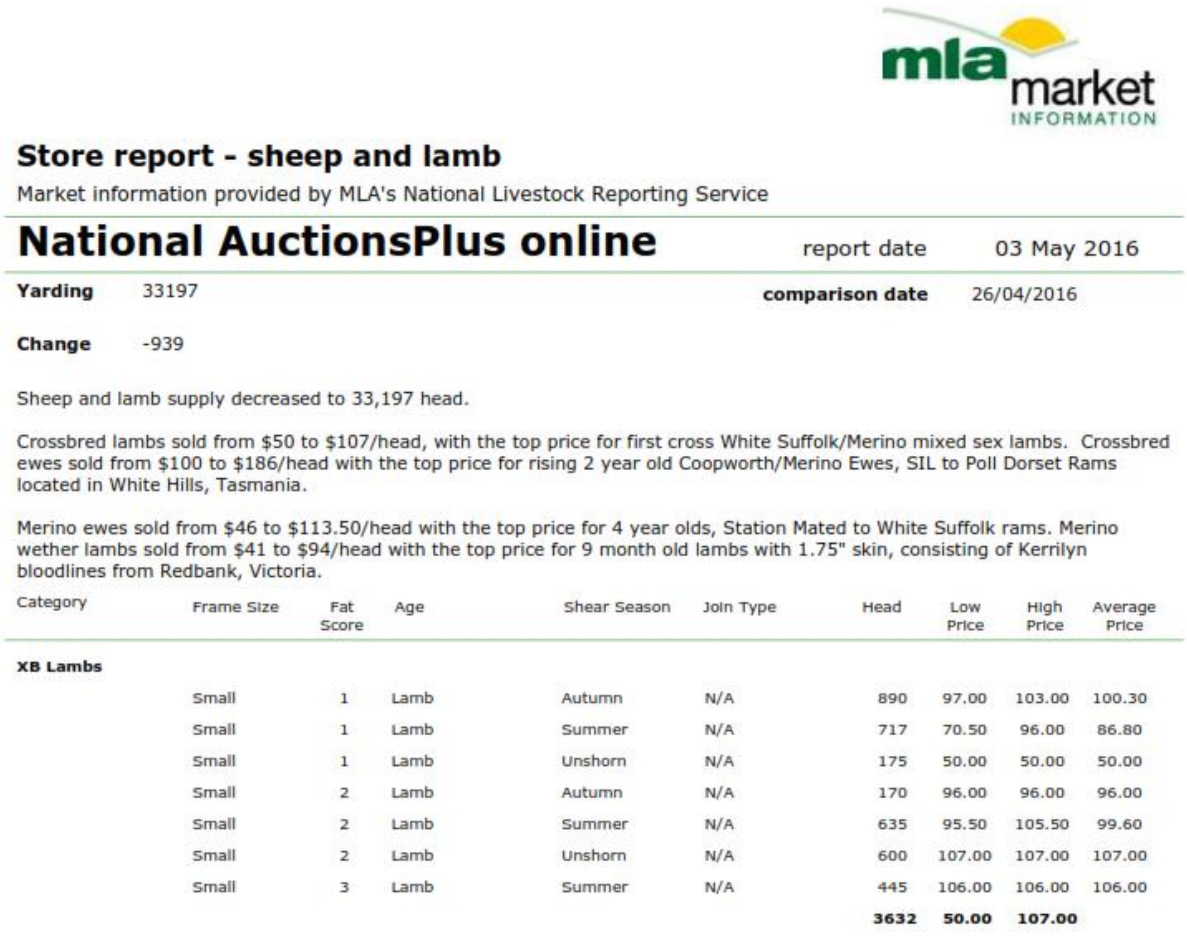
Market information provided by MLA's National Livestock Reporting Service

Western Australia

report date 13 May 2016

Category	Weight Range	Fat (mm)	Fat Depth	Low Price (c/kg cwt)	High Price (c/kg cwt)	Avg Price (c/kg cwt)	Trend
Lamb	16-18	2 - 4	6 - 20	440	450	445	NC
	18-20	2 - 4	6 - 20	470	550	510	NC
	20-22	2 - 4	6 - 20	470	550	510	NC
	22-24	2 - 4	6 - 20	490	550	520	NC
	24-26	2 - 4	6 - 20	490	550	520	NC
	26+	2 - 4	6 - 20	470	490	480	NC
	Merino 16-22	2 - 4	6 - 20	420	460	443	NC
Sheep	14-18	2 - 4	6 - 20	280	290	285	NC
	18-24	2 - 4	6 - 20	250	290	273	NC
	24+	2 - 4	6 - 20	250	280	263	NC

Figure 15 MLA over the hooks market report (example)



Store report - sheep and lamb

Market information provided by MLA's National Livestock Reporting Service

National AuctionsPlus online

report date 03 May 2016

Yarding 33197 **comparison date** 26/04/2016

Change -939

Sheep and lamb supply decreased to 33,197 head.

Crossbred lambs sold from $50 to $107/head, with the top price for first cross White Suffolk/Merino mixed sex lambs. Crossbred ewes sold from $100 to $186/head with the top price for rising 2 year old Coopworth/Merino Ewes, SIL to Poll Dorset Rams located in White Hills, Tasmania.

Merino ewes sold from $46 to $113.50/head with the top price for 4 year olds, Station Mated to White Suffolk rams. Merino wether lambs sold from $41 to $94/head with the top price for 9 month old lambs with 1.75" skin, consisting of Kerrilyn bloodlines from Redbank, Victoria.

Category	Frame Size	Fat Score	Age	Shear Season	Join Type	Head	Low Price	High Price	Average Price
XB Lambs									
	Small	1	Lamb	Autumn	N/A	890	97.00	103.00	100.30
	Small	1	Lamb	Summer	N/A	717	70.50	96.00	86.80
	Small	1	Lamb	Unshorn	N/A	175	50.00	50.00	50.00
	Small	2	Lamb	Autumn	N/A	170	96.00	96.00	96.00
	Small	2	Lamb	Summer	N/A	635	95.50	105.50	99.60
	Small	2	Lamb	Unshorn	N/A	600	107.00	107.00	107.00
	Small	3	Lamb	Summer	N/A	445	106.00	106.00	106.00
						3632	**50.00**	**107.00**	

Figure 16 MLA AuctionsPlus market report (example)

mla market INFORMATION

Eastern States Daily Indicators
Wednesday, May 11, 2016

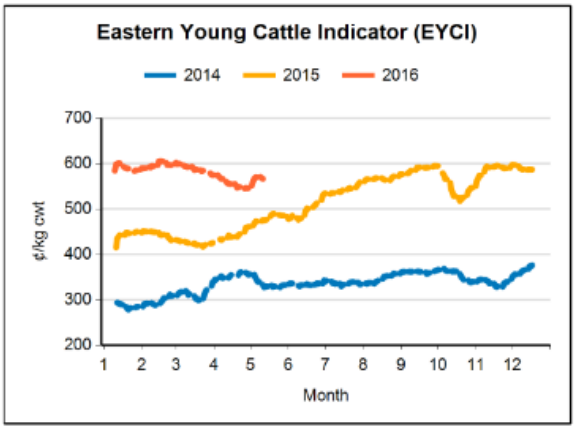
	¢/kg	Wednesday, May 11, 2016	change on yesterday	change on last week	change on last year
Cattle	EYCI	566.50	-1.50	-0.50	91.75
	Trade steer	319.10	2.40	9.60	42.80
	Medium steer	272.60	3.60	-0.10	28.70
	Heavy steer	285.00	5.50	5.10	22.80
	Medium cow	204.30	NC	3.10	20.10
	Feeder steer	310.30	-0.80	2.40	45.90
Sheep	Restocker lamb	543	11	18	-28
	Merino lamb	498	4	12	-25
	Light lamb	536	8	17	-13
	Trade lamb	542	9	13	-34
	Heavy lamb	542	5	19	-42
	Mutton	345	5	11	-11

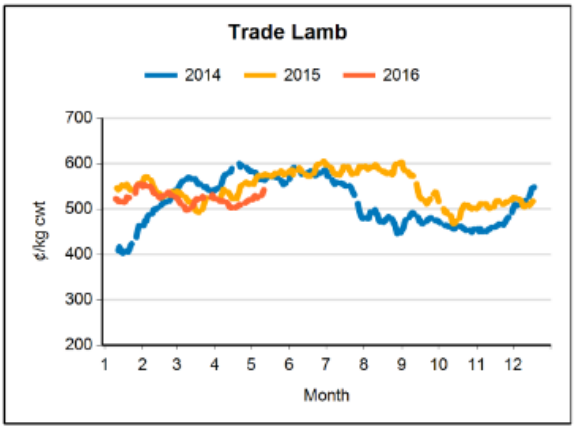
The EYCI (Eastern Young Cattle Indicator) is calculated daily, and is the 7-day moving average price for C2 and C3 vealers and yearlings at major cattle markets in NSW, Victoria and Queensland.

The remaining cattle and sheep indicators are weighted averages, and are also calculated daily as a 7-day moving average price. Livestock categories are selected from all NLRS reported saleyards in NSW, Victoria, SA and Queensland.

Prices for cattle are reported in ¢/kg live weight, except for the EYCI, which is in ¢/kg carcase weight.

Prices for sheep are reported in ¢/kg carcase weight.





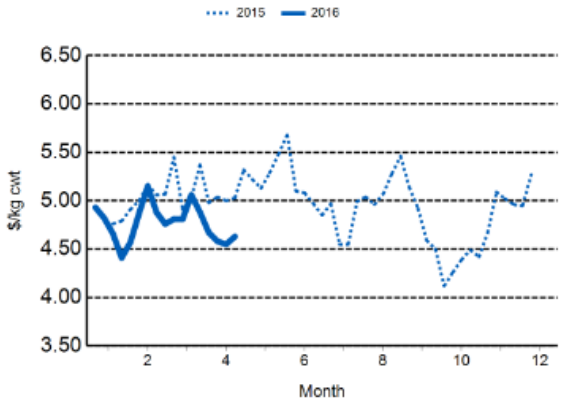
For more information and statistics, visit MLA's prices and markets at www.mla.com.au/Prices-markets

Figure 17 MLA Eastern States Daily Indicators Report (example)

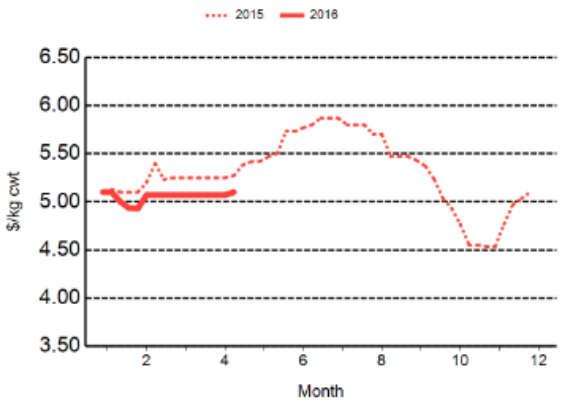
Sheep and lamb markets

week ending 29 April 2016

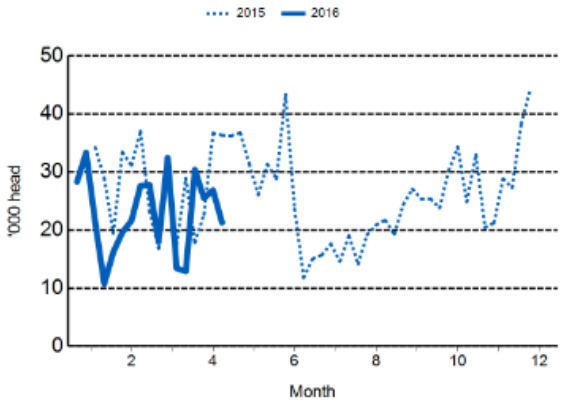
Saleyard trade lamb indicator



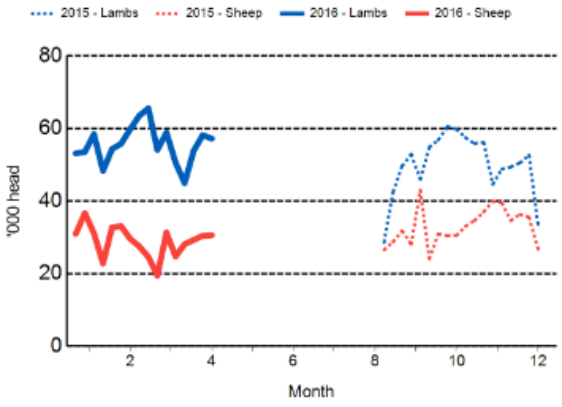
OTH heavy trade lamb indicator



Sheep and lamb yardings



Sheep and lamb slaughter**



Saleyard sheep and lamb indicators (c/kg cwt)		TW	LW	LY
Restocker/feeder lamb	0-18kg	**452**	487	422
Light lamb	12-18kg	**479**	457	497
Trade lamb	18-22kg	**463**	455	532
Medium sheep	18-24kg	**262**	252	314

OTH sheep and lamb indicators (c/kg cwt)		TW	LW	LY
Light lamb	16-18kg	**445**	445	515
Heavy trade lamb	20-22kg	**510**	507	538
Medium sheep	18-24kg	**260**	260	285

Saleyard throughput (head)	TW	LW	LY
Lambs	**9,513**	16,085	18,828
Sheep	**11,780**	10,781	17,396

Sheep and lamb slaughter* (head)	TW	LW	LY
Lambs	**57,224**	58,186	nq
Sheep	**30,594**	30,421	nq

Live export wether price ($/head)	TW	LW	LY
Live export wether	**92**	88	106

**latest slaughter figures are for the week ending 22 April 2016

Saleyard and OTH sheep indicator

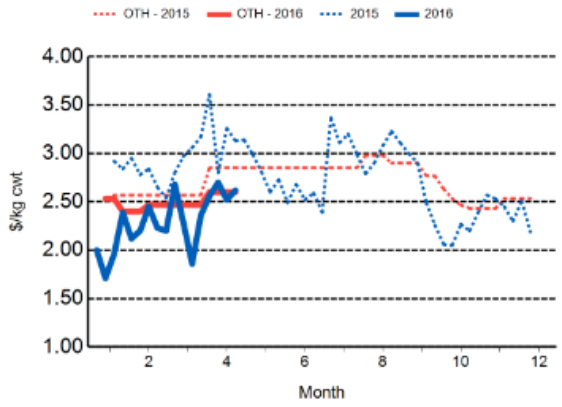


Figure 18 WA Weekly Indicators report (example)