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**Final report**

**EID enabled – stimulating the information supply chain**

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# Abstract

The Victorian government has implemented mandatory electronic identification (EID) of sheep and goats to underpin the National Livestock Identification System (NLIS) and strengthen traceability for biosecurity purposes. Most Victorian producers are not using EID in the collection of individual animal data in their business. Furthermore, of the small number of producers who are using EID (mainly stud breeders and some early adopters/innovators), many simply use it to view current performance and do not regularly use the data to inform decision making.

The EID enabled project has promoted the use of precision individual animal management which will allow producers to select high performing animals, leading to increases in the productivity of their enterprises. A supply chain that can communicate and share information is more likely to become a value chain, increasing the benefits for all participants.

A review of EID technology adoption by producers and contractors was conducted and subsequently used to inform the design of the projects deliverables including the Define Your Data (DYD) training package, OneScan communication and engagement plan and EID enabled webinar events. A range of delivery methods were used including workshops, webinars, eLearn’s, focus groups, case studies and interviews to ensure accessibility across a range of learning styles and adoption levels was achieved.

The DYD training package products will assist producers and service providers (livestock consultants) with the development of business goals and breeding objectives and the skills to implement them within their businesses. Livestock consultants have also been provided with professional development opportunities to increase their expertise when providing consultation to clients, allowing for goals and pathways to success to be defined.

A review of the current data sharing between supply chain participants identified several existing barriers, primarily the lack of individual animal feedback available to producers. The processing sector was supported throughout the design, installation, and validation of NLIS device scanning and carcase tracking systems. These systems will underpin the sharing of individual animal feedback data and development of market opportunities.

Value chain participants including producers, processors and service providers were empowered with the skills, knowledge, and appropriate tools to utilise EID enabled individual animal data to generate improvements in productivity and business performance.

# Executive summary

**Background**

The Victorian government has implemented mandatory electronic identification (EID) of sheep and goats to underpin the National Livestock Identification System (NLIS) and strengthen traceability for biosecurity purposes. Most Victorian producers are not using EID in the collection of individual animal data in their business. Of the small number of producers who are using EID (mainly stud breeders and some early adopters/innovators), many simply use it to view current performance and do not regularly use the data to inform future decision making.

**Objectives**

The project aimed to support the creation of extension products and data sharing systems so that value chain participants are empowered with the skills, knowledge and appropriate tools to utilise the mandatory introduction of EID NLIS to generate improvements in productivity and business performance, through the use of individual animal performance data.

**Methodology**

The project outcomes included:

1. Producers: Identify barriers to information collection on-farm and develop tailored training packages to be delivered through workshops and structured learning activities.
2. Processors: Facilitated improved information flow and interactions between producer-processor-producer.
3. Farm advisors and contractors: Enabled to provide more informed advice and services to producers in the collection, analysis and use of individual animal information.

**Results/key findings**

* Producers who participated in the *Define Your Data* training package reported an increased understanding of the importance of defining their business goals and breeding objectives combined with development of their skills to use EID technology.
* Several processors engaged in the project were able to meet their NLIS scanning compliance requirements and progress development of carcase tracking systems.
* The *OneScan* communications plan created several technical products that would assist producers to present ewes in the optimum condition for pregnancy scanners to collect accurate individual animal data.
* The *EID enabled decision making* webinar series provided livestock consultants the opportunity to increase their knowledge and skills across the range of EID technology manufacturers.

**Benefits to industry**

An EID enabled supply chain provides producers and processors with opportunities to improve individual business and whole of supply chain performance, through shared data that is used to improve management decisions. This project has created several legacy products that can be used by industry to further develop supply chain participants knowledge and skills in the use of EID technology and its incorporation into their businesses. The rising cost of agricultural inputs will continue to make the value proposition for precision management of livestock using individual animal performance data more apparent as well as increasing focus on traceability within food supply chains.

**Future research and recommendations**

* NLIS underpins traceability and market access opportunities that ultimately provide the benefits of productivity gains for supply chain participants. It is recommended that practical skills-based extension and training activities be provided. This has been shown to be highly successful in this project and should be continued.
* The DYD training package products have potential to be further developed and integrated into several existing extension programs including other supported learning packages (SLPs).
* Deliver OneScan communication and engagement activities and programs with a focus on reproductive efficiency of individual animals to achieve increased fertility, pregnancy scanning data accuracy and lamb survival rates.
* A feasibility study investigating the opportunity to increase or expand Victorian sheepmeat market access supported by NLIS Lifetime traceability. This will increase the value proposition of carcase tracking systems for processors and facilitate the provision of individual animal feedback to producers, underpinning supply chain quality assurance programs.

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# Background

## Introduction

The Victorian government has implemented mandatory electronic identification (EID) of sheep and goats to underpin the National Livestock Identification System (NLIS) and strengthen traceability for biosecurity purposes. In addition, electronic identification can be used to identify individual animals for collection of information throughout the supply chain. This information provides an opportunity for supply chain participants to make more informed decisions, create new business models and improve business performance. Currently, the collection, analysis and management of EID information within each supply chain segment, and the information flow between segments, is a relatively new endeavour and the processes and experience of the supply chain are undeveloped.

Producers, Service Providers involved in collection and provision of information, and Processors, are three priority target segments of this project.

## Development of producers

The on-farm collection of information is improved with EID, through reducing errors and inefficiencies and increasing the speed of identifying individual animals. It also encourages digitisation of information, as the identification of animals is usually associated with the input of other animal performance and health data (e.g. weight, condition score, sex, pregnancy status, treatment records) with data logging or capture devices (e.g. electronic scales, computers, smart devices), and it can be viewed as an enabler of precision management. However, most Victorian producers have not used EID in the collection of individual animal data in their business. Furthermore, of the small number of producers who have used EID (mainly stud breeders and some innovators), the majority do not regularly use the data to inform decision making.

There are three reasons why this occurs. Firstly, there is not an obvious value proposition as to why the collection of individual information will assist in farm or animal management beyond current decision-making processes. Articulation of a value proposition will require each unique business to identify their business goals, production objectives, their livestock’s breeding objective, and determine what information is required to inform decision making and improve business performance. Currently, this is a disconnected process for commercial producers, and the majority do not have a clear process to identify their information requirements to plan and analyse their business performance.

Secondly, rarely has information capture been the motivation or sole purpose for measuring animals, and it is historically viewed as added value to the process of completing a required task. Even without EID, producers have a poor track record of managing or measuring individuals over time and prefer to use mob-based averages or measure a proportion of the flock as an indicator. A key to motivating producers to utilise the efficiencies of EID is helping them understand where information can be collected and what information is required, to improve decision-making and business performance. Understanding the breeding objective and future direction of the business is critical to identifying these needs and the ability to enact the process of information collection and use.

Thirdly, the technology associated with EID is still in an early development stage and the ease of use of EID devices and related data capture technologies can be limiting. Whilst these issues are not difficult to overcome, they represent a simple barrier in a producer environment where simple aspects of implementing software and hardware can be frustrating and time consuming. Although the primary responsibility resides with the manufacturers, upskilling producers in their ability to use the equipment and move the data from a collection state to a point of analysis is an underpinning skill. Irrespective of software or hardware, being skilled to take information that is captured with farm level devices and collate, analyse and use that information to assist decision making is an area for improvement in the producer population, and is primarily restricted by the ease of use and skills of the producer. Upskilling producers in this area will help create the demand to manufacturers to produce equipment that is easier to use, creating options for manufacturers to explore other value propositions.

The motivation for producers to collect, analyse and utilise information for decision making will likely be driven by:

* + Discontent at not being able to accurately analyse their business needs, improve labour efficiency, improve ease of management, and apply selection procedures that improve business performance
  + Attribution of both positive and negative performance outcomes in reference to management interventions or uncontrollable events (e.g. weather)
  + Diagnosis and analysis of animal performance within and over consecutive production cycles

There are several areas where development and support can be provided to motivate producers to use EID to collect information and become more informed and implement practice change. These include improving reproductive efficiency, implementing more targeted breeding programs, and enabling the feedback between on-farm segments of the supply chain. Reproduction efficiency is one area where producers will be motivated to employ data capture with EID. A key point in data collection is at pregnancy scanning. This information is used to implement differential management of ewes during their reproductive cycle, such as managing single and twin-bearing ewes separately due to the large difference in energy requirements during pregnancy and resultant improvements in lamb birth weight and survival.

Historically, EID has been promoted as an enabling technology to select top performers from within flocks. However, a smarter and less risky approach will involve applying structured breeding programs to account for the fixed effects of an animal to avoid culling animals that have high performance but are impeded by poor management. Unfortunately, little consideration is given at the time to the past production outcome, or the outcome over consecutive production cycles. In many cases animals may be culled for poor condition even though that poor condition is related to high performance in a substandard management environment (e.g. poor pasture allocation).

The ability to link data points back to the individual can also be applied in breeding programs and reduce the risk of uninformed selection on single traits. Smarter decisions can be enabled by systems and processes based on EID that enable an animal’s true performance to be considered at these events. Enabling this attribution and diagnosis will help link production outcomes to the prior managerial capability and motivate producers to improve their skills and business performance. Electronic identification has large potential to enact a greater level of self-analysis and attribution that could reinforce prior learning and stimulate the adoption of new practices.

## Development and support of processors

Processors are a key component in the supply chain and are recognised as being significant motivators of change for producers in their ability to meet market specifications and address continuity of supply issues. They play a key role in providing feedback to producers on whether their product has met the required specifications and or any issues related to animal health, disease and defect that can only be detected once an animal has been slaughtered (Pleurisy, measles, grass seeds). As EID enabled individual carcase hook tracking is implemented, producers will be able to access information to attribute cause and effect of their management on carcase outcomes. An important component will be to identify how information can be translated back through the supply chain, potentially even when animals have been sourced from a saleyard.

Although there is significant potential for producers to utilise information from processors that has been enabled by EID, there are several areas that will require development and training for the processor, producer, and agents. These are likely to be:

* + Improving skills of processors to supply accurate and usable carcase and animal health feedback
  + Providing skills and knowledge to processors to implement the upload of individual animal information to new or existing industry databases (e.g. NLIS, Livestock Data Link-LDL) which currently have low subscription.
  + Providing skills and knowledge to producers to access and use industry databases to collect, analyse and action decisions on-farm
  + Developing skills and knowledge of livestock agents to access industry datasets, assist clients to analyse data and advice on changing management practices to better meet market specifications, address animal health feedback, and consider continuity of supply issues.

## Development of farm advisors and contract service providers

A key group identified in the development of this project included the collectors of on-farm information. These are generally contractors that visit the farm for one-off events to undertake a task in animal management. Pregnancy scanners are the most notable on-farm collector of information for several reasons. They collect important information that informs animal and farm management, some operators have initiated EID enabled equipment, and they are a small target audience that are more easily reached than other segments. Although some pregnancy scanners can use EID to record scanning data electronically, this is rarely achieved and the use of scanning information at other times for animal management is limited.

Currently, most animals are either drafted or identified at scanning with a physical brand or mark on the wool that diminishes over time. This does not allow the accumulation of repeated reproductive information over years or allow the easy classification of animals later in the reproductive cycle when culling or pre-joining management is being employed. The generation of electronic scanning information and the subsequent access to the information by the producer at later date is a development opportunity that is a first step in enabling producers to utilise and analyse important information to improve business performance.

The use of EID provides a means by which different segments of the supply chain are able to communicate. Enabled by stock agents, breeders of lambs will be able to interact with and receive information on the performance of their lambs from other industry sectors, such as during finishing at a specialist lamb finisher. This transfer of information serves the needs of both segments and provides information on which management decisions can be made to improve performance and productivity. Lamb performance (both prior to entry of the finishing system, and while being finished) is a key profit driver for intensive lamb finishing systems.

## EID enabled supply chains

Each supply chain participant has potential to make significant improvements in whole-of-chain productivity. EID enabled supply chains could positively influence business performance through improved communication systems, business differentiation and efficiency gains of all or some segments. Implementation of EID enabled supply chains is complex and requires a unique skill set. To date support and the incentive that industry requires to fully adopt EID has not been realised.

If producers are suitably motivated, skilled and receive strong market signals, they will actively seek out and pull information through the supply chain, from service providers such as pregnancy scanners, livestock agents, and processors.

# Objectives

**Overall Outcome:**

Value chain participants are empowered with the skills, knowledge, and appropriate tools to utilise the mandatory introduction of electronic NLIS to generate improvements in productivity and business performance, through the use of individual animal performance data.

**Primary Outcome:**

An EID enabled supply chain provides producers and processors with opportunities to improve individual business and whole of supply chain performance, through shared data that is used to improve management decisions.

**Outcome 1: *Producers are motivated to seek and use individual animal information enabled by electronic identification to improve productivity and business performance.***

**Objective 1.1:** Producers are motivated and capable of seeking, interpreting, and acting based on information enabled with electronic identification of individual animals.

**Outcome 2: *Processors increase efficiency and business performance as a result of producers accessing and using individual animal feedback (carcase and animal health) to improve compliance to market specifications by 15%.***

**Objective 2.1:** Increased supplier/producer understanding of their feedback and compliance to market specifications and improved skills to implement change in management practices to increase the rate of compliance.

**Outcome 3: *Farm contractors (pregnancy scanners, lamb marking contractors) and advisors (livestock agents and consultants) are skilled in the collection, use and delivery of EID information to producers and the supply chain, which enables new service offers and business models to emerge and improves business performance across the supply chain.***

**Objective 3.1:** Contractors (particularly pregnancy scanners and lamb marking contractors) collect and provide accurate individual animal information to producers in an electronic format.

**Objective 3.2:** Farm advisors (such as livestock agents and consultants) provide accurate informed advice and support services to producers in the collection, analysis and use of individual animal information.

Producers who participated in the *Define Your Data* (DYD) training package products developed to increase knowledge and skills of producers using EID reported an increased understanding of the importance of defining their business goals and breeding objectives, coupled with development of skills to create data plans and the use of EID technology. This integrated approach of linking the data collected with desired outcomes will support long-term adoption of the used of individual animal data to inform the business managers decision making process. Case studies of three commercial producers that have adopted EID demonstrated the opportunities to measure the performance of their sheep enterprises and the impact of their management decisions.

For processors to provide individual animal feedback on carcase and animal health conditions, a number of systems need to be in place. The EID enabled project provided support, implementation of NLIS device scanning and carcase tracking systems on-site, to facilitate the identification of individual animals and enable processors to meet regulatory scanning requirements. The delivery of NLIS workshops for producers has enabled processors to increase the proportion of animals that are consigned with a NLIS Lifetime traceable status, which provides a marketing opportunity currently unique to Victoria. Producers suppling livestock to processors were provided with range of tools including the *Lamb Marketing Masterclass* webinar series and *Shortcuts* animal health videos. These products were designed to increase their ability to choose a production system that suits their business goals and environment, understand the processing and retail customer preferences, learn how to select animals that meet market specifications and how to create value chains through marketing opportunities.

The *OneScan* communications plan for increasing adoption of EID during pregnancy scanning created a number of technical outputs including field days, webinars and technical articles that will assist producers present ewes in the optimum condition for pregnancy scanners to collect accurate individual animal data.

The *EID enabled decision making* webinar series provided livestock consultants the opportunity to increase their knowledge and skills across the range of EID technology manufacturers. Participation in DYD training package events has also provided them with communication tools to support their EID service offer.

# Methodology

## Project advisory committee

A Project Advisory Committee (PAC) was formed to seek broader technical input to the design of the project deliverable outputs and improve collaboration with other activities occurring within Agriculture Victoria and externally. The PAC members were selected from representatives of Agriculture Victoria’s Meat and Wool services team, sheep and red meat value chain flagships. The PAC met as required to plan deliverable activities and approve proposals from the project team.

## Situation reports

Three situation reports were completed throughout the project delivery in relation to producer’s adoption of EID technology, pregnancy scanning contractors service offer incorporating EID and the interactions between participants within supply chains that enable information flow. The findings of these situation reports were used by the project team to design the project deliverable outputs. Often this required significant changes from the original project proposal and allowed the outputs to be adapted to better meet current requirements to achieve the project objectives.

## Delivery methods

A range of physical and digital delivery methods were used during the project to offer a wide range of extension activities to a variety of clients. The impact of COVID-19 in the latter half of the project significantly impacted delivery. Specifically, during the practice change adoption phase which was designed to be delivered face to face. The project was able to adapt delivery methodology. increasing the number of outputs that focused on awareness and knowledge development as well as on-line delivery.

COVID-19 also impacted on the opportunities to engage livestock consultants to facilitate adoption programs as per the original intent of the project. Where possible they were engaged during content creation to increase the awareness of the project and its outputs amongst the service provider sector and their client base.

The MLA adoption categories A, B, C based on awareness, KASA or practice change were used to define events and have been reported on in the Results section.

Category A activities form the initial stage of the learning pathway by seeking to engage producers at an activity level. These activities could include field days, forums / expos, seminars, and farm walks. Generally, the cost is minimal or free for producers to attend. This category measures satisfaction and value of activities, and intent to change.

Category B seeks to provide the second stage in the learning pathway for producers. At this level, knowledge, skills, and confidence will be the primary outcomes measured. These activities provide participants with more in-depth information, including problem-solving activities and a focus on skill development. A facilitator will usually manage group discussion and interaction.

Category C seeks to measure practice change (adoption), along with shifts in knowledge and skills, to assess ‘how well’ producers understand and can subsequently implement what they have learned.

## Project operational plan and deliverables

The project operational plan contained twelve deliverables aligned with the project’s objectives and target audience (producers, processors, and advisors). The objective and associated deliverables are listed in Table 1 below. Each deliverable produced one or more outputs to achieve the objective as described in the Results section.

Table 1. Project Operation Plan Objectives and Deliverables.

|  |  |
| --- | --- |
| **Objective 1.1** | **Producers are motivated and capable of seeking, interpreting and acting based on information enabled with electronic identification of individual animals.** |
| Deliverable 1.1.1 | Develop a *Define Your Data* (DYD) training package for producers to gain the skills to achieve their breeding and production objectives by defining what individual animal data can be used within and across production cycles. Development of the package will include an evaluation of current tools available for producers and EID adoption practices. |
| Deliverable 1.1.2 | Deliver the DYD training package to 100 participants |
| Deliverable 1.1.3: | Deliver (DYD supported adoption to 30 producers, to improve on-farm management, based on EID information. |
| Deliverable 1.1.4 | Conduct 30 LDL or NLIS workshops to producer sector |

|  |  |
| --- | --- |
| **Objective 2.1** | **Increased supplier/producer understanding of their feedback and compliance to market specifications and improved skills to implement change in management practices to increase the rate of compliance.** |
| Deliverable 2.1.1 | Deliver a report that includes at least three examples of producer-to-processor data flow and feedback interactions across two processors, that include direct and saleyard consignments to identify: (1) current data flow systems, (2) barriers to data flow; and (3) implications for on-farm decisions. Report on the barriers and recommendations to address transparency of data flow between producers and processors.  Prepare a situation report on producer and processor awareness of NLIS and LDL within Victoria and the use of industry feedback systems by processors (particularly LDL and animal health feedback systems) in Victoria including limitations to adoption. |
| Deliverable 2.1.2 | Deliver 10 lamb supply chain workshops aligned with at least two processors to supply chain participants including producers/suppliers, livestock agents, buyers and processors. |
| Deliverable 2.1.3 | Develop and deliver to 60 participants a learning package for the Lamb Industry to increase skills and knowledge in areas of the lamb supply chain, focusing on on-farm, processing, and retail areas. Themes include technology and data management, regulatory requirements and identifying key stakeholders. |

|  |  |
| --- | --- |
| **Objective 3.1** | **Contractors (particularly pregnancy scanners and lamb marking contractors) collect and provide accurate individual animal information to producers in an electronic format.** |
| Deliverable 3.1.1: | Survey pregnancy scanners and other contractors currently operating in Victoria and report on the barriers to providing EID enabled information |
| Deliverable 3.1.2: | Design an extension product that increases the skills and knowledge of sheep breeders and pregnancy scanning contractors to collect accurate individual animal records that underpin lifetime reproductive performance analysis. |
| **Objective 3.2:** | **Farm advisors (such as livestock agents and consultants) provide accurate informed advice and support services to producers in the collection, analysis and use of individual animal information.** |
| Deliverable 3.2.1: | Conduct six focus groups with the supply chain (livestock agents, lamb finishers and breeders) to identify the information needs of each participant and barriers to information flow within the supply chain |
| Deliverable 3.2.2: | Provide targeted training/support to improve capability of three livestock agents/agencies and three advisors in the collection, use and transfer of EID enabled information |
| Deliverable 3.2.3: | Facilitate the linkages, collaboration and development of a model that enables sharing of animal performance (live and carcase) back along the supply chain to inform participants (lamb finishers, breeders and the advisors) and pilot the information sharing model |

# Results

## Project advisory committee

The PAC consultation method provided significant impact on the progress and quality of the project deliverable outputs. A key recommendation was of the development of a range of products within the *Define Your Data* training package that cater for the range of adoption levels (early, majority and late) and offers different delivery options, rather than a single one-size-fits-all product. Other examples include the suggestion of the Profitable Grazing Systems Supported Learning Package (PGS SLP) format for inclusion in the DYD package, encouraging increased collaboration with the Agriculture Victoria Red Meat Value Chain (RMVC) flagship team, facilitating linkages with processors and technical expertise for the Lamb Marketing Masterclass webinar series and supported a consultation process for livestock consultants engaged to deliver outputs.

## Project engagement summary

The project resulted in significant engagement for the three target audiences (Producers, Processors and Service Providers) across the range of MLA extension program categories (A, B, C). Table 2 lists the 112 events that were delivered to 1456 producers and 208 service providers during 2018 to 2021 project delivery period.

### Producers and Service Providers

Table 2. Producers and service providers engaged during project activities

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ACTIVITY TYPE | DESCRIPTION | EVENTS DELIVERED | PRODUCERS | SERVICE PROVIDERS |
| Case studies:  Investing in EID  (Cat B – KASA) | Case studies of producers that have invested in EID technology | 4 | 10 | 0 |
| Case studies:  Lamb marking + EID  (Cat B – KASA) | Case studies of producers that use EID technology at lamb marking | 3 | 5 | 3 |
| Data collection: carcase tracking validations  (Cat B – KASA) | Assisting data collection for AskBill and Corriedale projects | 8 | 4 | 11 |
| Agriculture Victoria on-farm field days:  (Cat A – Awareness) | Multi-topic with guest presenters “Increasing Total Productivity using EID” | 3 | 254 | 26 |
| Industry events:  (Cat A – Awareness) | Regional shows and field days – AgVic information stand and presentations | 10 | 186 | 30 |
| AgVic electronic NLIS for sheep and goats’ engagements:  (Cat A – Awareness) | Meetings during phase 1 to inform stakeholders of rollout timeframe and requirements | 15 | 267 | 23 |
| One-on-One  (Cat B – KASA) | Ad hoc requests for assistance to setup and use EID equipment | 5 | 5 | 0 |
| AgVic Producer Demonstration Site  (Cat C – Practice change) | “To weigh or not to weigh” Rich River BWBL group | 9 | 15 | 2 |
| Webinar series:  (Cat A – Awareness)  (Cat B – KASA) | “EID enabled decision making for service providers”  “EID enabled ewes”  “Lamb marketing masterclass” | 3  (17 sessions) | 170 | 60 |
| Lamb supply chain:  Workshops  (Cat B – KASA) | Pilot workshop | 1 | 11 | 2 |
| DYD training package:  Workshops  (Cat B – KASA) | “DYD cycle” workshop  “EID101” workshop | 4 | 63 | 7 |
| DYD training package:  Feeder/Intro events  (Cat A – Awareness)  (Cat B – KASA) | Network group meetings with presentation of EID benefits and equipment display | 10 | 158 | 10 |
| NLIS database training:  (Cat B – KASA)  (Cat C – Practice change) | Interactive workshop or webinar with traceability requirements and NLIS database use | Workshops 24  Webinars 13 | 213  95 | 8  26 |
| **TOTAL** | | **112** | **1456** | **208** |

### Processors

Throughout the project engagement was undertaken with the processing sector. During the consultation phase of the project, three significant Victorian processors indicated during conversations they were focusing on inputs and investment in the compliance of electronic NLIS recording for sheep and goats that became mandatory for processors in March 2018. In response, the project team endeavoured to assist processors with meeting this requirement through the following methods.

* consultation opportunities with the MDC projects Sheep EID Technical specialist to optimise NLIS scanning systems
* assistance developing data management plans,
* validation of carcase tracking systems
* collaboration with other stakeholders undertaking activities with processors.

### Other stakeholders

There are several stakeholders that are integral to the success of transferring data between supply chain participants. Their roles include technology providers, technical specialists, business consultants and collaborative research groups. The engagement with this sector during the project is described in Table 3.

Table 3. Industry stakeholders engaged during project activities

|  |  |
| --- | --- |
| TYPE | DESCRIPTION |
| Research and extension groups | * ALMTech (Advanced Livestock Measurement Technologies): participation in Supply Chain group meetings, provision of assistance during data collection in plant. * AskBill carcase quality validation: collection of carcase data in plant. * Sheep Genetics Australia: collection of carcase data in plant during Corriedales eating quality project. |
| Livestock agents | * Ad-hoc requests for assistance using EID equipment and software * Ad-hoc discussions regarding NLIS requirements * Ad-hoc discussions of benefits for commercial turn off planning across clients supplying lambs |
| Industry partners | * Integrity Systems Company (ISC): provision of feedback on functionality of NLIS and LDL database and general user experiences. * Southern Australian Livestock Research Council (SALRC): Members of the PAC provided feedback from the SALRC committees on project deliverables. |

## Project deliverables

The results of the project deliverables and associated outputs are detailed below.

## Deliverable 1.1.1 DYD training package – design and development

*Aim: Develop a Define Your Data (DYD) training package for producers to gain the skills to define what individual animal data can be used (within and between production cycles) to achieve their breeding and production objectives. Development of the package will include an evaluation of current practices.*

### Output A) Desktop Study of current EID practices and adoption

A desktop study to evaluate EID adoption by sheep producers was conducted to report on the current practices and production cycles. The study was produced by reviewing reports previously published regarding EID use by sheep producers in Australia and included a review of EID adoption in Australia and internationally as well as by other livestock industries. Training and skills development resources already available for producers were identified, including case studies that demonstrate how producers are currently using EID within their businesses.

In August 2018 a 2-day workshop for sheep consultants with experience offering EID data management or development of breeding objectives. Commentary of the consultants’ experience with supporting EID adoption and observations of barriers or failures was included in the desktop study. The primary aim of the workshop was to identify processes that maximise the success of producers using EID within their business and reasons for lack of adoption or dis-adoption by producers. The key output from the workshop was the development of a DYD framework that will underpin subsequent training activities within the DYD package to meet the projects objectives.

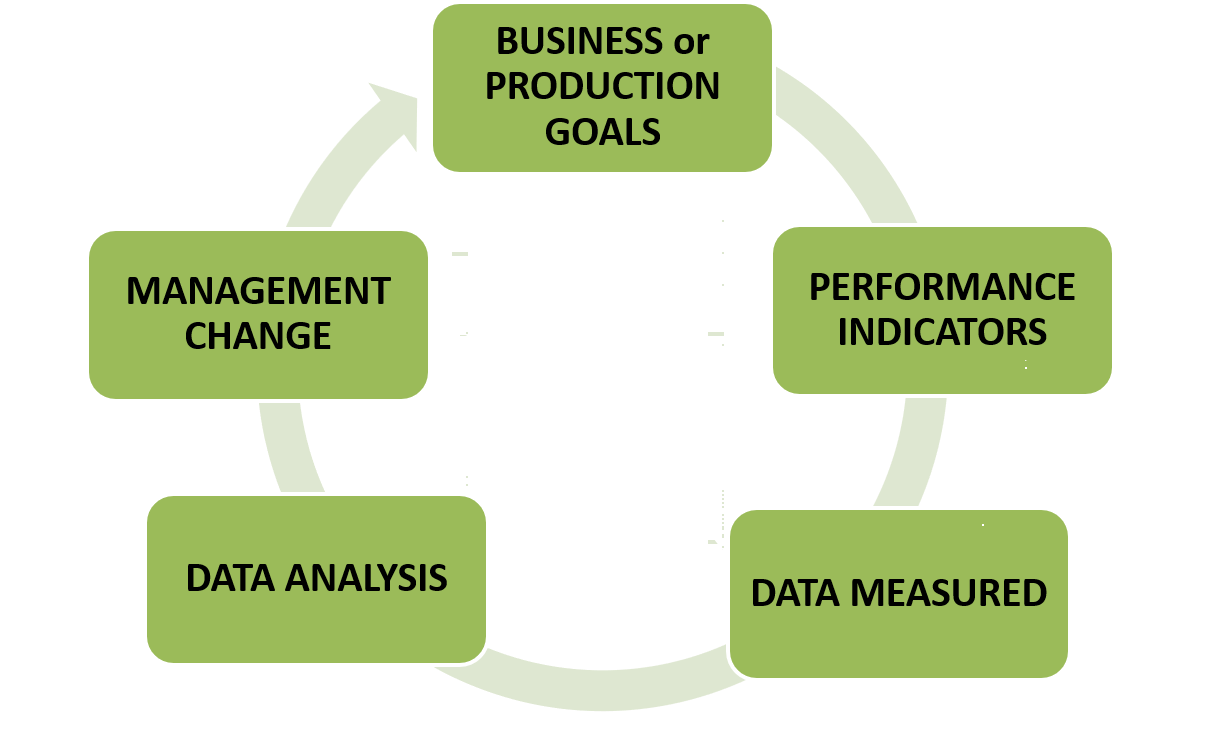
Recommendations and key findings from the Desktop Study relevant to the DYD training package design and other outputs of the project are included in the report (Attachment 1) and listed below.

1. Whilst lack of equipment options was previously listed in reports as a barrier to adoption to use of EID, there has been an increase in the number of farms adopting technology with the ability to capture data from EID equipped animals. Many of the users of the associated technologies are early adopters and have not had a history of using EID for data capture. It is recommended that the provision of basic training on the use of EID equipment will improve producer understanding of both the technology and its application.
2. Producers will be well served by tools that assists with development of a breeding objective with SMART (Specific, Measurable, Achievable, Relevant and Timely) goals assisting with identifying the role of individual animal data for measuring performance targets. It is recommended that the use of EID technologies be incorporated into existing training programs such as BredWell/FedWell, Lifetime Ewe Management etc.
3. Despite the segmentation within the sheep meat industry, there remains a need for some generic training and skills development activities. There remains a need to provide generic training and skills development activities across all segments of the sheep meat industry. The development of user guides and demonstrations provides a readymade way of equipping the sheep industry with the required skills. The ability to connect with a range of service providers through training and extension activities has the potential to increase the reach of project outcomes and will enable deeper market penetration. It is recommended that continued investment in maintaining products, so they are kept up to date and relevant with the changing EID environment and remain easily accessible to all segments of the sheep meat supply chain

### Output B) *Define Your Data* framework

The DYD framework developed during the consultant workshop identified five key steps that producers should be encouraged to follow when using individual animal data within their business. Key actions within the steps are outlined below in Figure 1. This cycle forms an integral starting point of all products delivered in the DYD training package in order to establish the importance of producers understanding why the data they are collecting is important for their business and how they will implement the data in the decision making processes.

Figure 1. *Define Your Data* cycle



The five steps of the DYD cycle include stages of decision making and follow a production cycle.

Step 1: Business or production goals

* Producers should identify the objective they are trying to achieve, and why it is important within their business.
* Preferably these are SMART goals (Specific, Measurable, Achievable, Relevant and Timely).

Step 2: Performance indicators

* Producers should identify the data that is required to measure performance. This data could include current or historical information, production and financial, mob average or individual animal records.
* It is important to highlight that collecting and analysing data uses business resources. Only data that will be used should be recorded.

Step 3: Data measured

* Producers should develop a data recording and analysis plan. This includes who, what, when, where and how for both the data collection and analysis.

Step 4: Data analysis

* Analysing the data and interpreting the results. Often, assistance from service providers such as experts and consultants can be useful at this stage

Step 5: Management change

* After analysing the data, producers should ask the following questions:
  + Was the objective achieved?
  + What are the implications for future management decisions for business operations?
  + Should the data collection and analysis process be repeated, or it is a once-off event?

### Output C) *Define Your Data* training package

Five DYD training package products were developed and piloted during the project as outlined in Table 4. Category A events were designed as introductory sessions for producers with limited awareness of EID enabled individual animal data. They aimed to increase participant awareness by providing a brief overview of the opportunities to increase livestock productivity, the technology systems and stimulate the attendees desire to investigate further. Category B events developed the attendees knowledge and skills through more advanced content including knowledge of the importance of business goals and breeding objectives , how EID is used to collect data and manage data in order to incorporate in decision making processes. Category C events provide practical skills-based assessment and support to individual businesses, preferably over a longer term to allow for review of the impacts on livestock productivity and business performance.

Table 4. DYD training package product design and delivery

|  |  |  |  |
| --- | --- | --- | --- |
| PRODUCT NAME  (Category A,B,C) | OBJECTIVE | SESSION PLAN | RESOURCES |
| *Introduction to DYD* - feeder event  (Cat A) | Increased awareness of EID technology and data management | Workshop 1-2 hours   * DYD cycle overview * EID technology overview including demonstration of equipment * Overview of traits and data management | * Slide pack * Demonstration equipment |
| *DYD* *cycle* - workshop  (Cat A/B) | Increased knowledge of the DYD process and develop skills for defining business goals, breeding objectives and data plan. | Workshop 1-2 hours   * DYD cycle overview * Discussion regarding goals, objectives and plans * Practical attempt to draft goals, objectives and plans | Slide pack/ session plan  (Attachment 2) |
| *EID101* –  workshop  (Cat B) | Increased awareness of EID technology and data management and develop skills for using EID equipment. | Workshop 5 hours   * DYD cycle overview * EID technology overview including demonstration of equipment and practical session * Overview of traits and data management | Slide pack /session plan  (Attachment 3) |
| *EID101* –  eLearn  (Cat B) | Increased awareness and knowledge of EID technology and data management. | eLearn ~45 minutes   * DYD cycle overview * EID technology * Data collection * Decision making | LMS link  (Attachment 4) |
| *DYD* SLP (PGS)  (Cat C) | Increased knowledge of the DYD process and develop skills for defining business goals, breeding objectives and data plan.  Develop skills for using EID equipment to collect quality data throughout a production cycle. | Supported Learning Package 4-5 sessions over 12 months   * DYD and Breeding Objectives * Increasing reproductive efficiency * Smart animal selection * Market compliance * Developing data plans | DYD PGS SLP Project Plan  Attachment 5 |

## Deliverable 1.1.2 DYD training package delivery

*Aim: Deliver the Define Your Data training package to 100 participants*

The DYD training package products developed were delivered to a total of 249 participants during fifteen pilot events as outlined in Table 5.

Table 5. Pilot event participant summary by DYD training package product type

|  |  |  |
| --- | --- | --- |
| PRODUCT NAME | PARTICIPANTS | NOTES |
| *Introduction to DYD* | 168 | Ten events: Nullawil, Dookie, Kilmore, Echuca, Swanpool,  Bendigo, Amphitheatre, Creswick, Hamilton, Avoca |
| *DYD* *cycle* workshop | 32 | One pilot event: Hamilton |
| *EID101* workshop | 37 | Three pilot events: Bairnsdale, St Arnaud, Dookie |
| *EID101* eLearn | 12 | Reviewed by Agriculture Victoria staff |
| *DYD* SLP | 0 | Unable to undertake pilot due to COVID-19 restrictions. |

*Introduction to DYD* workshops

The *Introduction to DYD* events were delivered during the initial phase of the project in 2018 using a flexible session format. Producer groups were able to express interest in information about particular topics including NLIS and LPA requirements, EID technology display, the importance of setting business and breeding objectives, data collection systems and examples of how individual animal data can support for decision making during production cycles such as pregnancy and growth rates. Evaluation results were a satisfaction rating of 8.4/10 and recommendation rate of 96%. Participants were also asked questions that provided the opportunity to comment on intended practice change, what resources they found useful or would like further information on and the pilot delivery structure. These evaluation results were used as insights for the DYD products design.

Question: How do you hope to change your practice because of this event?

* Better recording of mob and individual animal data
* Checking NLIS database more regularly and use the new dashboard
* Register for NLIS account / Complete LPA accreditation
* In general, try to remain more informed about changes to NLIS and technology available
* Replacing lost tags to maintain lifetime data
* Look at EID equipment for my business / Purchase appropriate scanner
* Using EIDs when pregnancy scanning
* Make sure NLIS transfers happen
* Get more info from AgVic & NLIS websites

Questions: Was the information presented useful and what are the benefits to their business?

* Info on markets other than saleyards/agents
* Better recording, less data glitches

Questions: Comments from participants regarding event structure:

* I enjoyed the presentation, it was timely for us starting a new business and need to order tags, the systems look different to before
* A great presenter who did a great job making a complex process simple
* I found this very interesting and valuable, thanks
* Too long, hard to concentrate for this amount of time
* Well presented
* Lots of info but a bit long.
* Start on time.
* Many farms have professional expertise but not computer literate

Learnings for the pilot delivery team to be incorporated into future workshops and/or design of future products/activities:

* Keeping audiences engaged: incorporating enough of the exciting / interesting content such as equipment displays, with the important information such as NLIS regulations, breeding objectives and data plans. Building knowledge throughout session with increasing complexity.
* Length of session: there can be a lot of new information, language/jargon, and concepts. Keeping the sessions concise, allow for breaks. Advertise a time for arrival, with start time 30 minutes later, often chatter and catch ups delay start – allow this to happen but in a controlled environment.

*DYD cycle* workshop

The *DYD cycle* workshop pilot was conducted in October 2018 at Hamilton in conjunction with an external service providers Dynamic AG Consultancy. The DYD framework was presented as part of *eID Excelerate,* a one-day workshop to increase Microsoft Excel skills. Twenty-three participants attended, with a satisfaction rating of 8.4/10. Feedback comments included:

Question: How do you hope to change your practice as a result of this training?

“I won’t be collecting and collating unnecessary data”

“move from collecting data only to using and analysing it”

“work out what I want or can get from EID”

“be very targeted in our data collection, with some specific goals in mind”

“start using the EID equipment that I have”

Question: What additional training would you like to have in the future?

“producers will need to know how to manage NLIS database”

“basic training on the collection and use of EID in a practical situation”

“analysing data”

“follow up session once I have practised what I learnt today and have some real data”

“more specific ideas on the valuable data for different enterprises”

“group sessions targeting specific breeding objectives”

Question: Further comments?

“I like the DYD concept, help with decision making is always appreciated”

“combine DYD with breeding objective into a template to tighten up/prioritise the spread of data required to deliver it”

Learnings for the pilot delivery team:

Whilst recognising the importance of defining data needs, there is a high demand for further training on the management of data. This can be difficult to achieve due to the range of equipment and software available and often this requires long term support. Building capability for service providers such as livestock consultants and data managers will be essential for adoption by the majority of producers.

*EID101* workshop

First pilot was conducted in April 2019 with the Gippsland BestWool/ BestLamb (BWBL) group. The session included information on EID equipment features and options for systems using different components based on a variety of enterprise types and data needs. Fifteen participants attended the workshop, including a local veterinary practice that offers pregnancy scanning with RFID tag recording. Four people in the group were already using EID equipment, representing 30% of the group. The event had a satisfaction rating of 7.8/10 with 100% of attending indicating they would recommend the event to others. One participant responded that they would not be implementing a practice change because they were already using EID within their stud enterprise and had a clear data plan.

Ten of the eleven participants (91%) indicated they would implement practice change with the following comments:

“look at purchasing a different RFID wand reader”

“further investigate EID equipment options”

“buy a panel reader for fast weighing”

Suggestions for improving the event included:

“provide pre-work on terminology etc, then more specific questions can be asked during session”

“training for specific manufacturers EID equipment, generic info not as helpful if when you have already purchased”

“don’t need the connectivity information, it’s too technical”

“a practical session to import/export data using a data collector based on real activity e.g. pregnancy scanning or lamb growth rates”

Pre and post multiple-choice questions indicated a lack of technical knowledge within the group regarding cable types, connectivity options etc. These are often the aspects of EID equipment that cause poor performance and reliability issues. Although participants may express dis-interest in this area, it is important for the successful operation of EID equipment in the field. The groups knowledge of productivity data such as pregnancy scanning, growth rates and breeding objectives was high. Given every group member pregnancy scans their ewes and a high proportion of the group already use EID equipment (and the group includes a stud seedstock supplier with high EID usage), the wider group has been exposed to the concepts of EID and data management on a regular occurrence during BWBL group meetings.

*EID101* eLearn

The EID101 workshops were adapted into an eLearn format based on the workshops pilot evaluation to provide a self-paced learning for audiences across a range of skills or familiarity with EID technology. An external contractor was engaged to create the package using the workshops slide pack as the starting content.

The EID101 eLearn has recently been launched on the Agriculture Victoria Learning Management System. Designed for producers, the course provides an introduction into the technology that is used to identify individual animals using electronic devices over four parts. Part one “Defining Your Data” includes important messages about first setting goals for business and livestock enterprises. These are then used to identify the data needed to measure progress towards the goals.

The second and third parts “EID101 equipment” and “Collecting quality data” explore how EID technology works, the equipment that can be used, connectivity and how to collect data that is accurate and useful. The final part “Decisions with Data”, provides examples of how data can be used to support decision making.

Design elements include:

* run time approximately 45 minutes to complete
* meets accessibility requirements
* includes interaction elements and videos
* links to industry resources
* able to be updated as required

The eLearn was internally piloted by Agriculture Victoria sheep specialists to ensure technical content was correct and by persons with low level of EID knowledge to test its efficacy at achieving the learning objectives.



*DYD* SLP

The Define Your Data Supported Learning package (DYD SLP) was developed to provide support in development of individual livestock data collection, database management and decision-making skills and adoption of EID technology. The package was designed using the MLA PGS framework including linking with curriculum areas and identifying Key Performance Indicators (KPIs). The DYD SLP delivery plan includes five sessions with an optional sixth one-on-one with a consultant (see Table 6).

The four objectives of the package include:

Objective 1. Producers have a defined breeding objective and are able to identify the data needed to measure performance in order to achieve their business goals

Objective 2. Producers are confident and able to use EID to accurately collect and interpret individual animal data to in decision making processes

Objective 3. Producers are able to identify and rank individual animal performance against their breeding objective or business goals

Objective 4. Producers are able to access and interpret carcase feedback data in order to increase compliance to market specifications

The session content was developed by livestock consultants specialising in the five topic areas: developing breeding objective, collecting and managing data, animal selection, measuring reproductive efficiency of ewes, and meeting lamb market specifications.

Delivery of the DYD SLP pilot was planned for 2020 for Deliverable 1.1.3. Due to COVID restrictions on event delivery, the 2020 pilot program was not undertaken. The DYD SLP is available for piloting with support from Agriculture Victoria.

Table 6. DYD SLP session plan

|  |  |  |  |
| --- | --- | --- | --- |
| **Session number 1:** *Introduction to Define Your Data and Breeding Objectives* | | | |
| **Learning outcome/s** | **Learning topics\*** | **Learning activities** | **Supporting tools or learning resources to be used** |
| Participation in this theory session will increase understanding of:   * The DYD cycle * SMART breeding objectives and/or business goal * The role of EID as a tool for data collection * The “measure to manage” concept | **Curriculum:**  Reproduction & Genetics (Sheep)  4.1 Productive and profitable genetics.  4.2 Trait selection.  4.3 Selecting profitable sheep.  **Curriculum links:**   * Business * People | **Delivery method:**   * Workshop   **How will you train the skill?**   * Theory session of DYD and Breeding Objectives (BO) * Practical demonstration of BWFW (Bred Well Fed Well) BO tool * Practical session developing own BO   **How will you assess the skill?**   * Completion of own BO | **Resources:**   * Slide presentation * BWFW Breeding Objective tool * Breeding Objective template |
| **Session number 2:** *EID underpins on-farm reproductive efficiency* | | | |
| **Learning outcome/s** | **Learning topics\*** | **Learning activities** | **Supporting tools or learning resources to be used** |
| Participation in this theory session will increase understanding of:   * The traits indicative of reproductive efficiency * Tools to record reproductive data for mob-based and individual animal data * Establishing benchmark performance values | **Curriculum:**  Reproduction & Genetics (Sheep)  1.1 Using condition score targets to maximise reproductive potential.  1.5 Pregnancy scanning as a tool to manage ewes during pregnancy and lambing.  1.6 Identified areas for improvement within reproductive management.  **Curriculum links:**   * Business * People | **Pre-work:**   * Collate previous years joining and lamb marking data.   **Delivery method:**   * Workshop   **How will you train the skill?**   * Theory session of fertility and lamb survival as a result of ewe BCS. * Practical demonstration of BCS estimation and data collection * Practical session demonstration of data collection spreadsheet using own previous years mob-based data   **How will you assess the skill?**   * Able to use spreadsheet | **Resources:**   * Slide presentation * BCS (Body Condition Score) training kit * Fertility calculator spreadsheet |
| **Session number 3:** *EID underpins smart decisions on animal selection* | | | |
| **Learning outcome/s** | **Learning topics\*** | **Learning activities** | **Supporting tools or learning resources to be used** |
| Participation in this theory session will increase understanding of:   * Revise reproduction traits * Using reproduction traits to rank performance | **Curriculum:**  Reproduction & Genetics (Sheep)  4.4 Evaluate current genetics.  4.5 Genetic progress and how it is achieved.  5.1 Selecting genetics to meet your breeding objectives.  5.2 Breeding strategy.  **Curriculum links:**   * Business | **Pre-work:**   * Collect current years joining and lamb marking data including BCS, supplementary feeding and paddock allocation data.   **Delivery method:**   * Workshop   **How will you train the skill?**   * Theory session of fertility and lamb survival as a result of ewe BCS. * Practical demonstration of BCS estimation and data collection * Practical session demonstration of data collection spreadsheet using own previous years mob-based data   **How will you assess the skill?**   * Able to enter data into spreadsheet | **Resources:**   * Slide presentation * Fertility calculator spreadsheet |
| **Session number: 4** *EID enables whole of value chain gains* | | | |
| **Learning outcome/s** | **Learning topics\*** | **Learning activities** | **Supporting tools or learning resources to be used** |
| Participation in this theory session will increase understanding of:   * The definition of supply chains and value * The specifications of sheep meat markets * The traits (live animal assessment) associated with measuring market specifications on-farm * Interpreting carcase feedback data including animal health | **Curriculum:**  Value chain (Beef & Sheep)  1.1 Characteristics of a supply chain.  1.2 Characteristics of a value chain.  1.3 Understanding customer requirements and market specifications.  2.1 Developing skills in live animal assessment so producers are able to match their livestock to the market specifications.  **Curriculum links:**   * Business * People | **Pre-work:**   * Collate previous carcase feedback examples. * Create MyMLA account linking NLIS, LPA, MSA and LDL accounts   **Delivery method:**   * Workshop   **How will you train the skill?**   * Theory session including:   + Market specifications   + Traceability & Integrity (NLIS, LPA)   + Feedback data – interpretation and application in improvements (LDL) * Practical demonstration weighing and fat score assessment including drafting * Prediction of turn-off based on growth rate   **How will you assess the skill?**   * Assess livestock for market specifications * Identify common animal health conditions and management options for reduction of incidence | **Resources:**   * Slide presentation * Weigh crate with RFID scanner and data collector unit * Feedback sheet example * LDL data example |
| **Session number: 5** *Defining your data plan* | | | |
| **Learning outcome/s** | **Learning topics\*** | **Learning activities** | **Supporting tools or learning resources to be used** |
| Participation in this theory session will increase understanding of:   * Revision of BO * Development of data plan | **Curriculum:**  Reproduction & Genetics (Sheep)  4.1 Productive and profitable genetics.  4.2 Trait selection.  4.3 Selecting profitable sheep.  **Curriculum links:**   * Business * People | **Delivery method:**   * Workshop   **How will you train the skill?**   * Theory session * Practical session developing own data plan   **How will you assess the skill?**   * Completion of own BO | **Resources:**   * Slide presentation * Data plan template |
| **Session number: Optional** *Defining your Breeding Objective* | | | |
| **Learning outcome/s** | **Learning topics\*** | **Learning activities** | **Supporting tools or learning resources to be used** |
| Participation in this theory session will increase understanding of:   * The role of EID as a tool for data collection * The “measure to manage” concept | **Curriculum:**  Reproduction & Genetics (Sheep)  4.1 Productive and profitable genetics.  4.2 Trait selection.  4.3 Selecting profitable sheep.  **Curriculum links:**   * Business | **Delivery method:**   * One on one meeting   **How will you train the skill?**   * Practical session developing own BO   **How will you assess the skill?**   * Completion of own BO | **Resources:**   * BWFW Breeding objective tool * Breeding Objective template |

## 

## Deliverable 1.1.3 DYD adoption program

### *Aim: Deliver Define Your Data (DYD) supported adoption to 30 producers, to improve* *on-farm* *management, based on EID information.*

Recruitment of producers for the supported adoption component of the project was undertaken using an Expression of Interest (EOI) process to existing groups. The Rich River Best Wool Best Lamb (BWBL) group expressed interest in adopting the use of EID within a Producer Demonstration Site (PDS) framework which commenced with the 16 group members in early 2019 (Output A). The ASKBILL project lead by the Sheep Cooperative Research Centre (CRC) required assistance collecting carcase data of reference lambs for 12 producers in 2018 and 2019 (Output B). These producers were assisted with the collection of on-farm data and then provided individual animal carcase and animal health data. Other groups including the Southern Farming System/Birchip Cropping Group EID adoption project expressed interest however the extension activities were unable to commence due to COVID restrictions on workshop delivery during 2020.

The MLA Profitable Grazing Systems Supported Learning Package program was also identified as a pathway for adoption using the DYD package created by this project or by incorporating EID enabled individual animal data into existing packages such as the *Lifting Lamb Survival* and *Meet the Market*. COVID restrictions resulted in the Victorian PGS program being paused during 2020 due to face-to-face delivery restriction and the limited success with supporting skills development and practise change in an online delivery format.

To meet the deliverable objective of motivated producers to seek opportunities to use EID enabled data, a consultant was engaged to author an article on the use of EID at lamb marking to collect data and create three case studies featuring producers that had successfully adopted the use of EID and where using it to collect data at lamb marking and subsequently use that data to support decision making (Output C).

### Output A) “*To weigh or not to weigh*” Producer Demonstration Site (PDS)

The “To weigh or not to weigh” PDS aimed to implement the DYD supported learning package by investigating the benefits of using EID to record individual animal performance. and to understand the impact of weighing interval and mob proportion on decision making ability when managing lamb turn off systems.

Four scenarios were observed:

1. EID all animals – record all animals each weigh event (three producers’ sites)
2. Non-EID – record all animals each weigh event (one producer site)
3. Non-EID – weigh part of mob each weigh event (one producer site)
4. Non-EID and no weights recorded (one producer site)

Six producers were actively involved in the project hosting a site with the remaining 10 group members observing and assisting at data collection plus contributing to group discussions relating to the management options of lamb’s post data collection.

The initial aim was to monitor the producers over a two-year timeframe, the first year providing benchmark data and allow for development of EID and weighing skills. The second year would focus on implementation of the first years learnings. The first year was conducted however the second year of the project was unable to be completed due to COVID-19 associated delivery restrictions on workshops and assistance with data collection. The projects intent was to record qualitative observations and commentary such as the decisions made with the weight data and subsequent management activities. It was not intended to compare the animal performance data such as growth rate or time to turn off between the sites as there was a large range in genetic and environmental effects.

Producer knowledge and skills evaluation:

* Many EID equipment owners only had a basic level of skill that allowed the collection of data but not interpretation of the results beyond general trends or ability to problem-solve if there was a technical issue during data collection.
* Lamb marking data at one site was not recorded accurately due to inconstancies across operators within sites and issues with equipment malfunctions.
* The groups knowledge of factors affecting lamb growth rates was high. However few set growth rate targets to achieve defined turn-off periods.

Observations from year one:

* Only recording part of the mob resulted in the heavier lambs being weighed more often and a lighter tail being observed after the early consignments were sold.
* Calibration of weigh scales had not been undertaken resulting in large variance, particularly with dressing weights of consigned animals.

Intended follow up for the second year when group meetings resume include:

* Engaging an EID equipment and data management specialist to assist individuals with setting up data recording systems and skills using own equipment including problem solving
* Ensure calibration of scales through use of known weights
* Continue building knowledge using EID recording equipment
* Investigate options for recording lamb marking weights efficiently and accurately

### Output B) “ASKBILL” decision support tool - linking on-farm and carcase data project

ASKBILL is a web-based application developed by the SheepCRC Project combines on-farm data with climate and genetic industry datasets to model production forecasts and alerts that can be used by livestock managers to support management action decision making. Twelve Victorian producers were involved in the on-farm data validation trial of the software in 2018 and 2019. These producers measured mob and individual animal performance data including liveweight, growth rate, worm burden and animal health treatments for 1748 lambs born in 2018. Support was provided to these producers in setting up their on-farm data collection using EID and subsequent data collection when requested. Four of the producers had received the Victorian governments EID technology grant using it to purchase new data collectors, they had little experience with EID prior to this time.

When the lambs were consigned for slaughter (12 separate events) to three Victorian processors, the project team attended to match the animals EID with the carcase body identification. Carcase data including hot standing carcase weight (HSCW), fat (palpated and GR-site), animal health conditions and trim notes. Lean Meat Yield (LMY) was calculated for 7 mobs processed at a plant with Dual X-ray Technology (DAXA) installed. Producers were provided with the individual animal feedback; some points of interest include:

* Animal health – one producer identified significant tape worm issue resulting in 85% lambs affected, significant number being down graded
* Carcase – provided feedback on trim, often linked with lower HSCW.
* Carcase - GR measurement more descriptive than the palpated fat (range 1-5)
* NLIS upload confirmation – first consignments with this information, transferring off property account to the processor.

Follow up phone calls to the producers involved were conducted in 2021. All were still using EID to record liveweight and growth data for their lambs. Some reported that they used the data to forward project turn off dates and forward contracting to buyers. Most were using the data trends to assess performance of past management such as paddock allocation – linking to pasture quantity and quality, and then determine the next paddock movement. The majority (9/12) were recording animal health treatments with EID such as vaccination and drenching if convenient, for example same time as a liveweight measurement, but tended not to if the treatment was a standalone event. All expressed interest in receiving individual animal carcase feedback – in particular animal health conditions and causes of trim.

### Output C) “Lamb marking + EID” case studies and content package

Three of the Rich River BWBL group PDS sites were recording lamb marking weights and lifetime data records such as birth type. The collection of data at this early stage is not common for commercial producers unlike their stud counterparts, however there was a high level of interest in the observing group members at the different methods to record the data, and how it could be used to assess lamb and dam performance. The findings from the DYD supported adoption through the ‘To weigh or not to weigh’ PDS provided information that was used to develop three case studies and one article. The article and case studies will be published as an MLA Feedback magazine article series and will also feature on the Agriculture Victoria website.

The article summary is included below:

*Taking your sheep business to the next level requires good monitoring, good decision making and great implementation. The more things that you measure, the more you can perfect your management and the better your business will be. Incorporating EID systems into your enterprise can help you achieve this outcome. EID enables you to record different aspects of performance across a range of time points. This data can then be collated and analysed, allowing you to make informed decisions. The value that can be realised from implementing EID is higher the earlier you start recording information in an animal’s lifetime. Ideally you should apply the tags at lamb marking and start your data recording from that point to gain full benefit of using EID as a management tool.*

*The value to an individual farm varies dramatically with enterprise and system use. This is due to a number of factors including user’s skill and ability, enterprise mix and business goals and objectives. There are many complexities and a one size fits all approach is not appropriate however, generally, the value of applying EID systems to commercial sheep enterprises can be categorised across five broad areas:*

*1. Measuring responses to management in your own sheep.*

*2. Managing the individual while also managing the mob.*

*3. Increasing the flexibility of labour.*

*4. Selecting which animals to retain.*

*5. Enhancing traceability and transparency.*

*All of these seemingly small aspects add up to a better sheep business.*

## Deliverable 1.1.4 NLIS/LDL training workshops for producers

*Deliver 30 producer workshops on NLIS and/or Livestock Data Link (LDL)*

### Output A) NLIS workshops for producers

The NLIS and LDL workshop design began with consultation of key stakeholders to determine their requirements and resources that would be available for delivery. During discussions with MLA Integrity Systems it was agreed that promotion of LDL and training producers in the use of the system should be done in conjunction with provision of carcase feedback to producers by individual Victorian processors. There was no further uptake of LDL by processors throughout the project timeframe.

The focus for producer workshops was training in the use of the NLIS database to manage individual animal transactions and understanding traceability systems importance for the Australian livestock industries. The workshop content was developed with other Agriculture Victoria teams including those responsible for monitoring and managing NLIS compliance. Two primary objectives were identified:

1. To provide information on the sheep & goat National Livestock Identification System (NLIS) traceability program including regulatory tagging requirements, Property Identification Codes (PICs) and National Vendor Declarations (NVDs).

2. To provide an overview of, experience in and build confidence in, livestock traceability through the NLIS database use to support traceability requirements and property to property transfers (P2P).

The workshop package that was developed included a session plan, PowerPoint presentation, an activity worksheet and supplementary information material list. Evaluation was conducted using Response Cards for pre and post skills and knowledge assessment, satisfaction rating and event recommendation. Training of regionally located Agriculture Victoria staff for delivery of workshops was conducted to ensure consistency of key messages and delivery and build capability within regional areas.

In November 2019 a pilot webinar version of the NLIS workshop was delivered using the Webex Training® interface. The webinar ran over two sessions including part 1 – Traceability and NLIS database overview and part 2 – practical session using the demonstration NLIS database. This webinar format was used extensively during the COVID-19 restrictions in 2020 to meet delivery targets.

A total of 37 events, including 24 face to face workshops and 13 on-line webinar workshops, were delivered to 308 producers and 34 service providers. Attendees gave an average satisfaction rating of 8.74 (range 7.4 to 10) out of a possible 10, with 84% of attendees rating 8/10 or above, 99.25% of attendees would recommend the event to others. The attendees demonstrated a significant increase in knowledge of important traceability and NLIS requirements as shown in Table 7.

Table 7. Change in percent of participants answering correctly pre and post attending NLIS workshops and webinars.

|  |  |  |
| --- | --- | --- |
| **KNOWLEDGE AREA** | **PRE** | **POST** |
| Which ear to apply tags – sheep | 29% | 98% |
| Post breeder colour – sheep | 48% | 96% |
| NLIS ID & RFID number are not the same | 57% | 98% |
| Scenarios when a Vendor Declaration required | 87% | 89% |
| NLIS notification period | 30% | 94% |
| Auctions Plus – NLIS responsibilities | 60% | 98% |

Figure 2 highlights an increase of almost three-fold in attendee confidence to perform a Property to Property (P2P) movement transfer using the NLIS database, from three to eight out of 10. This is attributed to repetitious instruction, with presenter demonstration followed by attendee practising two examples, and then being referred to follow up resources to utilise post workshop.

Figure 2. Confidence of participants to complete a Property to Property transfer using the NLIS database before and after attending NLIS workshops

Eighty-nine percent of attendees intended to change at least one practice as a result of attending the workshop, and six percent were unsure), often because they did not generally receive livestock privately, or they were already doing what was necessary. Intended practice change included:

* checking their NLIS database account to make sure movement of livestock were represented on the database
* monitoring movements to make sure no devices were moving on or off that weren’t associated with a movement of their livestock
* following up with their agent about movements of livestock that hadn’t happened as they should on the database
* learning how to use a scanner to avoid having to handwrite NLIS IDs
* improving recording keeping practices
* ordering post-breeder tags
* scanning before dispatch so they have their own record of what moved off their PIC
* undertaking a PIC reconciliation if they were a cattle producer. Several sheep producers also indicated they would like to do a PIC reconciliation but were informed that it was not a current NLIS database feature.

## Deliverable 2.1.1 Producer-to-Processor Interactions Situation Report

Deliver a report that includes at least three examples of producer-to-processor data flow and feedback interactions across two processors, that include direct and saleyard consignments to identify: (1) current data flow systems, (2) barriers to data flow; and (3) implications for on-farm decisions. Report on the barriers and recommendations to address transparency of data flow between producers and processors.

Informal consultation was undertaken with Victorian processors throughout the project delivery period as well as a desktop study were used to complete the situation report. This was usually done whilst on-site for other activities associated with the project or when collaborating with other stakeholders. These activities are described below.

* Individual carcase tracking systems (CTS) have been installed by several Victorian processors however have not yet been fully enabled due to continued technical issues and competing resource requirements, including that of NLIS scanning.
* COVID-19 significantly impacted on the Victorian processing sector affecting both operations and limiting contact opportunities with their suppliers.
* Four Victorian processors were assisted with validation of CTS, including the development of a CTS Validation Standard Operating Procedure (Attachment 2) that can be used to monitor performance internally when required by the business. This is extremely important to increase to trust between processors and suppliers that the feedback data being provided on individual animals is accurate.
* One Victorian plant was assisted with the preparation of a data management plan prior to installation of a DEXA unit, this was in collaboration with the ALMTech project.

The producer to processor interactions situation report (Attachment 3) including a review of feedback systems used in Victoria was written collaboratively by the MDC EDI enabled and the Agriculture Victoria Red Meat Value Chains Flagship Optimising Lamb Value Chains project teams. The report conclusion and recommendations are included below.

### Conclusion

The growth and maintenance of a strong sheep and goat agricultural sector is a key role of government and industry bodies, given that it encompasses many stakeholders and complexities. The success in stimulating information in the sheep and goat supply chain benefits not only the core stakeholders but the overall economy of Victoria. The ability to achieve success in EID enabled data transfer and supply chain allows Victoria to optimise red meat value chains and provides opportunity for this success to be replicated nationwide.

Traditionally this has been limited by the difficulty of undertaking work across all levels in the supply chain. Previously there has been a lack of a tool, system, and legislation to create a cohesive mode of operation. NLIS and EID technology provides the pathway to stimulate interactions between Processors and Producers and other segments of the industry. This has been largely due to stakeholders being unable or unwilling to envisage a model in which information is shared for the benefit of all, and reluctant to give away what might be perceived as a competitive advantage. National standardisation and reporting systems are beginning to break down these barriers to create a more cohesive sheep and goat industry. This report identifies that there is a need for government and industry to provide support to the processor and producer segment of the sheep and goat supply chain to stimulate two-way communication and to promote these National standardised approaches to information gathering and sharing. Industry and government support should focus on facilitating the use and uptake of EID enabled technology and provide the necessary skills and knowledge needed for the sheep and goat producer and processor segment to make practice change. The more readily this technology is used the greater the potential for flow on benefits and opportunities to the wider industry. Above all a high standard in the use of NLIS EID enabled technology should be maintained and promoted for biosecurity purposes.

### Areas for further investment

There is a high degree of risk for processors to attempt to change current mode of operation as it often requires significant investment and retraining and upskilling. Agriculture Victoria and the wider industry has a role in breaking down adoption of change into manageable components and to pilot and demonstrate the potential benefits of practice change. Implementing change on a smaller level has the potential to reduce or spread the risk however when these small practice changes are combined have a greater impact on the wider ability of Victoria and the sheep and goat industry to continue to maintain market integrity and competitiveness of the sheep and goat industry. Focus areas identified through this report include.

* Recognise that traceability and biosecurity to maintain market access is the key priority area for education of supply chain participants
* Upskilling producers to take full advantage of electronic identification and the benefits it can provide on farm.
* Enable, support and train processors to adopt technology that can improve objective carcase measurement and information transfer
* Government continue to work closely with and build relationships with industry bodies such as MLA, ISC, Prime Safe, AMPC to develop and promote the addition of national supply chain behaviours that stimulate supply chain interactions; develop national standards for reporting carcase and animal health disease and defect information; promote adoption of existing national programs such as NLIS, Livestock data link to promote consistency of feedback and reporting systems.
* Explore how complimentary technology can be integrated to further extend current information collection and transfer for example block chain technology.
* For industry bodies to invest in across border programs that enable a better understanding of goat producer needs and processor interactions given majority produced interstate and processed in Victoria.

## Deliverable 2.1.2 Lamb supply chain workshops

Deliver 10 lamb supply chain workshops aligned with at least two processors to supply chain participants including producers/suppliers, livestock agents, buyers, and processors.

The Lamb supply chain workshop package was designed using a framework that provided content that was flexible to audience knowledge level, topic preference and individual processor supply chains (Output A). Three modules of the workshop package were delivered to the Swan Hill processor suppliers in consecutive workshops (Output B).

Due to COVID-19 restrictions and pressures faced by the processing industry face to face delivery of the Lamb supply chain workshops for this deliverable was not achieved in 2020. This deliverable was redesigned to accommodate these restrictions and ensure achievement of deliverable objectives. Additional workshop content and the SHORTCUTS animal health videos (Output C) were delivered that support ongoing opportunities to increase supply chain participants knowledge and awareness to meet market requirements and optimise carcase quality and yield.

### Output A) Lamb supply chain workshops - design

A Lamb supply chain workshop package was developed and then piloted with producers supplying to a processor. Further planned workshops in 2020 were cancelled due to COVID-19. The project team refocused to continue the development of the workshop modules and redesign mode of delivery. A slide pack for the workshop modules have developed for use by Agriculture Victoria extension staff. With COVID-19 restrictions limiting face to face delivery the modules will be converted to an eLearn format becoming a legacy product of this project.

The workshop design objectives included:

* To provide an up to date resource which is valued by Agriculture Victoria and industry.
* Support sheep producers to respond to varying climate and develop marketing plans to suit changing needs.
* Develop services that will support sheep industry to implement traceability and product integrity systems.
* Strengthen community confidence in red meat through adoption of best practice sheep marketing and product integrity systems.

The lamb supply chain workshops were designed to be flexible to the audience based on knowledge level and desired learning area. A matrix (Figure 3) of five key modules or themes and the information topics was created. Topics were assigned an X for being essential learning for the module or O - optional. The matrix illustrates the complexities of the lamb supply chain and crossover topics. Delivery of the content is designed so it can be a once off event or scheduled over several sessions.

Figure 3. Lamb supply chain workshop module and topic matrix

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Module / Topic** | **M0 Overview** | **M1 Target markets** | **M2 Preparing stock** | **M3 Feedback** | **M4 Using EID** | **M5 Compliance** |
| Overview | X | O | O | O | O | O |
| What is a supply chain? | X |  |  |  |  |  |
| Glossary | X | O | O | O | O | O |
| Markets and customers | O | X |  |  |  |  |
| Specifications | O | X |  | O |  |  |
| Weight |  | X | O | O | O |  |
| Fat |  | X | O | O | O |  |
| Communicating specifications |  | X |  |  |  |  |
| Grids |  | X |  | O |  |  |
| Compliance to specifications |  | O |  | X |  |  |
| Definition of lamb |  | X | O | O |  |  |
| Age and dentition |  | X | O | O |  |  |
| Dressing Percentage |  |  | X |  |  |  |
| Cost of weight vs fat |  |  | X |  |  |  |
| Curfew |  |  | X |  |  | O |
| Crutching |  |  | X |  |  |  |
| Skins |  |  | X |  |  |  |
| Feedback - What is it? |  |  |  | X |  |  |
| Accessing feedback |  |  |  | X |  |  |
| Consignment information\* |  |  |  | O |  | X |
| Animal health - diseases |  |  |  | O |  |  |
| Animal health - defects |  |  |  | O |  |  |
| Condemnations |  |  |  | O |  |  |
| AUS-MEAT standards |  | X |  | O |  |  |
| Sex |  | X | O |  |  |  |
| Lean Meat Yield |  | O |  | O |  |  |
| Electronic Identification (EID) |  |  |  |  | X |  |
| Individual animal management |  |  |  |  | X |  |
| Managing data on farm |  |  |  |  | X |  |
| On farm traits to record |  |  |  |  | X |  |
| Traceability |  |  |  |  |  | X |
| NLIS |  |  | O |  |  | X |
| PICs |  |  |  |  |  | X |
| Ear tags |  |  |  |  | O | X |
| NLIS Database |  |  |  |  |  | X |
| Livestock Data Link |  |  |  | X | O | O |
| Lifetime traceability |  |  |  |  |  | X |
| Property to property movements |  |  |  |  |  | X |
| NVDs |  |  | O |  |  | X |
| LPA |  |  |  |  |  | X |
| Quality Assurance Programs |  |  |  | O |  | X |
| MSA |  |  | O | O |  | X |
| MyMLA |  |  |  | O |  | X |
| Animal health - treatments |  |  | O |  | O | O |
| Withholding periods and ESIs |  |  | O |  | O | X |
| Growth rates |  |  | O |  | X |  |
| EID equipment |  |  |  |  | X |  |

### Output B) Lamb supply chain workshops - pilot

A pilot event was conducted with the Swan Hill BWBL producer group in March 2020 attended by 11 producers and 2 service providers. Representatives from the local processing plant and livestock agencies attended as guest presenters.

Three modules were piloted during the event (Overview, Target markets and Feedback). These were chosen to align with the processor presence at the event and to encourage communication between the three supply chain participants. The objectives of the workshop included:

* Attendees have an improved understanding of the background context of lamb supply and demand in Australia and why marketing is important.
* Participants can identify markets, customers and what their preferences are.
* Participants can engage with a local processor to understand their markets and their requirements
* Participants have improved understanding about how their farming system may influence their ability to meet certain target markets.
* Participants can source carcase feedback and improved understanding of interpreting it for use in on farm decision making.

Participants gave the pilot event an average rating of 8/10 for satisfaction with 100% of the respondents said they would recommend to others. Comments from participants regarding the pilot and intended practice change included:

* “Will work with agent to follow up with my buyer” (engaging with a processor to understand market requirements)
* “Will look at marketing and what is best for my business and clients” (stock agent)
* “Ensure less stress in animals (pH) and vaccination is correctly placed”
* “Buy some scales”
* “Look at vaccination sites for problems
* “Informative speakers and interesting content”
* “Plenty to think about not sure what I would change yet”
* “Well done at workshop there is lots of information and lots of discussion”
* “A great event, very beneficial to producers and industry partners”

Following on from the pilot further topic content was developed and an eLearn is intended to be produced. This product would be well placed as a feeder event for the MLA PGS SLP *Meeting the Market* to raise awareness and knowledge before undertaking skills-based learning activities.

### Output C) ‘*Shortcuts’* animal health video series

A series of short videos (< 90seconds) addressing animal health conditions of sheep that impact on carcase quality and practical tips and tools for producers were produced as an alternative product. These videos will provide information to reach a wide audience while providing a long-term product which could be integrated into the face-to-face Lamb Supply workshops in the longer term

The topic areas were selected based on processor interviews and the National Sheep Health Monitor projects findings include lung worm, bladder worm, sheep measles and hydatids, liver fluke, cheesy gland, arthritis, pneumonia and pleurisy, bruising and injuries, vaccination lesions and grass seeds.

The *Shortcuts* video series is a collaborative output of the MDC EID enabled project and the Red Meat Value Chain flagships “Optimising lamb value chains” project focusing on increasing producers awareness of animal health conditions that affect carcase quality and provide management options for eliminating and/or reducing its occurrence and impact. Eight animated videos of up to 90 seconds length were produced. The videos are currently available for use by Agriculture Victoria extension staff, to use with their client groups, through internal video streaming site. The videos are being made available for public distribution with an accompanying media plan.

## Deliverable 2.1.3 Lamb supply chain training package

Develop and deliver to 60 participants a learning package for the Lamb Industry to increase skills and knowledge in areas of the lamb supply chain, focusing on on-farm, processing and retail areas. Themes include technology and data management, regulatory requirements and identifying key stakeholders.

### Output A) Lamb Marketing Masterclass webinar series

The Optimising Lamb Value Chains and MDC EID enabled projects collaborated to deliver a four-part webinar series aimed at increasing producers’ knowledge of lamb marketing options. Originally developed as a face to face workshop resource package for service providers, piloted with two BWBL groups, the product was adapted to an online delivery format (Figure 4). Industry experts and producer champions were used to communicate key messages and provide experienced discussion. The product was designed as an awareness and knowledge building activity. Throughout the sessions, participants were directed to skills-based training such as Bred Well Fed Well, Lifetime Ewe Management, and the Lamb Eating Quality PGS SLP.

The four sessions are outlined below:

|  |  |  |
| --- | --- | --- |
| **Title** | **Guest speaker** | **AgVic facilitator** |
| Know your market | Tim Leeming | Tim Hollier |
| Know your customer | Edwina Toohey | Alice Ritchie |
| Know your product | Elke Hocking | Kate McCue |
| Know your value chain | Tom Bull | Kirstie Anderson |

180 registrations for the event were received from Victorian and interstate participants. On average 43 people viewed the live events. Due to the webinar series timing being held in November 2020, it was recognised that attendance may be low due to other commitments including hay making, grain harvest, extra daylight hours etc. The session recordings were circulated on the Monday post the live event to allow participants to watch at a time that was suitable for them. Viewing of the recordings has been generally much higher than participation for some of the live events (Part 1- 140 views, Part 2 -77 views, Part 3-36 views, Part 4 – 23 views).

Figure 4. Lamb Marketing Masterclass branding



Satisfaction rating for the series was 8.4/10 and 97% recommendation. Comments on what attendees would like more information about or are likely to do differently from the four webinars include:

|  |  |  |
| --- | --- | --- |
| find out more about Auctions plus | MSA registration for lamb, is it important for processors. | Look into Ramselect |
| weaning and developing a marketing plan | preferred breed for processors as you mentioned about the time for trimming fat | measure the noncompliance issues and get the feedback from processors |
| Undertake a Lifetime Ewe Management course. | where to get pH measurements | Discuss with processor what their plans are for feedback provision systems (LDL or their own?) |
| put thoughts on paper with our lamb marketing plans and firm up some timelines | Why should I chase eating qualities (as a ram breeder) when a premium for eating quality seems a very long way off? | Check out the solutions to feedback |
| What are the things that the farmers I work with are focused on regard lambs and sheep | DNA Markers against ASBV genetic figures | Would have liked a bit more information on key profit drivers of prime lamb enterprise. kg/ha approach vs kg/head. |
| Ewe management and fertility | Where and how to start developing relationships with customers | Marketing options, personal marketing plans, thanks |
| grazing management & feed budgeting | Case studies if there are any on success stories of farmers working with processors towards improving quality on-farm. | do more weighing |
| Better utilise EID's and marketing plan | would be interested to gain more knowledge on latest technologies for carcase assessment. Thankyou | Tighten lambing dates up to make lambs a more marketable and even weight/age. |
| Marketing options. Have been a bit jaded by the over the hooks sales"." | spread of risk percentages ie weighting risks |  |

The webinar recordings will be used for audio and visual content that can be incorporated into the Lamb Supply Chain eLearn currently in development and future communication products.

## Deliverable 3.1.1 Pregnancy scanning contractors survey

Survey pregnancy scanners and other contractors currently operating in Victoria and report on the barriers to providing EID enabled information

Pregnancy scanning contractors based in Victoria and interstate contractors that operate significantly in Victoria were contacted by phone to participate in the survey in late 2018. Survey questions were largely qualitative, designed to determine the number of contractors offering EID services, the scope of their EID service offer and identify any issues and possible solutions during their adoption of EID technology.

Twenty-eight contractors were surveyed directly by Agriculture Victoria staff. Five contacts were no longer operating with twenty-three full surveys completed. Eighteen contractors offered EID services, representing 78% of all operators. From the five contractors not offering services, one indicated they will add this service if requests from clients increases, another that they borrow EID equipment to use for clients that request the service, another that they intend to and are waiting for the data collection systems to become more reliable before adopting the technology two operate as sub-contractors for a larger company and direct clients to the other contractors within the business that have EID equipment.

The survey results showed that Victoria is currently serviced by a significant number of pregnancy scanning contractors that offer individual animal recording using RFID technology. In general, these operators are skilled in the collection and management of individual animal data. Scanning contractors are considered a source of technical expertise by producers and could be used to promote the benefits of individual animal records using EID tags.

Barriers to adoption by contractors included the cost of equipment, limited demand from producers and lack of technical skills. Issues with tag read range and missing or non-reader tags were also identified, along with concerns over quality of identifying multiple foetuses based on timing of scanning relative to joining activities.

Several recommendations are listed with the Situation Report (Attachment 3) including development of educational material for both producers and scanning contractors to improve the quality of animal data being collected and further communication with scanning equipment suppliers to develop technical guide for optimising equipment setup and use. The key findings and recommendations of the situation report include:

1. Development of educational material for producers and/or scanning contractors containing the following information:

* Optimising scanning accuracy of multiple foetus detection with scanning date relative to conception date (focus currently is on joining/rams removal date rather than more precise conception date)
* Optimising accuracy with ewe preparation, time off feed and water, with reference to Victorian and National animal welfare standards.
* Optimising individual animal records, checking for tags, drafting for mixed age (2017 drop and older).
* Productivity gains with lifetime records and combining scanning data with other traits e.g. condition score before joining, pedigree, litter weight weaned etc.

1. Research into USB button for collection of other traits. This may have applications for recording other traits such as condition score.
2. Work with data collector manufacturers to develop protocols for sessions with EID and non-EID animals. Communicate these to scanning contractors.
3. Publish updated pregnancy scanning contractors contact list on the Agriculture Victoria website.

## Deliverable 3.1.2 OneScan Extension Plan

Design an extension product that increases the knowledge and skills of sheep breeders and pregnancy scanning contractors to collect accurate individual animal records that underpin lifetime reproductive performance analysis.

### Output A) OneScan Communications and Extension Plan

The OneScan Communications and Extension Plan (Attachment 5) was created as a result of the barriers identified in the pregnancy scanning contractor’s situation report. The aim of OneScan is to consider the range of communication channels and technical content available to extension service providers that can be used to increase producers and contractors awareness and knowledge of using EID to record reproductive data and subsequently collect accurate data in an efficient manner.

A number of the opportunities identified in the plan were undertaken and are listed below.

### Output B) TechNote

An Agriculture Victoria Technote “Improved collection of multiple foetuses and optimising the use of EID” (Attachment 6) highlighting the benefits of identifying multiple bearing ewes and recording pregnancy scanning data using EID, including tips for increasing data collection accuracy and efficiency and . The content was also used in an article for the MLA Friday Feedback eNewsletter and the Agriculture Victoria SheepNotes publication. Key messages include:

* Scanning for multiples and managing nutrition can increase ewe and lamb survival.
* Recording pregnancy scanning data of individual ewes provides a backup in the event that single and multiple bearing mobs are mixed together
* Lifetime reproductive data can be recorded using EID and used to select high performing individuals
* The collection of accurate and quality data requires preparation and communication with the contractor. This high value data is often recorded at little cost to the producer.

### Output C) Field Day

The “Increasing Total Productivity in Sheep” field days held at Greta and Dunkeld in November 2017 and May 2018 were attended by 230 producers and 24 service providers. Attendance at the pregnancy scanning contractors’ concurrent sessions was very high, with significant engagement and discussion from the audience. Based on this positive feedback a session plan for a OneScan Field day was developed and two events scheduled in November 2019 and early 2020 in the south west and south east regions of Victoria respectively. These were cancelled due to the 19/20 Victorian bushfires and COVID19 restrictions on public events during 2020.

### Output D) Webinar series

The *EID enabled ewe’s* webinar was delivered in collaboration with The Mackinnon Project PDS co-ordinator and host site livestock managers and featured livestock consultant and data manager Elise Bowen of Sheep Data Management in October 2020. The webinar discussed the benefits and opportunities of monitoring ewes body condition score and weight and the use of individual animal data to make management decisions such as preferential feeding and classing.

63 attendees registered for the event attracting a large number of service providers and leading producer advocates (48 livestock managers and 15 service providers). Evaluation of the event which ran 1 hour over time due to extended discussion resulted in participants rating the event 8.8/10 and providing 100% recommendation. A recording of the webinar is available (Attachment 14).

Practice change indications included:

* Calculating the Standard Reference Weight of ewes
* Calculating the conception / condition response for their flock
* Monitoring individual body weight and/or condition score
* Recording individual pregnancy scanning results
* Setting weight targets for ewe lambs

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## Deliverable 3.2.1 Advisor focus groups

Conduct six focus groups with the supply chain (livestock agents, lamb finishers and breeders) to identify the information needs of each participant and barriers to information flow within the supply chain

### Output A) Focus groups x 6

Due to COVID19 restrictions the focus groups were re-designed as a phone survey. Participants were asked a series of questions relating to the way they purchase and sell livestock eg saleyards, online, private and the information that they currently receive for a variety of transactions in the supply chain including seed stock, finishing and consigning to processors. They were then asked what information they would like to have included in transactions. Thirty-two responses were collected representing 24 lamb finishers and breeders and 8 livestock agents. This response rate is equivalent to expected attendees for the planned focus groups (4-8 per event).

For most transactions between breeders, finishers and processors that main source of animal information is recorded in the National Vendor Declaration, with some information being provided in National Sheep health Statements although most respondents commented that they had infrequently supplied them. Transactions using the AuctionsPlus platform had a higher level of information about the animals. Only seedstock sales frequently involved the sharing of information about individual animals including performance and pedigree data. Feedback from processors was provided but usually only contained carcase weight and fat score. One respondent had received a phone call form a processor regarding animal health issues and was supplied images of the carcases affected.

When asked about the data that is most important to their business, the majority (75%) responded that animal health data either as supplied by sellers or as feedback from processors was important i to manage livestock husbandry activities.

When asked about what data they would like to receive, many commented that individual animal data from processors would be useful for measuring performance against breeding objectives, supporting provenance and quality claims and to be able to get this information as a breeder who may not have finished the animals but has invested in the genetics and early life performance.

Another respondent commented that they run an EU accredited cattle herd and that they request evidence of EU status and NLIS Lifetime traceability for their potential purchases and would consider doing the same thing for sheep if a market was available.

Based on the survey findings animal health was used in Deliverable 3.2.3 Feedback model.

## Deliverable 3.2.2 Advisor and service provider capability building

Provide targeted training/support to improve capability of three livestock agents/agencies and three advisors in the collection, use and transfer of EID enabled information

### Output A) EID enabled decision making webinar series for livestock consultants

Throughout June, July, and August 2020 the project delivered a webinar series for livestock advisers in partnership with the major EID equipment and individual animal management software suppliers. A very high level of registrations from the invitation list were received, spanning a wide range of skills from those with decades of experience gained during the SHEEP CRC eSheep program and including a number of younger attendees from the MLA funded livestock advisor internship program. Participants represented independent advisors and those aligned with larger consultancy agencies for example Meridian Agriculture, Birchip Cropping Group, Livestock Logic and NextGen Agri. Eleven sessions were presented with 7 suppliers to an audience of 43 participants from across Australia and New Zealand. Participants gave the webinar series an overall satisfaction rating of 8.2/10 and 100% would recommend the series to others. Figure 5 includes spatial information of participants and EID technology companies included.

 Traditionally educational resources for EID equipment and software is aimed at the producer level, lacking the technical specifications that more advanced users are looking for. With limited time and access available for professional development, often advisors are aligned with a single supplier, becoming a specialist in that companies range of offerings and recommending this to their clients. However, this solution may not suit client’s specific operation and needs, which can lead to frustration and discontent as the client is responsible for paying the capital costs and using the equipment. For Agriculture Victoria, engaging with service providers such as livestock advisors can be challenging due to the time constraints and costs associated with travel and time away from income earning activities.

The deliverable objectives included:

1. To provide training to livestock advisors for use of EID to enable better decision making with their clients. To do this, advisors need to be aware of the range of equipment and software available including how to access support services, how to setup seamless systems for data transfer between themselves and clients.
2. Demonstrate the Define Your Data process to livestock advisors including the important of business goals and breeding objectives supporting data collection planning.
3. Provide a product that was tailored to service provider’s needs, allowing for discussions to be more technical, sharing of experiences with technology and development of technical specialist networks or informal community of practices.

Participants were sent a pre-recorded video introducing the Agriculture Victoria MDC project and DYD process. During the registration process of the majority of advisors requested that the events be recorded for later viewing either because they could not attend that session or to review later on.

The suppliers were asked to nominate two presenters, preferably with a product design/development and customer support roles. They were also provided with a session template to ensure key topics were covered. On the week of delivery, a practice session was held to ensure they were experienced with the webinar software and to provide feedback on their initial presentation. After the event suppliers were shown the qualitative evaluation data relating to their presentation "What is the most exciting thing you have seen today?" and "What are you most likely to use?" as well as a general discussion about the session, this debrief was greatly appreciated by the companies.

Outcomes

Livestock advisors:

* are able to recommend a range of products that meets their client’s individual needs.
* were offered practice datasets and opportunities to road-test new products and features
* Regularly attended sessions and sent emails/SMS messages to confirm they will be watching
* Have developed better networks with supplier representatives

Suppliers:

* Developed skills with design and delivery of webinars, allowing for discussion and interaction
* Better understand the need of livestock advisors
* Many are now delivering webinars using these new skills
* Increased client list

**Figure 5. EID enabled decision making – Webinar series evaluation**

## Deliverable 3.2.3 Feedback model

Facilitate the linkages, collaboration and development of a model that enables sharing of animal performance (live and carcase) back along the supply chain to inform participants (lamb finishers, breeders and the advisors) and pilot the information sharing model

### Output A) Model pilot activity

The use of NLIS (National Livestock Data Link) and electronic Identification (EID) offers the opportunity to facilitate greater data flow across the lamb supply chain. EID provides the tool for automated data collection and feedback systems. These feedback systems provide the opportunity to enhance essential biosecurity information and timely data to producers for on farm decision making.

In the absence of a fully automated processor to producer feedback system this project drew upon case studies and pilots that have simulated feedback models. Personal communications with producers, processors and the wider industry was also used to draw the following summary and recommendations around information linkages, feedback and sharing of data.

During the project it was identified that data collection, analysis and interpretation is a complex and varied process. This is due to the many variables on each individual farm, processor and other segments of the chain, and the objectives of each of these businesses.

Specialised EID software programs and information sharing platforms will provide the tools necessary to collect and provide feedback throughout the supply chain. A national approach such as Livestock Data Link (LDL) would provide the added benefit of standardisation and minimum reporting requirements.

Pilot Producer feedback systems

Individual carcase feedback systems installed by processors utilise electronic identification of sheep and information technology systems to track the animals from slaughter to the boning room. Individual carcase tracking systems are expected to provide accurate and reliable methods to record, monitor and maintain the tracking of individual carcases. The technology to do this uses Radio Frequency Identification (RFID) to allow for the traceability and to minimise human error. Recording of the RFID number encoded in each electronic NLIS (Sheep) tag, and the accurate correlation of this number with the date of slaughter and Hot Standard Carcase Weight (HSCW), as well as fat depth is a minimum requirement in Victoria. Added information such as, retain information, sex and dentition can also be added if these parameters can be recorded. It is a Victorian requirement that this computer file is then uploaded to the NLIS database.

Information in files may be used by Agriculture Victoria for biosecurity, food safety and market access purposes. Processors that are installing systems can collect individual carcase feedback to provide to producers using systems such as the NLIS.

In anticipation of receiving automated feedback from Processor to Producer, Agriculture Victoria has undertaken pilot case studies as a ‘proof of concept’ investigation into some of the possibilities that could be achieved through implementation of feedback systems which provide linkages for added information flow.

On farm case studies

The case studies were approached by asking the producer to identify their business goals and what they wanted to investigate to improve, benchmark or ‘fine tune’ their system.

Businesses identified a range of areas of interest which included the following investigation areas.

• Assessing animal performance in a feedlot, how to manage the tail end.

• Using EID to help evaluate sire performance

• Is it profitable to sell heavy lambs outside of optimum market specification?

• Starting out with EID for on farm decisions

Through working closely with the case study participants Agriculture Victoria Red Meat Value Chain Extension Officers identified that there was a wide range of skill level when dealing with EID technology. Some businesses required more extensive support to get set up with their equipment, identify what needed to be recorded and to start recording information. The process of working with producers and processors confirmed that feedback can be collected and utilised on farm however there is need for support in how to do this. It is clear, ongoing extension and support would need to be provided to industry in this initial implementation phase while industry develops a skill base to draw upon.

Quotes from case study participants interviewed, (grouped by response).

Price motivation:

*“Basically, this project and the tracking of lambs from farm to box is important to our business because it allows us to get paid on what we actually produce and potentially allows me to make adjustments to management to achieve the desired product and therefore drive profitability.”*

*“Utilising EID technology I was able to link individual carcase hook tracking at the processor with my on-farm data to identify what influences my returns”.*

Identifying limitations:

*“Data management still remains our biggest hurdle across all of our EID use, and carcase data just adds to the complexity. We are working on it, but it is still an issue. I just don’t have the time, and it does take some time to learn how to use a new piece of software.”*

*“What we have found is the importance of trying to remove the variability in data. Once you have decided what needs to be recorded you need to ensure that it is being done in a timely manner, consistently and that way quality data is maintained.*

*“I am really interested in this technology and bought equipment, but it has sat in the cupboard as I didn’t know where to start.’*

Processors

Economic analysis and return on investment from individual carcase feedback from processor to producer. Victoria has several processors committed to installing an individual carcase tracking system. Communication with these processors initially identified the following reasons for investment in this technology and data management systems:

* benefit their business as it will provide them with another mechanism to provide product integrity and assurance in the form of improved product traceability and an added food safety measure to their consumer.
* benefit their network of producers with individual carcase feedback and information in an easily accessible and timely format, enabling stronger linkages from paddock to consumer
* benefits in processing efficiency gains, inventory management

Economic modelling of value adding to individual carcase tracking by capturing disease and defect information was done. Results of this modelling examined the potential return on investment of implementing an EID enabled, fully automated individual carcase tracking system with added disease and defect feedback provided to producer. The assumption was made that by providing feedback of this type it would reduce the incidence of the disease or defect. The modelling focused on one condition, grass seed contamination. This was chosen in consultation with processors as it is identified as the major animal health issue experienced in plant. Table 8 represents results of the economic analysis. For example, if the prevalence of medium to heavy grass seeds contamination was 2.5% of all carcases processed; the additional cost or lost income from grass seeds was $25/head; and the feedback program resulted in approximately a 20% reduction in the incidence - then the processor would achieve approximately a 12% p.a. return (NPV = $0) on investing in an individual carcase feedback program.

Whilst modelling of this produces a positive result it is noted that to achieve these efficiency gains there would also need to be an education and extension package for industry to facilitate on farm change to produce the desired results which has not been factored in.

Since this modelling was completed some of the processors have stalled in the installation and operation of their individual feedback systems Discussions had with these processors cited the following reasons as to the delays experienced.

* Need for specialised skill development in the ongoing operation and maintenance.
* Personnel changes/skills lost.
* Technology failure
* Lost motivation due to focus on other issues and equipment failure.
* Cost pressures and the price of sheep.
* COVID-19

Table 8. Economic Scenario Analysis (Net Present Value method) for a hypothetical Processor to invest in an Individual Carcase Feedback system for Producers. NPV = thousand dollars.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Reduction in Incidence from Feedback Program (%)** | **Prevalence of Medium to Heavy Grass Seed**  Breakeven levels at 12% p.a. discount rate  **(% of carcases processed)** | | | | | | |
| 1.00% | 1.25% | 1.5% | 1.75% | 2.0% | 2.5% | 3.0% |
| 10% | -$470 | -$440 | -$410 | -$380 | -$350 | -$290 | -$230 |
| 20% | -$350 | -$290 | -$230 | -$170 | -$110 | +$5 | +$125 |
| 30% | -$230 | -$145 | -$55 | +$35 | +$125 | +$300 | +$480 |
| 40% | -$110 | +$5k | +$125 | +$245 | +$360 | +$600 | +$835 |
| 50% | +$5k | +$155 | +$300 | +$450 | +$600 | +$900 | +$1,195 |

Issues, Challenges and Recommendations to Developing systems that Promote Linkages, Collaboration and Sharing Information are described in Table 9.

Table 9. Date sharing systems - the issues

|  |  |
| --- | --- |
| ISSUE | CHALLENGE / RECOMMENDATION |
| Need for new skills – | Both producers and processors engaged with for this summary have identified the need for upskilling and developing new skills to deal with EID technology and data management. |
| Time investment- | Can be hard to invest time in creating linkages, collaboration and sharing of information. It takes time and investment to build trust and develop mutual benefits. Often these benefits are not immediate which can limit investing time. |
| Cost challenges- | Cost is a challenge across all segments of the feedback supply chain. Cost for skill development, time costs, technology costs, downtime for installation costs etc |
| Barriers - | Further investigation into ‘why’ individual carcase tracking has been delayed would be beneficial. Analysis of barriers to adoption for both producers and processors. Why is this technology not being used to its fullest potential? There is opportunity for cross-sector comparisons - beef industry could provide some parallel analysis here. What motivates the people/businesses that have adopted the technology and are using it? What is stopping people/businesses from fully implementing systems? Why are they getting ‘stuck’ halfway through the journey? |
| Business models – | different business models could provide a barrier or facilitate the use of feedback systems. For some a national platform and approach could be an issue for processors as they fear losing differentiation. For others this may be a catalyst in ensuring success of their adoption of feedback systems. |
| Data – | How is data integrity being managed? Is the data being collected quality controlled and consistent standardised methods of collection being adopted across the industry? |

Closing comments

The set-up, maintenance and ongoing support of effective reliable feedback systems is complex and not easily replicated across industry. The technology available alleviates some of these strains however there is a lag in upskilling individuals and businesses to be able to readily adopt these systems and utilise to their fullest potential. Further investigation is required to pinpoint support needed and feasibility of providing such support to individuals and businesses and subsequently deliver the benefits of supporting the sheep industry to adopt feedback and information sharing platforms.

# Conclusion

The EID enabled project has promoted the use of precision individual animal management which will allow producers to select high performing animals, leading to increases in the productivity of their enterprises. Livestock consultants and contractors are an integral part of the support system for producers to successfully adopt EID enabled data, facilitating discussions when defining business aims including breeding objective, advice in relations to equipment and software investment and support during collection and analysis of the data. Many Victorian processors are part-way through development of systems that will feedback individual animal data to their suppliers, and also to their customers. A supply chain that can communicate and share information is more likely to become a value chain, increasing the benefits for all participants.

### Producers

Outcome 1 “ Producers are motivated and capable of seeking, interpreting and taking action based on information enabled with electronic identification of individual animals” was achieved by the Define Your Data training package framework incorporating products that focused on building producer awareness/knowledge, skills and attitudes to drive adoption. *The DYD cycle* provides producers and service providers with a pathway that identifies the aims of the business and the data that is required to measure success. This process is critical to creating the value-proposition of the data, and justification for the investment in capital and labour resources to collect and manage data. The *EID101* workshop and eLearn package provide educational support for producers and participants in the broader industry to develop fundamental knowledge of the technology used in EID enabled systems. This can then be implemented in a group-based learning environment by participation in the *DYD SLP* by developing a breeding objective, creating a data plan, collection quality data and analysing results to measure performance.

The DYD training package focused on the potential productivity benefits of individual animal data, with the NLIS database training addressing producer knowledge of traceability requirements and skills using the NLIS database to record animal movements. This increased data entry provides benefits to the industry for efficient emergency animal disease responses, meets current domestic & export market requirements and will build new market opportunities, such as Lifetime Traceable lamb.

Producers that are able to define their business objective and measure performance as a result of informed management activities are more confident in their business management skills and more likely to take opportunities when available for their production system. These businesses are likely to be more adaptable, resilient, and sustainable in the long term.

### Processors

Outcome 2 “Increase supplier/processor understanding of their feedback and compliance to market specifications and improve their skills to implement change in management practices to increase the rate of compliance” required extensive consultation with supply chain participants and the development of educational material and communication products. Suppliers to processors were supported to increase their ability to choose a production system that suits their business goals and environment, understand the customer (processor and retail) preferences to allow flexibility in operations, how to select animals that meet market specifications and how to create value chains through marketing opportunities.

Processors were supported to meet the NLIS scanning compliance requirements in two ways with assistance provided by the project team to support the implementation of scanning systems on-site and through the delivery of NLIS workshops for producers. This has enabled the processors to increase the proportion of animals that are consigned correctly meeting electronic identification and movement document requirements.

The provision of individual animal feedback from processors to their suppliers is still in the development phase, with interest from all supply chain participants in progressing to functional systems. During this time, communication between the groups will be essential to ensure that the data provided is of benefit to the supply chain and importantly is provided in an easily accessible format that can be incorporated into business decision making processes.

### Contractors

Outcome 3.1 “Contractors collect and provide accurate animal information to producers in an electronic format” created the opportunity to demonstrate to movement of individual animal data within the supply chain in a lateral direction. Pregnancy scanning contractors that offer an EID enabled service in Victoria are widely available however there is large variation in the skill level of both the contractor collecting and handling the data and the producer receiving it. Given the significant production gains achievable when managing ewes according to pregnancy status within a production cycle, and selection of highly reproductive efficient ewes across cycles is imperative that the accuracy of this data is high. The OneScan communications and engagement plan provides a number of activities targeting awareness, skills and adoption to promote the collection and use of accurate pregnancy scanning data.

There are a number of other contractors in the lamb supply chain. Muscle and fat ultrasound scanners and fleece traits are regularly offering EID enabled collection for their stud clients, with low animal numbers and high skills in data handling by both parties resulting in high accuracy data. Lamb marking contractors offering EID services in Victoria were not identified during this project, however it is likely they will emerge in the future. Given this will be the first point of data collection for most commercial animals, and may contain lifetime traits and production data that can be used for selection of both the animal and its parents, this data will be of value in many systems.

### Service providers

Outcome 3.2 “Farm advisors such as consultants provide accurate informed advice and support services to producers in the collection, analysis and use of individual animal information” is critical to the successful adoption of EID for many producers. In Victoria there is limited availability for producers seeking this type of professional service, often having to use interstate suppliers and use of remote telecommunications. The services offered by consultants is often specific such as EID technology skills, data management or business consultancy, there are few suppliers that provide the end-to-end integrated solution of setting up data collection systems to meet the business objective. The ability level of livestock consultants using EID is increasing, however like most skills it will require ongoing professional development as manufacturers update hardware and software, or new technology and products become available. An example of this is cloud-based data management, commonly in other data storage systems such as financial and farm management but increasingly being used by manufacturers for individual animal data. Internet of Things (IoT) systems that use electronic NLIS tags are also likely to increase over time.

As identified by the livestock consultants focus group, offering the data collection and data management services without the business objectives first being defined usually results in data warehousing rather than data driven decision making, and presents a high risk of capital and labour cost without returning benefits to the business. Data collection for all farm enterprises, should be defined by the information needed to measure and manage the business goals.

## Key findings

As reported, the significant engagement with supply chain participants and stakeholders has provided insights and industry intelligence that was used to design the projects outputs and can also be used for future project proposals and program delivery. When considering the KASA principles of adoption and practise change, whilst the awareness of EID and its application was high, likely linked to the recent implementation of mandatory electronic NLIS for sheep in Victoria. However, the knowledge and skills to use the technology and manage then interpret data is low. The aspiration or drive of producers and service providers to use EID enabled individual animal data is highly variable, often linked to the individual either being an “innovative / early adopter” type or associated with and understanding of how the data will drive production and profitability within their business or for their clients.

* Interest and openness to engagement across supply chain participants is high when promoting activities related to EID enabled individual animal data. On-farm productivity gains aligned with reproductive efficiency, animal selection and meeting market specifications can be achieved. However, the lack of progress with individual animal feedback from processors and affordable pedigree records for commercial operations has made capitalising on this interest difficult. Continued research and development of data capture and accessibility at various points in lamb supply systems that meet the requirements of individual value chains.
* Ongoing support from livestock consultants and EID technology manufacturers in the collection and use of accurate data will facilitate successful adoption. Developing livestock consultants that can advise producers on how to define business and breeding objectives, create data plans and use EID enabled data to achieve their goals will promote successful adoption.

## Benefits to industry

THE MDC EID enabled project has delivered over 100 engagement activities in its three-year period, attended by 1500 farmers and 200 service providers. Additionally, several legacy products were created that can be used to support lamb supply chain participants adopt the use of EID enabled individual animal data within their businesses. These include the *DYD* and *EID101* workshops, *EID101* eLearn, *Lamb Marketing Masterclass, EID-enabled Decision Making* and *EID-enabled ewes* webinar recordings, *OneScan, Short cut video series,* communications plan, technical notes, case studies and situation reports. These products have and can continue to be used to inform and promote awareness of EID technology and skills for producers and service providers

A significant output of the project has been the extensive amount of collaboration undertaken with supply chain participants and industry stakeholders. These relationships and understanding of each other’s business needs underpin the motivation for participants to share data along the supply chain.

# Future research and recommendations

Future R&D

* On-farm: development of technology that allows cost-effective determination of pedigree to allow for animal selection that results in genetic gain.
* Processing sector: development of commercial animal health feedback. This will deliver animal welfare, productivity and financial benefits to producers and processors.
* Processing sector: development of carcase tracking systems to underpin individual animal feedback and kill-chain efficiencies. Research and development of ways to add value to EID enabled individual CTS.

Extension/Education

* Producers: Continue with NLIS database training to new and existing livestock managers. This skill development will deliver extremely high benefit to industry and is endorsed by past participants.
* Producers: Facilitate EID hardware and software systems training that includes more integration with manufacturers and service providers.
* Producers: Facilitate activities that promote the development of business objectives and goals.
* Service providers: Facilitate professional development opportunities for livestock consultants maintain relevance with reviews for new technology and data management systems, supply chain programs. Example include workshops and establishing a community of practice.

Project insights

* The key learning or insight of this project was the importance of supply chain participants defining their data needs ensuring relevance to their business objectives. This is vital to ensure that the value proposition is understood when considering the investment in capital and labour to collect and manage the data. Partnered with activities that build awareness, knowledge, and skills in a supported environment, ideally with service providers and consultants that are skilled and experienced will promote successful adoption of EID enabled individual animal data in lamb supply chains.

# References

Nil

# Appendix

**1.1.1 Define Your Data training package - framework development**

|  |  |  |
| --- | --- | --- |
| **ATTACHMENT**  **NUMBER** | **NAME** | **FILE** |
| 1 | 1.1.1 Desktop study |  |
| 2 | 2.1.1 Standard Operating Procedure – Carcase tracking system validation |  |
| 3 | 2.1.1 Producer to Processor Interactions Situation report |  |
| 4 | 3.1.1 Situation report - Pregnancy scanning contractors EID capability and capacity in Victoria |  |
| 5 | 3.1.2 OneScan Communication and Engagement plan |  |
| 6 | 3.1.2 OneScan Technical note – Using EID during pregnancy scanning |  |