



Final Report

Evaluation of traceability data in the lamb supply chain through to customers

Project code: P.PIP.0595
Prepared by: Andrew Grant
T-Provenance Pty Ltd

Date published: 27th June 2023

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

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

This publication is published by Meat & Livestock Australia Limited ABN 39 081 678 364 (MLA). Care is taken to ensure the accuracy of the information contained in this publication. However MLA cannot accept responsibility for the accuracy or completeness of the information or opinions contained in the publication. You should make your own enquiries before making decisions concerning your interests. Reproduction in whole or in part of this publication is prohibited without prior written consent of MLA.

Abstract

Traceability systems have the potential to deliver enhanced data usage across red meat supply chains and businesses. Alternative value creation has not yet been demonstrated and is not well understood across the Australian red meat industry. This value can be understood by analysing alternative uses for traceability data to deliver valuable insights, such as to enable consumer and farmer engagement on red meat products, streamline reporting and compliance requirements, such as chemical use withholding period thresholds pre-delivery of lambs to the processors and streamlining data capture for Livestock Production Assurance (LPA) and other certifications and accreditation. It is proposed that through the optimisation of traceability data, linked to on-farm management records, greater value to red meat supply chains can be provided through improved management of red meat brands and supply chains.

This project aimed to identify, evaluate and explain the data gaps and critical tracking events along the complete lamb journey and supply chain. This has been undertaken within the context of utilising the *Australian Guide to Implementing Food Traceability* (AGIFT), <https://foodtraceability.deakin.edu.au/agift-redmeatandlivestockguide/> and global data standard “GS1”, which is utilised by many food retailers (i.e. leading supermarkets) and food service organisations globally to enable product and traceability communication.

The project analysed the integration requirements of traceability relevant data sets from the lamb producer, and the MLA / ISC data platform, into Gundagai Meat Processors commercial supply chain. The project undertook analysis and exploration of potential value propositions and use cases, which can subsequently be built upon further for all participants in the Australian Red Meat industry.

Executive Summary

This is the Project Final Report (Milestone 7 for P.PIP.0595 – Evaluation of traceability data in the lamb supply chain through to customers) which has been led by traceability and sustainability solution provider Trust Provenance in collaboration with meat Processors, Gundagai Meat Processors, with a focus on their *Gundagai Lamb* brand, with support from Meat and Livestock Australia.

The Project was undertaken utilising the Trust Provenance traceability software platform “TPmeat”, and project aims were analysed through practical application and refinement of producer and processors needs. This allowed for proof-of-concept testing with lamb producers and a lamb processor’s data, and the implementation of a traceability system into the Gundagai Meat Processor’s facility and to their producer supply chain partners, with a view to ongoing application and increasing the Australian red meat industries reputation as a global leader on traceability and data integrity.

Traceability systems have the potential to deliver enhanced data usage across red meat supply chains and businesses. Alternative value creation has not yet been demonstrated and is not well understood across the red meat industry. This value can be understood by analysing alternative uses for traceability data to deliver valuable insights, such as to enable consumer and farmer engagement on red meat products, streamline reporting and compliance requirements, such as chemical use withholding period thresholds pre-delivery of lambs to the processors and streamlining data capture for LPA and other certifications and accreditation. It is proposed that through the optimisation of traceability data, linked to on-farm management records, greater value to red meat supply chains can be provided through improved management of red meat brands and supply chains.

This project aimed to:

- Identify and understand the traceability data gaps and critical tracking events required along the complete lamb supply chain from farm-to-processor-to-product supplied to the consumer, retailer, and food service sector.
- Utilise the standardised *Australian Guide to Implementing Food Traceability* (“AGIFT”), which is required to enable industry to develop valuable insights and value propositions. The AGIFT utilises global data standard “GS1”, which is utilised by most leading food service and food retailers globally.
- Analyse the utilisation and Application Programming Interface (“API”) linking with the Integrity Systems Company (“ISC”) data system.
- Engage with lamb producers to understand the preferred practices of capturing critical tracking events, engaging with processors and engaging with the ISC.
- Support the integration of these data sets from the MLA data platform, into a commercial supply chain and undertake analysis and exploration of potential value propositions and use cases, which can subsequently be built upon further.
- Create a no-code customer facing portal, which allows meat processors to provide unique product journey information on packaged red meat by utilising a universally readable (via

smart phone) QR code, and provide supporting information such as an About tab, and serving suggestions, recipes and other red meat information.

- Analyse requirements for integrating traceability systems into existing labelling and production information.

The project aims were addressed through the practical application of the Trust Provenance TPmeat traceability platform across the various aspects of the project, with a strong focus on the practical and commercial application of traceability for Australian lamb producers and processors.

The project explored the market requirements based on feedback from the MLA's Market Insights Team and the project team at Gundagai Lamb, and requirements for a sheep traceability platform, and how the data within the platform can create greater supply chain trust to optimise the supply chain customer relationship.

This project aligns with MLA's Strategic Plan Objectives: Decisions Informed Through Data and Insights, Beyond Today's Farm Gate, and Strengthening Our Core. Explicitly, by providing data collected along the supply chain via the TPmeat APP, that will create a shared understanding of the extent of substitution challenges that need addressing, and by capturing the data that will lead to insights that mitigate risks and increase our global competitiveness. The Market Access Science sub-program specifically addresses product integrity systems from processor to consumer, with a 2025 objective: 'Consumer trust in product is enhanced by the implementation of efficient systems and technologies to ensure product integrity to the end of the supply chain'.

The methodology used includes direct engagement with stakeholders, desktop research and analysis, proof-of-concept design and testing, scoping refinement, development of a Gundagai Lamb specific branding platform, and integrating with Gundagai Lamb's existing labelling systems.

Engagement included onsite visits to Gundagai Meat Processors, farm visits to lamb producers around the Gundagai region, engagement with personnel from the MLA Market Insights team, the Integrity System Company, customers of Gundagai Lamb, feedback and insights from work Gundagai Lambs have undertaken with food service, and engagement with other information systems suppliers to Gundagai Lamb.

The activities and findings from the Project have come at a significant time in the Australian Red Meat industry, due to growing national and global intensity in biosecurity and food safety (driven by Foot and Mouth Disease and Lumpy Skin Disease), continually growing consumer pressure for sustainable agricultural practices, and growing farming land prices and inputs costs (fuel, labour, other). Traceability helps to address each of these areas of growing "data demand".

The Key Findings from the Project include:

- The ISC API (application programming interface, which allows 3rd party software companies such as Trust Provenance, to "communicate") works well, and the ISC and API present a potential platform for collecting and sharing additional information between stakeholders.
- Some farmers are seeking additional information but in a low-touch, low-cost model (not farm wide information management systems).

- There are numerous critical tracking events (CTE's) along the paddock-to-plate journey which have application and value for consumers, processors and other stakeholders, in addition to those data collection points for ISC requirements.
- The identified CTE's align with the structure from AGIFT and the GS1 protocol.
- The lamb supply chain has several critical-tracking-events including lambing events, marking, drenching, transport, receipt, quality analysis, animal health, animal safety, processing, and transport. Some critical tracking events have different values to different stakeholders, for example, a consumer and a red meat processor may want to view different information.
- A low-cost, easy to use, scalable traceability solution that addresses multiple requirements (i.e. withholding periods, chemical use and inventory, place of origin) will help industry to collect, aggregate and utilise more information to align with consumers' growing demands.
- Collection of CTE's and a traceability system has many benefits including provenance marketing, biosecurity management, product recall, animal movement, on-farm practice analysis and optimisation, processor-producer engagement and analysis, and other value adding.
- Traceability crosses over (and is a pillar of) sustainability, such as recording and complying with chemical use. Collecting data points, where multiple uses are applicable, allows for producers and supply chain partners to collect once and use multiple times. Traceability systems could provide lamb producers with sustainability certifications/verifications, which will help with market access and provide other farm benefits.
- CTE's are created by different stakeholders and have different permissioning, different ownership and different viewing variations which need to be managed by all stakeholders in an equitable structure
- The Integrity Systems Company API essentially provides a bridge into and out of the ISC system. The API provides a unique opportunity and platform for sheep producers, processors, and other stakeholders to potentially link in data captured through on farm activities, The outcome of this is to streamline data capture, collation, and analysis to fulfil requirements for the ISC's Biosecurity Planning, Livestock Producer Assurance program (LPA) and national vendor declarations.
- The proof of concept identified baseline data points for showcasing Australian lamb to global customers.
- Engagement with participant lamb producers identified a willingness to capture additional data points primarily from an enhanced marketing perspective.
- Processors are required to integrate in specialty QR codes into their existing packaging and processing workflows. This has varying degrees of resource requirements depending on the complexity and flexibility of existing systems. Standalone labelling can also be utilised and integrated within existing workflows if a separate (additional) labelling system is implemented.
- Utilising a no-code branding solution gives the processor the ability to provide brand/ company information, suggested serving and cooking tips, to help in growing customer engagement.

The Key Outcomes of the project include:

- Clear understanding of the ISC API, such that information can be readily exchanged between software companies such as Trust Provenance and the ISC, meaning lamb producers can utilise Trust Provenance to streamline information management.
- Clear understanding of the Gundagai Meat Processors IT system, and links to meat quality software systems “MEQ Probe” and “DEXA”, such that information can be readily transferred to the Trust Provenance platform to align and link with information provided from the producer.
- Creation of the TPmeat light-touch APP for use by producers.
- Scoping of the prototype visualisation screen and procurer’s dashboard to allow streamlining and analysis of producer information into a specialised platform and partner offering.
- Utilising the TPmeat APP and platform helps to enable and initiate sustainability data capture, data storage, and data reporting for sheep producers
- Identification of sheep producers that want to partake in a traceability program to improve industry transparency, integrity, and reputation.
- Creation of the customer portal to provide packaged lamb unique information, an “About” section outlining the history of Gundagai Lamb and Gundagai Meat Processors and additional lamb information including an explanation of Gundagai Lamb’s unique selling propositions and other information.
- Standalone labelling provides a fast-track option for adding customised unique QR codes to packaged red meat produce.

The Key recommendations based on learnings from this Project include:

- API access: Streamlining access through an accredited solution program.
- Enabling adoption: Annual update of the Red Meat AGIFT documentation.
- Producer adoption support: such as the introduction of the current Sheep and Goat eID program, many producers will quickly move to traceability software as an additional cost. *Idea:* Provide a rebate model for traceability software for all producers with full on farm eID.
- Processor adoption support: Providing support for adoption.
- MLA/ISC Accredited Supplier Program: Create an Accredited Traceability Solution program, which traceability solution providers need to adhere to create a high level of integrity and confidence for producers. This accreditation should include alignment with GS1 and the NFF Data Code for producer data privacy.
- Sustainability Framework Data Collection: Streamline automatic data capture to populate the Sustainability Frameworks (for Sheep and Beef) and other documentation and requirement (ie LPA, Chemical use etc); this could be a component of the Accredited Solution Provider Program.

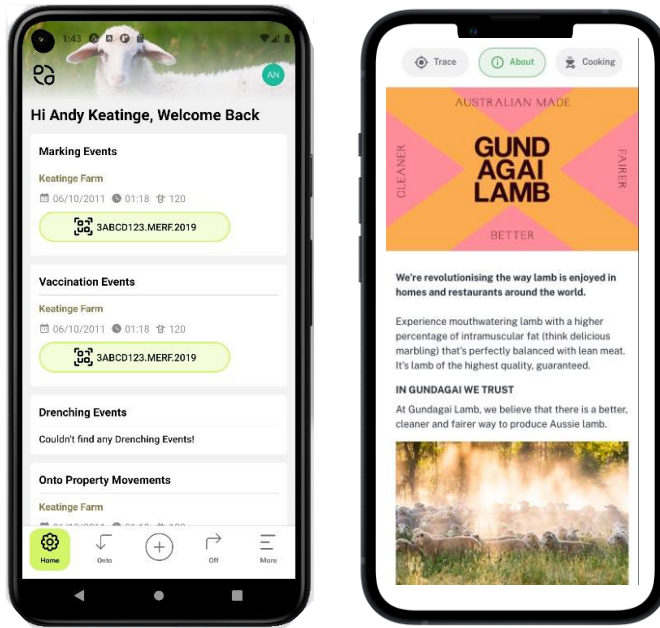


Table of contents

Abstract	2
Executive Summary	3
1. Project Aims, Analysis, Challenges, Findings and Solution	8
2. Models and Recommendations to Enable Implementation and Adoption of Traceability throughout the Australian Red Meat Industry	19
3. Conclusion	22

1. Project Aims, Analysis, Challenges, Findings and Solution

1.1 Project Aim 1

Project Aim 1 was to:

- Identify and understand potential traceability data gaps required along the complete supply chain from farm, carcass and product, to add value to Australian red meat.
- Undertake data analysis of all data, including movement data to create use cases.

1.1.1 Aim 1 – Analysis

- To identify data gaps, all data along the supply chain was analysed, which included identifying the following potential data points that have initial traceability value:
 - On-farm data: Sheep movements, sheep treatments, NVD/eNVD
 - Processor: Sheep receipt, eNVD/NVD data from producer, DEXA (dual energy x-ray absorptiometry) analysis, MEQ Probe analysis, animal health analysis, animal batch data, box data
 - Other components of the supply chain: Lamb/product dispatch and receipt, aggregation and disaggregation events (ie pallets split to boxes),
 - Other potentially attributable data: Secondary information which was discussed between producers, GMP and Trust Provenance included farm specific data such as Livestock Production Assurance data, certifications such as Global GAP and Certified Organic, and Carbon Neutrality, and Soil Carbon.
- The data is collected, stored and reported on, using various platforms including pen & paper, excel, proprietary software, farm management systems, traceability systems and combination between these formats.
- Due to the variation in platforms, there was limited consistency and no set standard or format across the platforms.

1.1.2 Aim 1 – Challenges and Findings

- Variations in the data format has issues when linking organisations along the supply chain. This linking of the same data but across different systems is referred to as “interoperability”. The ability for data collection from one supply chain partner ie a producer, to then be relayed in a data format which can “talk” to the next person in the supply chain, is a key requirement for robust, effective and economical traceability.
- There are various reasons for the format of data to vary, which include technical awareness, technical/digital competency, size of operation, blend of farming operation (ie livestock and broadacre V’s only livestock) and the need for multiple systems, costs of systems, system training requirements and support costs of software, corporate requirements of software, concerns in intellectual property and privacy of software,

ease of use of software, mis-alignment on value of capturing data / “what’s the point”, and use of data along the supply chain.

1.1.3 Aim 1 - Solution

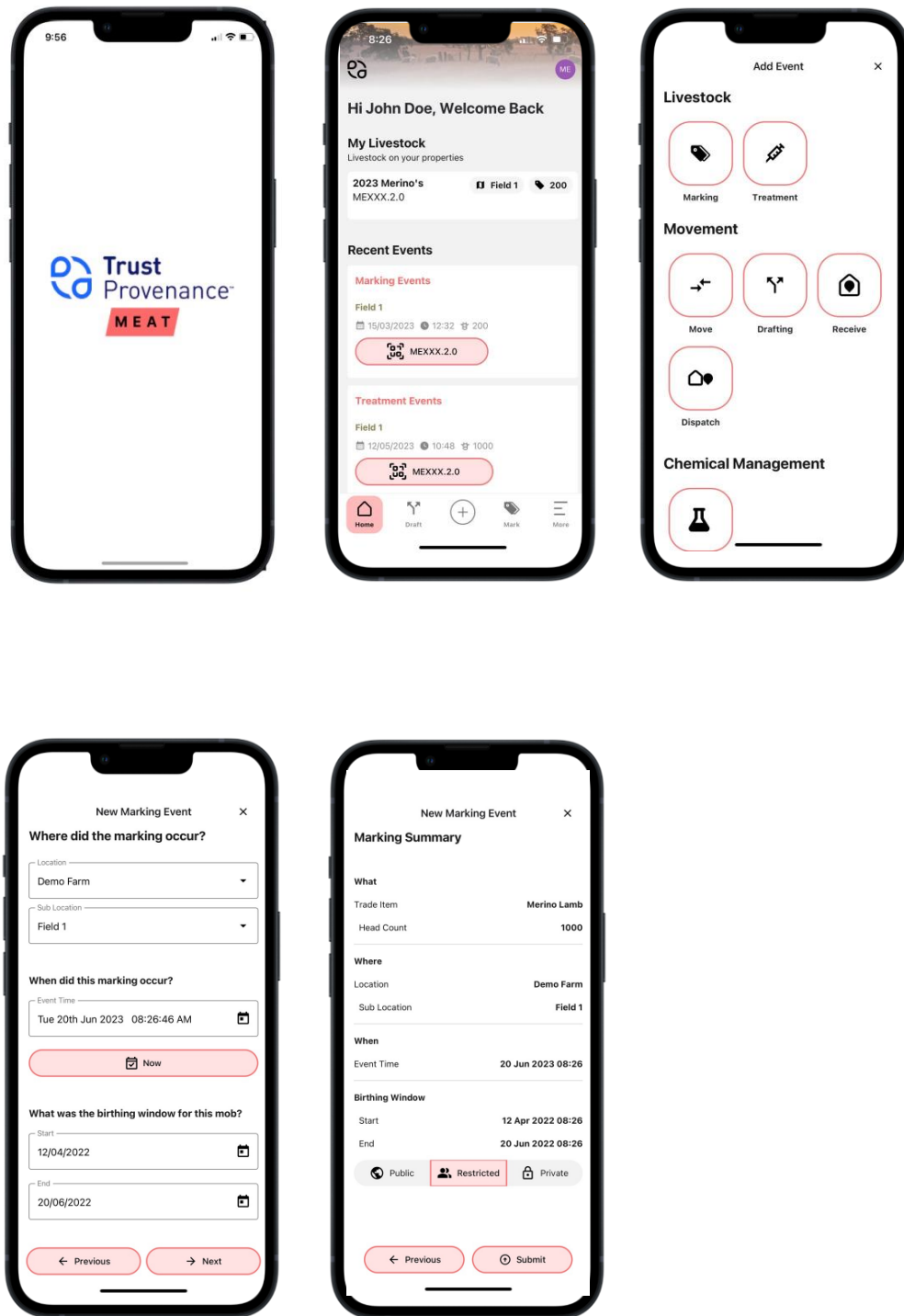
- The Trust Provenance TPmeat solution was reviewed to address the challenges outlined.
- An initial set of critical tracking events along the supply chain, were identified for the traceability prototype. It was decided that these would initially be focussed on critical tracking events which are customer facing, to provide marketing value to GMP’s Gundagai Lamb brand. These critical tracking events are outlined in table 1.

Table 1. Traceability prototype critical tracking events list.

End Customer - core CRITICAL TRACKING EVENT	Traceability Prototype CTE Ref	End Customer - KEY TRACEABILITY CATEGORY	Availability of data via API’s/ other	System	AGIFT and GS1 reference (Table A1)
Intra Muscular Fat measure	ProtoCTE1	Better	Raw data feed available. v1.0 will be via Triton API feed.	MEQ Probe API > Triton > API to TPmeat	PM CTE8
Lean Meat Yield measure	ProtoCTE2	Cleaner	Raw data feed available. v1.0 will be via Triton API feed.	Scott Technologies > Triton > API to TPmeat	PM CTE7
GLQ Score: Gundagai Lamb Score % measure	ProtoCTE3	Fairer	v1.0 will be via Triton API feed.	Triton > API to TPmeat	New CTE
Farm Location - GLN (global location number) recording	ProtoCTE4	Where did I come from	The farm mapped onto TPmeat and a CTE created. OR Data is entered via the eNVD (ISC API)	TPmeat Or ISC	PM CTE2 OFP CTE1

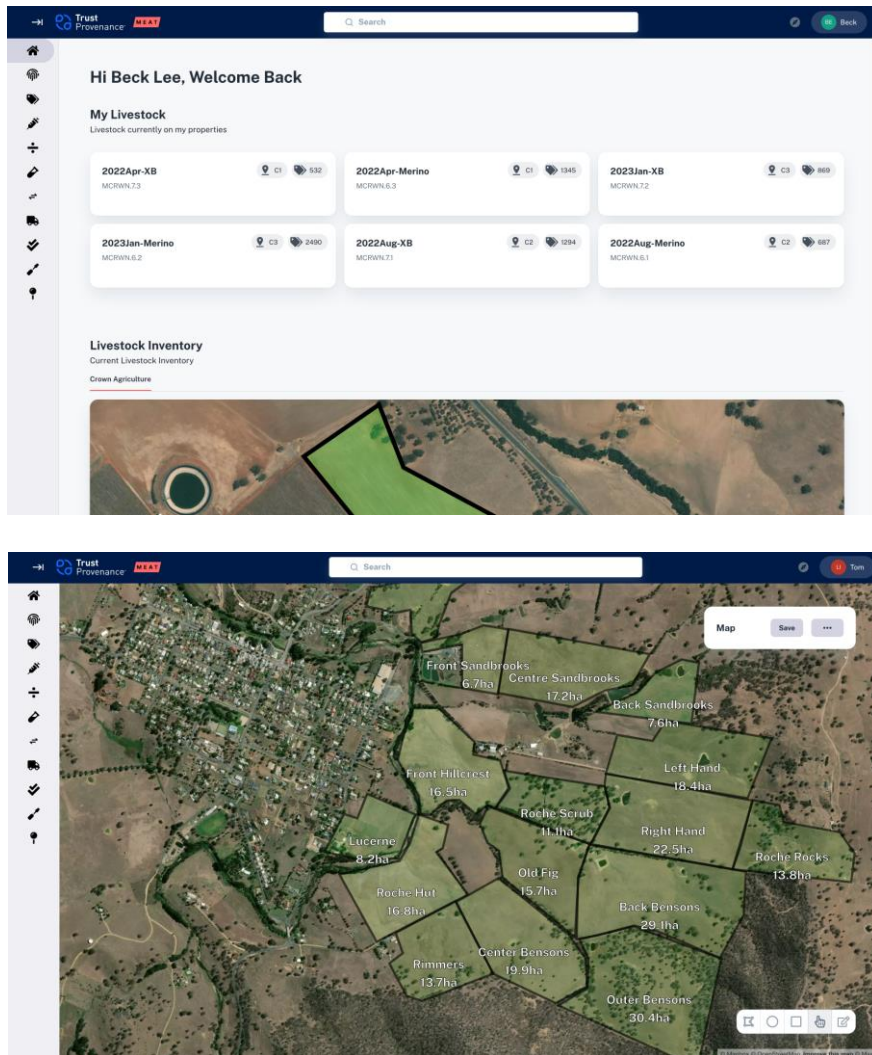
- Following the initial analysis, additional critical tracking events were identified that could be captured and viewing rights managed by permissions, such that consumers and processors see different levels of information.
- The critical tracking events identified were mapped into the Trust Provenance “TPmeat” traceability APP. An outline of the APP and the critical tracking events are outlined in Image 1 below.

Image 1. The Trust Provenance MEAT phone APP (TPmeat).



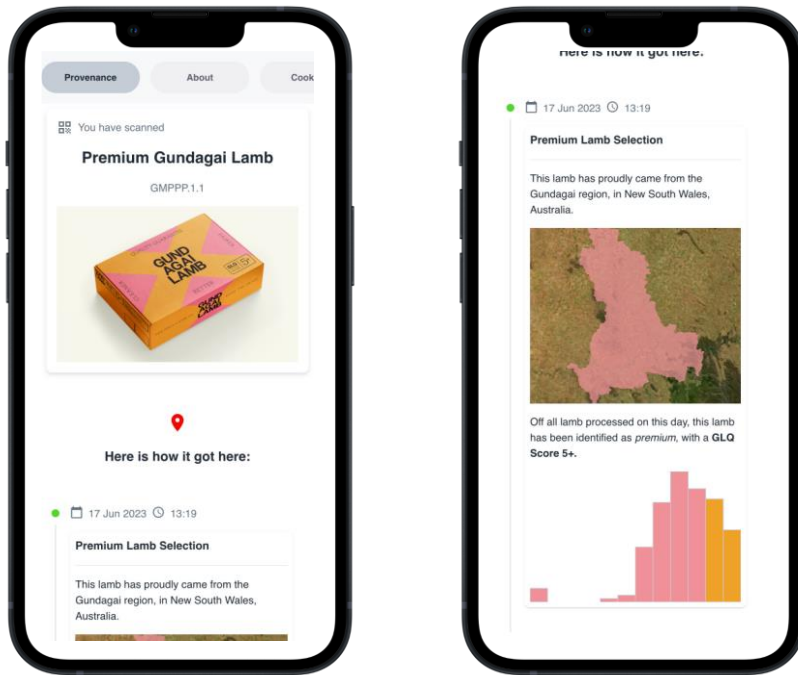
- Once critical tracking events are submitted, they are viewable via the TPmeat APP and website dashboard. This also allows the producer to look at the farm and see all information. Examples are in Image 2.

Image 2. TPmeat website dashboard showing events recorded and the farm map.



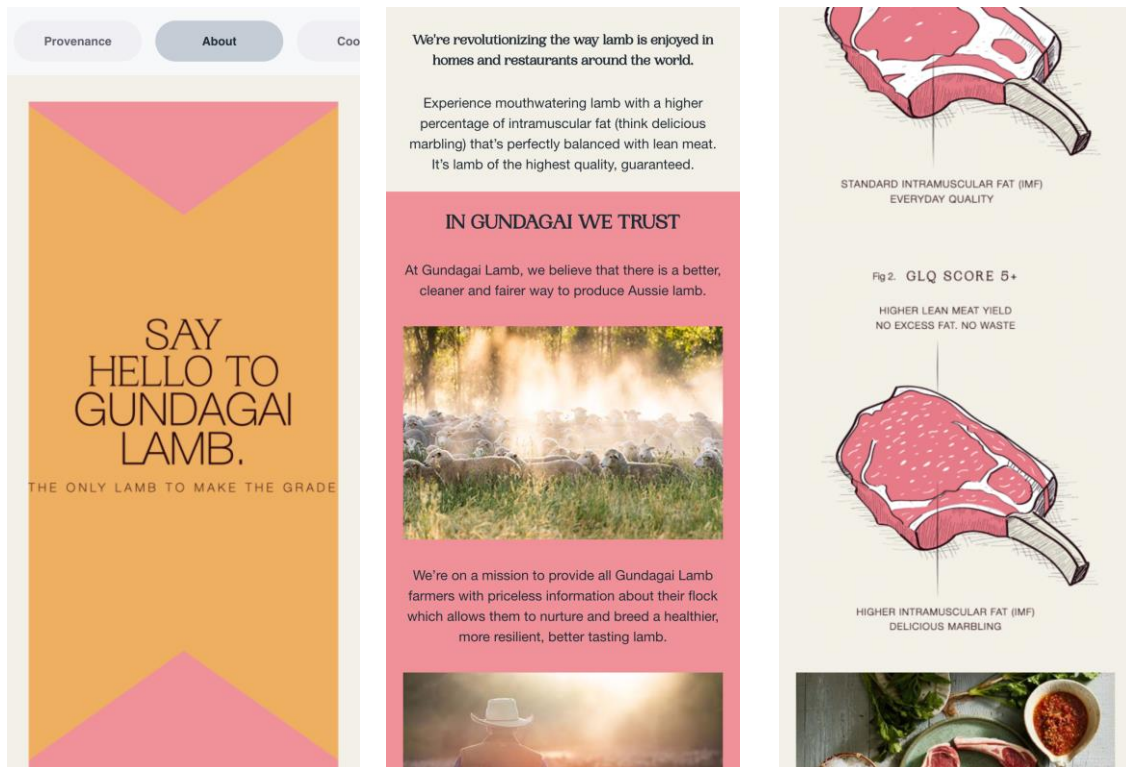
- The additional critical tracking events from Gundagai Meat Processors, including DEXA data and MEQ probe data, were linked via GMP's internal software system.
- The TPmeat platform captures each of the required critical tracking events and creates a unique QR code which can be put on any box (or pack), and when it is scanned by any user's mobile phone, provides a chronological list of information. An example of this is outlined in image 2.

Image 2. QR code scan results as presented on a mobile phone.



Other information can also be provided to the consumer after they scan the QR code, including information about the product, company, suggested serving ideas, and other information. An example is outlined in image 3.

Image 3. Product supporting information to engage with consumers.



1.2 Project Aim 2 – Utilising the Australian Guidelines to Implementing Food Traceability and the GS1 Data Management Standard

Project Aim 2 was to:

- Utilise the standardised Australian Guide to Implementing Food Traceability (AGIFT) framework and document, to implement a red meat traceability prototype, and leverage the guidelines details for the various critical tracking events identified.
- Utilise the GS1 data management standard and protocol for collecting storing and sharing critical tracking events, as this aligns with end customers requirements.

1.2.1 Aim 2 – Analysis

- The AGIFT framework was released in April 2024 and is a 234-page guide to implementing food traceability across the Australian agricultural sector. AGIFT was developed and led by Deakin Universities Food Traceability Laboratory, and was a collaboration of numerous R&D Corporations, GS1, Woolworths, DAFF and other industry partners.



- The guides detailed outline includes the use of the GS1 taxonomy which is based around critical tracking events (CTE's) and key data elements (KDE's).
- KDE's are element's from within the critical tracking event. For example, the date and time component of a lamb marking event, is a *KDE* of that *CTE*.
- Critical tracking events are the details of the actual event, and each critical tracking event has *who, what, where, when* and *why* data points that need to be provided. Each CTE is given a unique event code and is aligned to a unique mob of sheep. For example:
 - Critical Tracking Event: Lamb marking event
 - Who: Joe the farmer
 - What: Marking 215 lambs, eID's NF00001-NF00200
 - Where: New Farm geolocation 234.12 – 123.12
 - When: 1052am, 13th April 2023
 - Why: Lambs needed to be marked
- After each critical tracking event is completed, it is then submitted onto the TPmeat APP. This creates a tracking event which follows the unique identifier (the mob of sheep or eID).
- What does AGIFT and GS1 mean to an Australian lamb producer and processor? It means that every critical tracking event they capture on a GS1 aligned traceability platform, allows for alignment with what the vast majority of your end customers are wanting when it comes to data standards and format. This means greater efficiency and transparency across the supply chain from customs to freight forwarders, warehousing, biosecurity, product safety/recall and last-mile distribution across the globe.

1.2.2 Aim 2 – Challenges and Findings

- One of the key challenges of aligning to a guideline, is for legacy systems. There are a number of existing legacy systems, including leading software solutions, which do not align with the AGIFT and GS1 data protocol. This creates barriers to on-boarding and systemic risk to the industry.
- The GS1 protocol may not currently have references for every critical tracking event, however our findings and engagement with GS1 showed that they are open and willing to assess new critical tracking events and develop new codes for new critical tracking events.

1.2.3 Aim 2 - Solution

- A potential solution to the identified challenges is to leverage the existing GS1 traceability certification program, whereby traceability solution providers, such as Trust Provenance, have to receive certification from GS1, that their respective solution aligns with the GS1 protocol.
- Other potential solutions are for industries to create frameworks and potentially mandate compliance with a standard, such as GS1.

- It is not unforeseen that leading retailers and or food services may make this a requirement of transaction/ market access in the future. The alternative for the end sellers of red meat is to have a fragmented, one-consistent system which is fraught with error risk, integrity risk, biosecurity risk, and other risks, which potentially warrant mandating a standard.
- The MLA and Department of Agriculture, Fisheries and Forestry have the opportunity to help industry transition to a globally accepted standard, which will futureproof the industry.

1.3 Project Aim 3 – Traceability Value Propositions and Use Cases

Project Aim 3 was focused on outlining the value proposition that traceability brings to the red meat industry and demonstrating this value with Use cases and Business Cases.

1.3.1 Aim 4 – Analysis, Findings, Use cases and Business Cases

A number of value propositions from traceability were identified and analysed, and are described in detail below.

1.3.2 Biosecurity

- *Use Case:* Traceability of all critical tracking events allows producers, processors, logistics providers, and other stakeholders to have a more finite level of information. There are various critical tracking events which are not currently being recorded. This can provide additional information to industry and authorities via a more detailed traceability system such as mob splitting and aggregating (**Note:* Compulsory eID's across all red meat will assist in the practical implementation of this). Biosecurity management through a digital platform, including utilising artificial intelligence and business rules can rapidly and concisely identify, target and ring fence potential biosecurity threats such as a Foot and Mouth disease outbreak. Mob splitting, sale yard sales, animal-to-animal contact, location of animals, carcass and boxed product can all be digitally identified to effectively, efficiently and economically manage biosecurity risks.
- *Business Case:* The forecast costs of biosecurity outbreaks into the Australian Red Meat industry, such as a Foot and Mouth disease major outbreak, is estimated to cost between \$49.3 billion and \$51.8 billion¹. Biosecurity risk also damages “Brand Australia”, with impacts immediately and in an ongoing reputational context.

¹ <https://www.agriculture.gov.au/abares/research-topics/biosecurity/biosecurity-economics/consequences-foot-mouth-disease-outbreak>

1.3.3 Product Recall

- *Use Case:* Traceability allows for any GS1 labelled item to be recalled and traced through the supply chain. Traceability with a system of the calibre of Trust Provenance's TPmeat, allows for each critical tracking event to be listed and analysed, and for any further investigation of data to be undertaken effectively and qualitatively. Lower integrity traceability systems cannot accurately identify all potentially recallable products and cannot identify where all products are in a timely manner.
- *Business Case:* Product recalls can be very expensive. If we look back to the needle found in a strawberry in the horticulture industry, it became very apparent that there is a lack of integrity in traceability systems, which led to mass product recalls, costing \$12million² and leaving the industry in crises. The business case is that traceability in the context of product recall, provides a degree of assurance, coupled with creating a culture of good behaviour and a supply chain awareness of being able to capture and see all information.

1.3.4 Animal Movement

- *Use Case:* Traceability allows for various animal movements to be recorded easily and quickly, including movement within one property / intra property, property to property under the one PIC but utilising global-location-numbers (GLN's) to the paddock level, farm to saleyard (potentially auto creating NVD's), farm to farm (private sale), and farm to processor.
- *Business Case:* Streamlining existing animal movements documentation and/or compliance requirements such as NLIS, eNVD, and LPA, by utilising integrated traceability software and adding additional CTE's to animal movements. This will save time and cost, and mitigate risk. For example, a recent ABC Rural article³ outlined that spelling and/or dipping facilities in the Northern Territory that transfer cattle to processors on the East Coast have found cattle may go through various facilities before arriving at a processor. The additional CTE's are not recorded, creating exposure to biosecurity risk in the event of a potential disease outbreak, such as Foot and Mouth Disease.

² <https://www.dailymail.co.uk/news/article-6875769/Strawberry-needle-crisis-cost-industry-staggering-12million.html>

³ Is Australia's livestock contact tracing system prepared for an outbreak of foot-and-mouth disease? ABC Rural/ By Max Rowley, 21 Sep 2022

1.3.5 On-farm Best Practice Analysis

- *Use Case:* Traceability and the information it provides could be utilised to develop on-farm best practice analysis to benchmark on-farm activity. This data could be utilised to fulfil customer requirements and expectations, including but not limited to drenching withholding data and date integrity, lamb marking time frames, and mulesing techniques and practices.
- *Business Case:* On-farm operation optimisation and knowledge sharing amongst farmers is one of the key areas of productivity and profitability opportunity for Australian sheep producers. By sharing information and learning from best practice, all farmers have an opportunity to learn and improve their farm operations. The exact business case return on investment is unknown due to a number of variables and nuances.

1.3.6 Processor – Producer Analysis

- *Use Case:* There is potential for meat processors to categorise lambs from specific growers into specific categories and back analyse the information. For example, all Gundagai Lamb's GLQ5+ lambs (where eID's are in place) could be analysed for trend detection and optimal information analysed captured and acted upon.
- *Business Case:* Identifying producers that produce at different quality specifications, across region, location, type/ other analytics, could assist the meat processors with procurement and product planning.

1.3.7 Other – Regulatory Compliance

- *Use Case:* Other critical tracking events could streamline regulatory and other certification, and compliance requirements, such as withholding periods, chemical inventory management and use, carbon measurements (ie. the age of animal) and other claims. The additional critical tracking events could be added to the Trust Provenance TPmeat APP and allow producer and processors to readily align this information.
- *Business Case:* Creating user-centric digitised solutions for integrating into business-as-usual operation of red meat producers and processors allows for streamlining compliance (ie removing duplication of data entry), provides integrity to data collection (time stamping and chronological ordering of information) and potentially auto-reporting (i.e. sending information directly to ISC). This brings time saving to lamb producers and lamb processors.

1.3.8 Inventory/asset management

- *Use Case:* Inventory / asset management and the ability to deliver enhanced decision making across brands to deliver optimal margins.
- *Business Case:* The ability to undertake detailed analytics and allowing brands such as Gundagai Lamb to create a new level of engagement with producers is something that could be achieved. This would require detailed data analytics, machine learning, and scenario mapping, potentially creating a key point of differentiation for the Australian red meat industry.

1.3.9 Customer interaction

- *Use Case:* Value-add to red meat products from connecting a traceability platform to the farm gate, through the supply chain and right through to the consumer.
- *Business Case:* Customer interaction analytics is a useful tool to capture the number of interactions taking place and to have the confidence that the story of the product is clear, available and transparent. This helps to build both the Gundagai Lamb brand, Brand Australia and provide consumers with the confidence that the Australian Red Meat industry is the world's best and a quality brand they can trust. Interaction with consumers can also lead to brand stickiness, products feedback and other value points which are currently not available in the red meat industry. This information coupled with other research such as the MLA Market Insights team, would provide a richer level of information to red meat brands and industry.

1.4 Project Aim – Linking with the Integrity Systems Company platform to analyse and identify efficiencies for all stakeholders.

Project Aim 4 was focused on analysing the Integrity Systems Company's (ISC's) existing Application Programming Interface (API), which is essentially the technical bridge for which information can flow into-and-out of the ISC system, from third party software, such as TPmeat.

The importance of this is to help create interoperability and streamlining of information between the ISC and external parties, including lamb producers, lamb processors and other groups, and the utilisation of this information for industry wide benefits, such as for analysis of industry activities, sustainability framework reporting and other data sets.

1.4.1 Aim 5 – Analysis and Findings

- The ISC's API provides third party vendors with a rich and broad API surface, which enables various use cases and serves various business and commercial requirements, however, due to the currently outdated technology choices, integration can be difficult from the perspective of third-party software vendors. The utilisation of a Simple Object

Access Protocol (SOAP) interface, provides a significant challenge, as this protocol has issues when seamlessly linking to most modern web frameworks.

- The provided API documentation is verbose and difficult to digest in some areas, particularly the SOAP specifications. Fortunately we had support from ISC Integrator Analyst, Mr Peter Quigley, who provided guidance throughout the integration process.

1.4.2 Aim 5 – Suggested Solution

- The proliferation of GraphQL, an open-source data query and manipulation language, across the ISC API surface would modernise the platform and enable third party vendors such as Trust Provenance, to extract a great deal of functionality from the existing API.

2. Models and Recommendations to Enable Implementation and Adoption of Traceability throughout the Australian Red Meat Industry

This section is focussed on models and recommendations to enable the implementation and adoption of traceability throughout the Australia red meat Industry and to promote the Australian Red Meat industry standards and global best practice across:

- > Producers
- > Processors
- > Data management
- > Reporting
- > Welfare
- > Biosecurity
- > Sustainability
- > Other metrics which are increasingly being analysed as components of market access and consumers demand requirements.

2.1 Industry Considerations

Each of these are outlined in different sections below. For clarity, there is considerable crossover and complimentary application on each consideration.

2.1.1 Setting the Standards

The industry could work together to outline the AGIFT for Red Meat document and subsequent use of the GS1 standard, is where the industry wants to move towards over a certain time horizon (ie 5 to 10 years). This will send a clear signal to all stakeholders and industries along the supply chain including producers, logistics companies, chemical suppliers, meat processors, meat wholesalers, meat traders, animal health, animal welfare, exporters, live exporters, food service, retailers, industry compliance, government compliance, biosecurity, and others. This could be done with the assistance of Trust Provenance and GS1.

Outcomes from this could include:

- Creating an awareness and buy-in across the supply chain that the world's best practice traceability and data integrity is what Australia Red Meat abides by.
- Creating buy-in from an adoption and implementation perspective to outline any barriers to use and issues that need resolving, and set a target date for full adoption similar to other industry wide goals such as the CN2030 target.
- Sending a message to all stakeholders that best practice data capture will be a requirement across the supply chain.
- Providing a guideline for software vendors serving the red meat industry. Potentially having an accreditation program for solution providers to adhere to, similar to Meat Standards Australia approval of other industry technology such as objective carcass measurement.

2.1.2 Harmonising Compliance and Other Data Sets

The industry could document and harmonise critical tracking event data points across multiple applications. This could include animal health related chemical use compliance, on-farm chemical use, and chemical use compliance information as utilised by processors, and aligning this with sustainability reporting requirements to streamline compliance and data management (remove duplication, increase data integrity and accuracy).

Creating a clear guideline for all stakeholders to follow (producers, solution providers, supply chain stakeholders, etc) will remove any ambiguity about what data can be used for what application.

This could include ISC API documentation and workflows for inputting and extracting data for NVD's, other LPA information, Biosecurity planning and NLIS data, and on where and how information should be used. Several examples should be created to show how this works in practice. This information could also be directly linked into the Sheep and Beef Sustainability Frameworks.

2.1.3 Accredited/Approved Solution Providers

The industry could set guidelines as to what is required to be an accredited traceability solution provider for the Australian Red Meat industry.

There are various traceability software platforms on the market, and which cover different aspects of the supply chain. For example some are more on-farm focussed, whilst others are processor focussed.

Creating an Accredited / Approved Solution Provider List will allow all stakeholders within the Red Meat industry to have assurances that the solution they are considering aligns with the industry and that there is clarity regarding the services being offered. For example, a matrix which outlines the solutions ability to capture CTE's at each stage of the supply chain or flexibility to add a new CTE's.

This could be done by Deakin University's Traceability Lab, in collaboration with GS1 certification, the NFF National Data Code Certification program, ISO accreditation for cybersecurity and best practice credentials and others.

2.1.4 Aligning with Other Emerging Standards

An annual landscape search of complimentary standards which are emerging and can complement one harmonised and centralised traceability framework could also take place. For example, the GS1 Global Architecture Group Scan4Transport initiative, have recently announced the AI4330 – Maximum temperature and AI4331 – Minimum temperature, requirements for logistics, which have application across the red meat supply chain.

Other standards include ISO (ie. ISO27001), and other accreditation programs such as Global GAP, ISCC and others.

This work could be done by Deakin University's Traceability Lab and the wider Deakin Centre for Supply Chain and Logistics.

2.2 Implementation and Adoption Plan

By completing the industry consideration work, this sets the foundation to implementation and adoption, which could include clear references to guidelines, protocols, standards, and requirements.

Trust Provenance could be a key participant in the process and assist in providing feedback from a vendor and assist in rolling out the implementation and adoption plan.

2.2.1 Setting a Timeline for Industry

Industry could set a timeline and targets for adoption of full traceability of all CTE's from a paddock-to-plate perspective via a QR code, implemented across the supply chain.

This could send a clear message to industry, end consumers / customers, and the global market. and should be underpinned with resourcing to enable implementation.

2.2.2 Educating, Structuring and Incentivising Uptake

Industry could educate, structure and incentivise the uptake and implementation of Accredited / Approved traceability solutions through several mechanisms, including:

- > Provide clear annual marketing demand and outline how market access is based on various drivers, including continual refinement and alignment of end consumer demands. Groups such as the MLA Markets and Insights team could provide supporting market research that underpins the demand. Creating and aligning producers about what their end customers (which are more than likely 10,000+ kilometres away) will help in the education of where the market is evolving to.
- > Engaging with meat processors that are innovative and open to traceability and supporting their initiatives and see traceability as a core pillar to their brand, will help create early adopters which the balance of industry can monitor and learn from. A TPmeat call out

approach to processors would help identify which processors are seeking to go down the traceability path.

- > Providing co-contribution funding for implementation costs and Support and Maintenance costs (*the NSW DPI are doing a similar program for AgTech adoption, whereby they are looking to fund 70% of the cost of AgTech equipment).
- > Creating case studies to show traceability in action and how it benefits the producer and processors, and benefits to end customers.
- > Engaging with producer groups to identify those wanting to focus on showcasing other attributes (not just traceability) ie quality.
- > Leveraging and partnering on the emerging state and federal support for eID and biosecurity programs. eID has raised varying levels of feedback from industry, from those who are early adopters and already have full eID implementation across their flocks/farms, through to those still wanting expectations from production consigned directly to abattoir. To increase the buy-in across industry and create a greater industry value uplift, digitising aspects of eID's with traceability software platform could reap multiple returns, not just across streamlining NVD's but also into sustainability data capture and providing digital literacy to the ecosystem.

2.2.3 Outreach and Complimentary industry Engagement, Training and Promotion

The MLA should engage with groups such as Livestock SA, Rural Solutions, and various sheep industry groups. Further, a marketing campaign, training campaign and promotional campaign should be developed, to communicate the benefits of traceability, the accredited systems being used, and run workshops on the requirements to implement traceability.

3. Conclusion

In conclusion, this project undertook concurrent analysis and consultative engagement with stakeholders in the industry to understand the various components to traceability from a technical, practical, and commercial perspective. This was undertaken by utilising traceability frameworks, traceability data standards, and implementing the Trust Provenance TPmeat traceability solution into a proof-of-concept project with Gundagai Meat Processors, with a focus in their premium Gundagai Lamb brand.

The listed findings, outcomes and solutions in this report, provide an overview of current traceability foundations within the Australian sheep industry, and the suggested recommendations for enhancing, maturing, and enabling greater traceability from a breadth (more sheep producers) and a depth (more critical tracking events on farm and in the supply chain) perspective, and from an implementation and adoption perspective.

Traceability collectively increases the transparency, integrity, and governance of the industry and *Brand Australia* by ticking the box for end consumers from several buying decision making aspects, including social license, product integrity, food safety, product recall, biosecurity and sustainability.

The MLA and ISC are in the ideal position to support further industry drive into the digitisation repository structure for red meat producers and processors in Australia, and leverage the baseline frameworks, standards and pilot projects, to create specialised guidelines, frameworks, solution accreditation, policy, resourcing and funding programs to enable the implementation and adoption of traceability for the red meat sector beyond analogue eID's towards a full red meat digital supply chain. This would allow the Australian red meat industry to be globally leading and future-proof the industry against market access risk, disease, biosecurity threat and existential sustainability threats.

Trust Provenance and their TPmeat traceability solution could provide all of industry with a low cost, highly scalable, GS1/standards aligned platform, that can bring producer information, processors information, MSA and quality information, location information, biosecurity information, sustainability information, logistics information and consumer engagement information, all onto the one platform, for the benefit of all stakeholders.

With daily information being released showing consumer demands continually trending towards 100% traceability and transparency, this is an area that industry should pursue to prove the value and quality of our red meat, producers, processors, industry bodies, government and programs, as its value that consumers want, we just need to get the system in place to showcase the information in the way consumers want to see it.