



Final report

Connecting the red meat and livestock data ecosystem through the Pure Farming platform - Public release

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1. Abstract

This project set out to explore the mechanism and benefits of using an existing cloud-based data integration platform (*Pure Farming*) to connect, permission, and transform data from the Meat & Livestock Australia (MLA) Group Data Platform. The intention was for data to be permissioned and controlled by producers, within the bounds of agreements between producers, MLA, and Rezare Systems (as operator of Pure Farming).

The project also investigated the appetite for use and potential benefits for producers by delivering them relevant insights leveraging multiple data sets, supporting product claims and assurance for producer's supply-chain partners and customers, and providing data to software solutions and models used by producers.

It also explored the feasibility for producers to control and re-use data that is held in industry systems (such as NLIS and eNVD) and on-farm software applications, and for data to be received and turned into insights by software vendors and supply chain organisations.

The project found that it was difficult for individual producers to request access to their data which is held in industry traceability databases. At the time the research was conducted, the database was limited to its core functionality of providing industry traceability and any individual data requests beyond core functionality were not able to be considered. The governance systems in place constrained the use of industry traceability data for individual producers. There are appropriate mechanisms to grant access to data for research and industry good purposes, but these do not scale to granular control by producers.

An exploration of value delivery to the supply chain demonstrated that use cases relating to data sharing had a direct benefit to producers. Another finding was that supply chain organisations are concerned about the implications of requesting and managing data from producers.

2. Executive summary

Rezare Systems carried out a research project that focused on integrating farm data across multiple systems, while giving producers control over how their farm and livestock data is used.

This project set out to explore how traceability data from the MLA Data Platform could potentially be combined with other farm data to provide insights and benefits for producers through integration into software and decision support tools, or delivery across the supply chain. The project used Rezare Systems' *Pure Farming*¹ data platform for this purpose.

Objectives

This project explored a mechanism that would allow supply chain organisations and decision support or software tool vendors to enable the use of data from other sources, and for producers to control the flow of data about their farm business. A key element of this project was to understand and experiment with the feasibility of connecting data from the MLA Data Platform for reuse by producers.

The project explored three hypotheses:

- Do supply chain participants have a desire to obtain data beyond what they can access currently?
- Do decision support and software tool vendors have a desire to obtain aggregated farm data beyond their current customers?
- Can data needed by supply chains and tool vendors be obtained programmatically from data held by the MLA Data Platform, with access controlled granularly by producers?

Methodology

In delivering this project, Rezare Systems undertook an analysis of market needs by engaging with supply chain companies (processors, brand owners, and retailers), and software and decision support tool vendors. In parallel, the project team worked with the Integrity Systems Company to understand the technical feasibility of integrating with the MLA Data Platform.

After negotiating a data access agreement between Rezare Systems and MLA, the project team developed integrations to demonstrate data connectivity into the *Pure Farming* platform, under producer control. Integrations were developed with the MLA Data Platform, eNVD (test) system, and a farm software vendor.

Finally, the project team worked with a retailer in the red meat supply chain to develop a use case for use of farm data. This resulted in calculating antibiotic use intensity based on livestock numbers and treatment records. The intention was to test this analysis (and more importantly, the data permission process) with a small group of producers before offering a wider pilot.

Key Findings

When engaging with software vendors and supply chain organisations, the project team found that:

- There is substantial interest from both software vendors and supply chain organisations such as processors and retailers, in accessing farm data from other sources, and in particular data that may be held by MLA.

¹ *Pure Farming* is described at <https://www.purefarming.com/>, retrieved June 2023.

- There is a substantial lack of awareness by participants of what data may be held by MLA, and the difference between different MLA solutions.
- The project demonstrated that it was technically feasible to deliver data from the MLA Data Platform, and MLA systems such as NLIS and eNVD to a data integration platform such as *Pure Farming*. The project would have benefited from use of the MyMLA authentication and authorisation system.
- Producers' rights in relation to data, and approaches to support those rights through informed consent to use of data for a particular purpose have not been well understood through the industry.
- Producer-led data exchange (through farm software integrations or an industry data exchange) is not well supported by the current regulations and industry agreements that underpin MLA systems.
- Data within MLA systems (such as NLIS data present in the MLA Data Platform) is fit for its primary traceability purposes, which relies primarily on device identification (NLIS number or EID) and records of device movements onto or off a PIC. The current data does not have the detail required to be suitable for use in farm management software or to support supply chain insights. However, the opportunity to combine this data with other farm management software to generate insights has yet to be fully explored.
- Supply chain specialists are not necessarily technology and data specialists. The supply chain partner was hesitant to engage with producers about software and integration, and concerned about the level of support that might be required.

The project was unable to progress testing with producers, and while outputs using sample data demonstrated what might be feasible, it was not possible to learn about the ease of use and concerns of producers.

Benefits to industry

Outcomes of the project that could benefit the red meat industry include:

- Identifying and confirming the importance of data access policies and regulations that support a framework for producers to access and re-use their data.
- Demonstrating the broad interest in applying farm-level data in farm software products and decision support tools, and to support supply chain information.
- Proposing data access approaches that could be considered by MLA to support producer re-use of data – including use of the MyMLA authorisation portal, and example agreements regarding use of data for specific purposes.
- Developing an understanding of the barriers to the use of farm-level data in supply chains, specifically confidence in communicating data access, and in supporting technologies.

Feedback from the supply chain organisation indicated that producers would value seeing how their farm operation performed against other farms in a region or supply group. However, the project team was unable to engage with producers to assess this.

Future research and recommendations

The following recommendations have been informed by the activities carried out and learning captured in this project.

1. Address technical and governance barriers to data integration with MLA systems.
2. Consider how MLA products such as NLIS could optionally capture or link additional data points that would benefit supply programmes and livestock genetics.
3. Support producers and other industry participants to learn the principles and vocabulary of farm data exchange, including best practices for control, security, and terms.

In addition, Rezare Systems should:

4. More closely align pilot data acquisition and analysis with the priority outcomes sought by the supply chain.
5. Provide pre-built templates and onboarding materials and support that make it easier for supply chain organisations to plan and onboard producers.
6. Continue to partner with a range of agricultural solution providers in the Australian livestock sector, to address actual and perceived gaps in the data that is available to supply chains.

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3. Background

Australian farm software companies and decision support organisations including consultants have routes to engage with producers, but collection and interpretation of farm-scale data to support decisions remains expensive and problematic. Likewise, supply chain organisations such as processors, exporters, and supermarkets, have tools that could support communication with producers and customers, but lack standardised farm data that is appropriately aggregated.

The *Pure Farming* platform brings together data from farms and across the supply chain to support insights and decisions. It aims to cleanse and integrate data from a wide range of sources to help organisations across the supply chain, and to help farmers and growers to control the data they connect, i.e., who is using it and under what terms.

The MLA Data Platform collates data that MLA collects from producers and industry and aims to provide greater value to red meat producers. Integrity Systems Company (ISC) seeks to enhance solutions available through the platform for traceability, improving livestock lifetime performance or data insights for producers and/or supply chains.

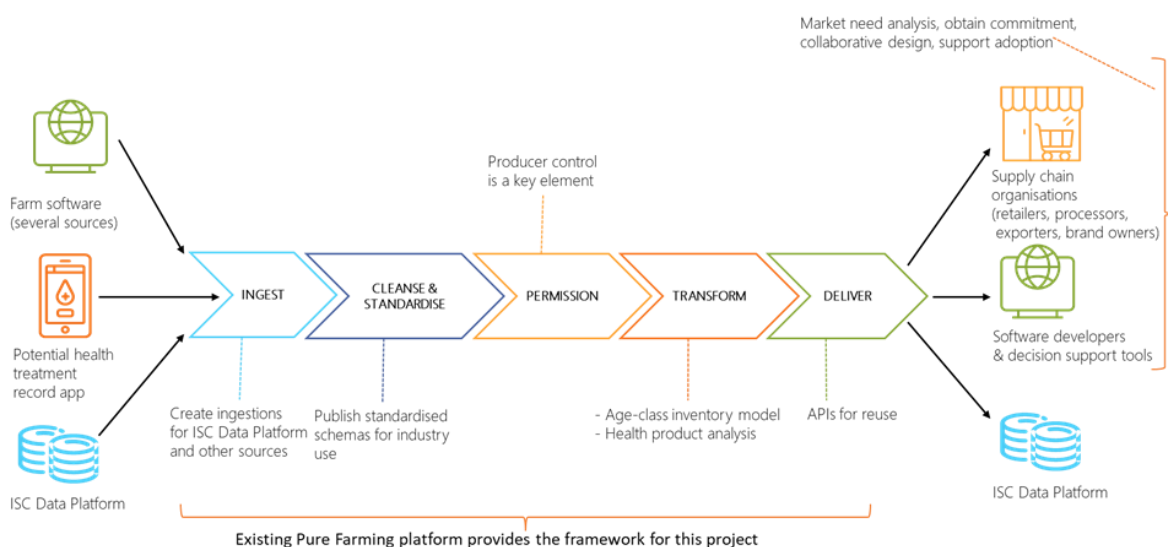
4. Objectives

This project used the functionality of the *Pure Farming* platform to demonstrate how data from the MLA Data Platform, in combination with other industry data (such as that from farm software) could be accessed and controlled by producers to enable greater linking of services throughout the data ecosystem.

Developers of software and solutions for Australian livestock producers could better service the industry if they could access connected data from a range of sources. The information within industry databases and a variety of farm and technology systems could potentially generate substantial insight value for individual producers if they could be brought together.

Error! Reference source not found. below demonstrates the proposed flow of information:

Figure 1: Proposed flow of information using Pure Farming



The intended benefits of the proposed work as shown in **Figure 2** include:

Figure 2: Proposed Benefits



Exploration during this project was focused on:

- Understanding how the proposed work and resulting data sets could be adopted and used by supply chain organisations to address the issues shown above.
- Engaging with software vendors and the providers of decision support to producers, to research how the cleansed and aggregated data could be used to provide value to producers.
- Collaborating with the ISC data team to understand the data elements from the MLA Data Platform could be used by *Pure Farming* to deliver the benefits described above.

The objective of the project is to use the functionality of the *Pure Farming* platform, and producer-controlled access to MLA Data Platform records and farm management software to support:

- supply chain differentiation,
- carbon emissions decision making, and
- power up the developers of software tools for the Australian red meat sector

5. Methodology

The project methodology was designed to explore the hypotheses outlined above:

1. An **analysis of market needs** to address hypotheses 1 and 2; the desire of supply chain participants and software or decision support vendors to access additional data.
2. Phased design and delivery of a **supply chain and producer demonstration** to evaluate the value of sourced data to producers and value chains (addressing hypothesis 1 in depth).
3. A **technical feasibility study** addressing the data contained in the MLA Data Platform and methods of connecting to it programmatically to address hypothesis 3.
4. Phased **ingestion and transformation of data** from the MLA Data Platform and other sources, with producer control, to address in depth hypothesis 3.

During the project, a fifth part of the planned project methodology – creating a **prototype health treatment application** – was replaced with two other key elements:

5. **Negotiation of data access** agreements and processes to allow producers to direct access to the MLA Data Platform (and hence address hypothesis 3), and
6. **Ingestion from farm software** to address shortcomings in the data from the MLA Data Platform, to support the supply chain and producer demonstration (hypothesis 1). This process used an equivalent methodology to that in item 4, above, and is not elaborated further here.

5.1 Analysis of market needs

The project team undertook a market fit analysis focusing on two separate constituencies:

- Supply chain organisations involved in the processing of red meat, branded product development, retail, or food service, and
- Software and decision support tool vendors providing technology or services to producers.

The market fit analysis commenced with a review of relevant publications to understand potential areas where insights could be provided to producers, or value derived for supply chains. This information was used to support interviews with the organisations in each area.

Stakeholder questions addressed:

- The services that the organisation delivered, or desired to deliver to producers,
- In the case of supply chains, the claims or areas of traceability and value that the organisation needed to provide evidence in the market,
- Types and potential sources of data to address the issues above, including the key data elements required and methods of delivery (this could include data outside that held by the MLA Data Platform),
- Questions or concerns over access and rights to use to data, and producer control over data,
- Perceived business value attached to being able to access this data (and hence an indication of willingness to pay for its provision), and
- Motivation and willingness to be involved in later stages of a demonstration project.

A subset of stakeholders were approached to provide letters of intent that documented their willingness to participate in exploring the use of the solution throughout the remainder of the project.

5.2 Technical feasibility study

The project team worked closely with technical specialists from Integrity Systems Company (ISC) to analyse the availability and completeness of data in the MLA Data Platform that could be suitable for use in the project.

Through a series of workshops, data schemas relating to the National Livestock Identification System (NLIS), Livestock Data Link (LDL), and electronic National Vendor Declaration (eNVD) were studied and potential data sets of interest for producers and supply chain partners were identified. The

potential data was then reviewed against the inputs to models and aggregations that would potentially be required to deliver value to supply chain organisations and software vendors.

In addition to data schemas, the ISC team provided documentation entity relationship diagrams and anonymised sample data to aid understanding. One on one sessions with subject matter experts were carried out to provide any clarification that was required.

The feasibility discussions also explored how data might be provided, including the use of new or existing application programming interfaces (APIs) or file delivery, and what authentication and authorisation methods might be used.

5.3 Ingestion and transformation of data

In the context of this project, an *ingestion* is the process of extracting data from a source system and processing it into the *Pure Farming* platform, including standardising the data to a common data schema. A *transformation* is the application of a model or a set of aggregation steps to produce a derived data set.

In order to explore hypothesis 3, the feasibility of ingesting data held by the MLA Data Platform under granular control of producers, and to support the delivery of a supply chain and producer demonstration 5.4, the project team would need to implement two or three ingestions and two data transformations:

- Ingestion of animal and animal movement data based on NLIS from the MLA Data Platform,
- Ingestion of animal movement data from the eNVD system to obtain further data about age and sex of animals,
- Ingestion of animal, animal movement, group membership, and (potentially) health treatment data from farm management software,
- Transformation of animal and animal movement data into a monthly or weekly livestock age class inventory (or stock reconciliation), and
- Transformation of animal health treatment records, a master database of Australian antibiotic remedies, and the stock reconciliation data above, into an antibiotic use intensity data model.

The data ingestion steps also required the project team to address data access agreements with data providers and producer control over data through a permission process.

5.4 Supply chain and producer demonstration

The purpose of the supply chain and producer demonstration was to explore hypothesis 1 in depth, and by doing so understand the perceived value of connected data from the MLA Data Platform or other sources to inform supply chain organisations and support insights for producers. The methodology for this process was:

1. Engage with the supply chain partner (a retailer) to identify a focus area for their business which could be addressed by the project. The area chosen by the retailer was in animal

welfare, and antibiotic use was selected as a metric that could be calculated by combining livestock and health treatment data.

2. Discuss with the supply chain partner the constraints and intended outcomes of the project and plan engagement activities that included identifying resource required within the retailer's business, involvement of other parties (software vendors and livestock procurement managers) and planning the scope of the work.
3. Plan producer engagement, including how the procurement manager would identify candidate farms; emails and other communications to be provided to farmers; and how producers would be interviewed to obtain their feedback. A small set of producers (5-10 farms) was targeted to provide sufficient data for analysis.
4. Prepare branded visualisations and outputs, including dashboards, to display the outputs for producers and the retailer and its procurement manager. In a real implementation these visualisations and outputs would be delivered as part of the retailer's own procurement and supply management technology, but during the project Rezare Systems would provide these to reduce effort for the retailer.
5. Test the producer data access steps, visualisations and outputs with producers and the retailer's procurement team, and document feedback.
6. Plan follow-on engagement, if approved, to support a pilot with a wider set of producers.

5.5 Negotiation of data access

In almost every case, building a data connection requires a negotiation with the data provider organisation that holds the data. A data access negotiation comprises:

- Establishing the purposes and intended outcomes of the data connection, and (typically) how it will deliver benefits to (or reduce cost and effort for) producers.
- Confirming that both parties – the data provider and the organisation receiving the data (in this case Rezare Systems into *Pure Farming*) agree that the producer has the right to control data about their farming business.
- Agreeing a means by which producers will identify themselves and authorise access to their data (typically by providing credentials that the data provider can test, such as a username and password or email address and customer number).
- Confirming or adjusting standard terms around service level agreements, use and removal of data, and provision of data to third parties with the producer's consent.

A key element of this project was negotiation between MLA and Rezare Systems regarding connection of producer data held in the MLA Data Platform, and potentially other systems such as eNVD.

6. Results

6.1 Analysis of market needs

Preliminary work on market needs was instrumental in evaluating the potential for *Pure Farming* to be used to connect data in the Australian red meat ecosystem.

All interviewees responded positively to the project objectives. Each provided insight into how access to ISC data would enable them to improve their service offering to producers in areas such as farm management, biosecurity, productivity, animal health and sustainability.

Several common challenges and observations emerged from the interviews:

- Discoverability and lack of transparency of available data.
- Lack of clear understanding of the difference between ISC and broader MLA datasets. In their minds, NLIS, eNVD, LPA, LDL, MSA data, market information and other MLA datasets are all included in access to data.
- Confidence that data had been checked for quality ahead of publication was key.
- Frustration with the different authentication systems needed to access ISC systems.
- All interviewees believed that producers providing per case access to their data through a common interface such as *Pure Farming* would help with industry adoption of ISC data outside of the current use cases.
- Through the interview process we tested the project assumption that benchmark data would be valuable to data consumers. We heard from interviewees that “there are lots of supply chains seeking market advantage and they all need to benchmark” so this would be a valuable outcome from the project.
- Interviewees saw value in the ability to access ISC data enriched with other data sources through the *Pure Farming* platform for climate, soils, carrying capacity, carbon, and other industry scale datasets.

Challenges consistently identified by providers included:

- Unique data: there was consistent acknowledgment that MLA was custodian of unique industry datasets that were not available through other channels.
- Difficulty identifying available data: providers reported uncertainty regarding the datasets that ISC made available to third parties and via what channels.
- Lack of quality documentation of available data was also cited as a challenge. Several providers reported that it was challenging to understand and use MLA data.
- Data quality was cited as a concern but not necessarily a priority issue; however, several providers suggested that they had had issues with data quality.
- The formats in which data is provided was highlighted by several providers. They indicated that the formats of the data were often difficult to work with and in many cases could benefit from a move to more modern technologies (e.g., from CSV or XML/SOAP to JSON/REST).

- Providers also reported that in some cases, there were several versions of the same API. Electronic National Vendor Declarations (eNVD) were often cited here.
- Linking animals to consolidate individual data into whole of life data and the mechanisms to enable this were cited by all providers.
- The high levels of effort required to authenticate software across MLA services was also a consistent point of discussion. Despite a single sign-on service being in place, providers reported needing to authenticate with several systems to access data.
- Finally, channels to communicate with MLA regarding data and data access were unclear.

The technology providers were less clear on their demands mainly because of their uncertainty on what data was available. Many of the datasets referred to by interviewees for example were MLA datasets including MSA and market information datasets. An area of clear interest was the datasets that might enable whole-of-life traceability of an animal. There were new and existing business models that could clearly benefit from this, for example retailers needing to justify market claims.

The ability to use NLIS data to reduce the effort to perform PIC reconciliations and to support audits were also frequently cited. Finally, providers also saw value in augmenting the LPA record sets.

6.2 Technical feasibility study

Rezare Systems and Integrity Systems Company technology team collaborated to achieve a common understanding of how an effective data platform access should be designed, using an approach that balanced the needs of the parties, with appropriate controls and auditability.

The project team identified subsets of MLA Data Platform information that could potentially be used to support transformations or calculations of:

- Livestock age-class inventory,
- Intensity of animal health treatments, and
- Carbon emissions.

A list of potential NLIS related data for individual animals on a property, and the movement records as animals move on and off a property were identified for delivery from the data platform.

6.3 Ingestion and transformation of data

6.3.1 Data ingestion from MLA sources

The project team constructed two ingestions from MLA sources: connecting NLIS animal identifier and movement data from the MLA Data Platform, and ingesting vendor declaration data related to movements from the existing eNVD GraphQL API.

The data available for the single PIC used during this phase of the research did not have any livestock death records, so it was not possible to determine if animal death events could be exported from the MLA Data Platform and ingested into *Pure Farming*, but other movement types were tested. Only cattle movements were tested, as sheep recording is not carried out in NLIS in states other than Victoria.

The second ingestion for eNVD data was constructed. The workflow by which producers could connect *Pure Farming* to the eNVD service and authorise access this data was developed to align with the eNVD agreements and documentation. **Error! Reference source not found.** This allowed demonstration of producer management of their data.

6.3.2 Livestock age-class model (stock reconciliation) transformation

An algorithm was developed to transform individual animal movement records to stock reconciliation records (livestock age, class, inventory and changes) for each birth period and sex group for a farm by calendar month.

6.3.3 Antibiotic use intensity transformation

Antibiotic use was identified by the retail supply chain partner as a useful use case for this research. An antibiotic use intensity algorithm was developed to take stock reconciliation data (from section 6.3.2, above) and use it in conjunction with health treatment data and a reference database of Australian-registered antibiotic products, to produce monthly and seasonal measures of the intensity of antibiotic use.

Globally there are a range of methodologies that are used to measure antibiotic usage. For this work, existing research papers that relate to antibiotic usage in Australia were reviewed, to ensure the proposed methodology is in line with previous recommendations that have been made, and to ensure it is as appropriate and relevant as possible.

The method documented was the density-based metric that MLA recommends² should be used for Australian red meat measurement work. This represents the number of animal daily doses (n_{ADD}) per 100 head per year, which is effectively looking at how many animal-days within that enterprise were spent under antibiotic treatment across the year, for every 100 animals on farm.

6.4 Supply chain and producer demonstration

6.4.1 Software vendor use case

The ideation sessions with a farm software vendor identified example use cases that could benefit producers. A key function was to use NLIS livestock data to speed up the onboarding of a new producer or farm, by pre-filling their livestock numbers.

The intent of the project was to allow producers to authorise Pure Farming to access data related to the PIC/s in their ownership. During the project it was established that this authorisation process was not aligned with the NLIS Terms of Use. To circumvent this, MLA/ISC required Rezare Systems to request for written and signed (email is sufficient) consent from individual producers to participate in this project to allow for the sharing of their data to Rezare and third parties. This authorisation model proposed for the research project was found to be impractical for the software vendor.

² Meat & Livestock Australia 2018, Antimicrobial stewardship guidelines for the Australian cattle feedlot industry, https://www.mla.com.au/globalassets/mla-corporate/research-and-development/program-areas/animal-health-welfare-and-biosecurity/mla_antimicrobial-stewardship-guidelines.pdf

When asked for feedback and suggestions, the software vendor shared these points:

1. The data available in the project from the MLA Data Platform was limited and would not support the use case for this research project (using NLIS data to quickly onboard new farmers, or to populate other tools). Other data sets that might be available over time could still be interesting.
2. Regarding the data access process involving collecting customer details and manually populating contracts for signature through Adobe Sign (i.e., MLA/ISC responsibility as custodians of NLIS data and abiding to the NLIS Terms of Use regarding the sharing of producer data for research purposes):

“...we would not subject our customers to this type of proposed auth (authorisation) process. Not only because of how bad a customer experience it would be but also because we have a strong position of promoting good security practice in the industry as it matures...”

6.4.2 Retailer use case

The project team engaged with a retailer and its traceability team over a 12-month period. The retailer provided a letter of intent to participate in the research project and invited the project team to participate in a strategy meeting.

The retailer identified potential priorities based on the data that was likely to be available from the MLA Data Platform within the project timeframe, and the needs of the retailer’s business. Understanding and reporting on animal welfare and animal health was most immediate priority, with other areas such as environmental outcomes and scope 3 emissions analysis among subsequent targets.

Antibiotic use intensity reporting was chosen as a use case to test in a limited reach, proof of concept. This addressed an area of animal health reporting that has substantial interest internationally, although antibiotic use is at significantly lower levels in Australian beef supply chains. The use case was to arrive at a means for measurement of antibiotic usage by taking into consideration medicine usage and livestock numbers on beef farms participating in the project.

6.4.3 Antibiotic intensity analysis example

The project team developed a dashboard and a report that could be used to visualise the antibiotic intensity data analysis that was developed in section 6.3.3. In the absence of a small set of producers to work with in this project (section 6.4.5), synthetic data was generated using international data sets, and adjusted to represent a small number of fictional Australian livestock farms.

6.4.4 Feedback from the retailer and supply manager

The project team met with the retailer to discuss and seek feedback on:

- The producer onboarding process and data access permissions (demonstrated using *Pure Farming*), and
- The potential for on-farm data to be used in the retailer’s supply management process (as demonstrated using the antibiotic intensity analysis).

Feedback from the retailer and supply manager was:

1. *“In terms of the producer onboarding and sign-up process, this would need to be supported by upfront communication and buy-in with producers in order for them to share their information to the platform.”*

The project team noted this point and agreed that this would have needed to use briefing materials for producers and supply managers such as the drafts that were previously delivered to the retailer and supply manager.

2. *“We would also need to create a separate Data Sharing Agreement with our producers in order for them to agree to provide access to their data as it would not be covered in our existing Terms and Conditions. This would be a big change management effort.”*

The project team agreed that additional terms would be needed, but only for those producers who chose to participate, and that they would be provided with these as part of the data access process that was demonstrated. In practice, this has necessitated one or two paragraphs of terms in other supply chains.

3. *“Feedback on the usability of the sign-up screens would need to be obtained from the producers but from our perspective, seemed straightforward and easy to use.”*

- *“In terms of the reporting capability that was presented in the portal for Antibiotic Usage, there is value in seeing the aggregated view across producers. It was well presented and there is value in comparing to averages.”*

- *“However, the real value to us would not be in these types of dashboards but rather the access to the data that we can't see today (e.g., NLIS, eNVD).”*

The project team noted this point, and that specifically the retailer might be interested in assurance status and eNVD declarations further back along the supply chain. This is important for highly differentiated products and is not supported by the current data access rules in place for the industry systems.

- *“We have a strong analytics team internally that would build out the required reports in combination with our existing data sets.”*

The project team agreed with this point – the visualisations were developed to support the project and some retailers internationally prefer to develop their own queries, visualisations, and portals using delivered data.

6.4.5 Onboarding producers

Unfortunately, due to resource limitations, the retailer’s supply management organisation was not able to assist with identifying or onboarding producers. The project team offered its own resourcing, and the farm software vendor also offered to help identify potential producers. After some time, the project team was notified that the retailer would be unable to pilot with its producers.

At this point it was mutually agreed (between Rezare and ISC) that this project would not continue.

6.5 Negotiation of data access

In the early phases of the project, it became apparent to both ISC and Rezare that the legal framework for the transfer of producer-controlled data from MLA systems, especially the MLA Data Platform would need to be addressed with care. The systems that feed into the MLA Data Platform (such as NLIS and eNVD) are regulated and/or the subject of multiple agreements with industry and Australian state authorities.

A workshop was held to discuss terms and options for producers to grant permission for data to be obtained from ISC by *Pure Farming*, and the technical transfer of data between MLA systems and *Pure Farming*. The technical transfer questions were relatively straightforward but were constrained by the legal requirements.

Established practice for accessing data that MLA/ISC are custodians of was based on authorisation of use for specific research projects, in addition to a data access agreement with the researcher and required manual consent from each producer.

The final approach approved by MLA was constrained to only the use of data within the project, for delivery to a single named party – the retailer or the software vendor in the project. *Pure Farming* would need to present the terms of use to the producer, who could then choose to enter their details (name, address, email address, PIC, and mobile number). *Pure Farming* would then provide the collected details to MLA's contract team, who would prepare a written agreement for the producer, and deliver it for signing through Adobe Sign.

Once the producer and MLA had executed the agreement, producer details would be passed to the ISC technical team who would manually configure an export from the MLA Data Platform of the data for that property.

Feedback from software vendors indicated concern that the delayed nature of approvals (with at least 24 hours passing before data would be available) and the additional work for producers having to sign agreements, would substantially discourage adoption by producers.

The difficulty in sharing producer data from the MLA Data Platform, and the manual process involved was a major learning for the MLA/ISC team. MLA/ISC were committed to ensuring the Terms of Use were adhered to. The NLIS Advisory Committee, which is made up of various industry and government representatives, are responsible for the Term of Use and the rules cannot be changed without approval. To be able to improve utility of the data, the ISC team as custodians of this data will review the data sharing process for future research projects using the data platform. This will involve prioritising the privacy and security of producer data and maintaining a balance of adhering to industry and state rules, in addition to managing stakeholder expectation.

6.5.1 Controlling and Revoking Data Access

Pure Farming allowed for producers to revoke access or disconnect their data in the following ways:

- During the research project, producers would be able to stop the flow of data from the MLA Data Platform to *Pure Farming* by contacting MLA.
- At any time, the *Pure Farming* platform also allows producers to disconnect a data source, revoke access granted to a specific consumer of data or close their account.

- In addition to this, and subject to the terms they have agreed with any consumer of the data, a producer may also contact those parties and ask to have their data deleted. This is not automatically undertaken by *Pure Farming* because Rezare Systems does not manage those software systems.

7. Conclusion

The project demonstrated the technical feasibility of connecting a data exchange technology (*Pure Farming*) to the MLA Data Platform and eNVD system to allow producers to re-use data about their properties contained in those solutions. It also demonstrated the challenges that remain in the data interoperability space and explored opportunities to provide data-supported insights into red meat supply chains.

The project team, in cooperation with MLA, made the decision to conclude the project in advance of its planned completion date. The unavailability of key personnel in the supply management organisation meant that engagement with producers had to cease. This meant that the project was unlikely to deliver further benefit to producers.

Key findings of the project and potential benefits to producers are described below. The activities carried out during the project (including changes), and the final evaluation have together resulted in several recommendations. These are summarised in section 8.

7.1 Key findings

When engaging with software vendors and supply chain organisations, the project found that:

- There is substantial interest from both software vendors and supply chain organisations such as processors and retailers, in accessing farm data from other sources, and in particular data that may be held by MLA.
- There is a substantial lack of awareness on behalf of industry participants of what data may be held by MLA, and the difference between different MLA solutions. Some organisations that were enthusiastic to source data from MLA did not necessarily understand the difference between animal data in NLIS, carcass results in MSA or LDL, or broader industry metrics and analyses produced by MLA.
- Data access may be time sensitive. In some cases, producers may wish to use their data to populate a specific tool or application. For those purposes, they may need to grant access to data in real-time and would expect data to flow within a short time (minutes to an hour, rather than days). This is likely to be the case with farm software and decision support tools – longer term use of data in supply chains or genetic improvement will be less time sensitive.

The project demonstrated that it was feasible to deliver data from the MLA Data Platform, and MLA systems such as NLIS and eNVD to a data integration platform such as *Pure Farming*. However:

- The functionality of data integrations was constrained by the available technology in the NLIS system (with its legacy system) during the time of the project. Data integrations were

significantly easier for both ISC personnel and the project team to implement where systems used modern technology and APIs (e.g., MLA Group Data Platform and eNVD).

- Data available in MLA systems (such as NLIS data available through the MLA Data Platform) is fit for its primary traceability purposes which relies primarily on device identification (NLIS number or EID) and records of device movements onto or off a PIC. This does not have the detail that is required to be suitable for use in farm management software or to support supply chain insights. Statutory livestock movement databases in other countries capture more data that may perform other roles in addition to traceability such as animal sex, date of birth or cohort, date of registration, and even parentage. The project team initially assumed some of this data might be available through the MLA Data Platform, and it was clear that software vendors and supply chain organisations also assumed this, but that understanding is incorrect.
- The project would have benefited from use of the MyMLA authentication and authorisation system. A significant proportion of project time was spent in solving a process for confirming that a user was authorised to grant access to NLIS data and then obtaining that authorisation. While not a complete solution, the MyMLA authorisation portal, built on standards based OAUTH 2 protocols, would have dramatically streamlined this process.

Discussions with all parties, but particularly the interactions between the project team and MLA, and with supply chain managers identified that:

- Producers' rights in relation to data, and approaches to support those rights through informed consent to use of data for a particular purpose have not been well understood.
 - MLA personnel understood clearly that producers should benefit from data they have collected, but the project team and MLA initially lacked a shared vocabulary and understanding of technology options to facilitate discussions and negotiations regarding data access.
 - Supply chain management personnel understood the benefits that might result from use of richer farm data but were concerned that entire new terms and conditions would need to be drafted for their supply management programme. A process of informed and specific consent about use for a defined purpose would have required a much simpler set of terms of use.
- Producer-led data exchange (through farm software integrations or an industry data exchange) is not well supported by the current regulations and industry agreements that underpin MLA systems.
- Supply chain specialists are not necessarily technology and data specialists. During discussions with the supply chain partner the project team noted a hesitation to engage with producers about the software products that they used, and concern about the level of support that might be needed. This indicates that solutions which require the use of farm data in supply chains will need to strongly address ease of adoption and ease of use. Such solutions will also require a support process that does not burden relationships between supply chain managers and producers.

Both the supply chain organisation and the software vendor that participated in the project expressed an interest in further use of data from the MLA Data Platform or similar sources, providing issues around authorisation and suitability of data for purposes can be resolved.

7.2 Benefits to industry

The project attempted to integrate a data exchange platform (*Pure Farming*) with industry sources such as the MLA Data Platform. It demonstrated the technical feasibility of such an integration, which is important in the context of projects such as the Australian Agricultural Data Exchange³.

Outcomes of the project that could benefit the red meat industry include:

- Identifying and confirming the importance of data access policies and regulations that support a framework for producers to access and re-use their data.
- Demonstrating the broad interest in applying farm-level data in farm software products and decision support tools, and to support supply chain information.
- Proposing data access approaches that could be considered by MLA to support producer re-use of data – including use of the MyMLA authorisation portal, and example agreements regarding use of data for specific purposes.
- Developing an understanding of the barriers to the use of farm-level data in supply chains, specifically confidence in communicating regarding data access, and in supporting technologies.

Feedback from the supply chain organisation indicated that producers would value seeing how their farm operation performed against other farms in a region or supply group. However, the project team was unable to engage with producers to assess this.

8. Future research and recommendations

The following recommendations have been informed by the activities carried out and learning captured in this project.

1. **Address technical and contractual barriers to data integration with MLA systems.**
Negotiation and construction of agreements and technical solutions to data integration formed a substantial component of the elapsed time in this project.
 - a. Address producer re-use of data through software connections when considering regulatory change and industry agreements. The project team recognise that MLA is currently constrained in its ability to facilitate granular re-use of data, and that change in this area can only be addressed once the concerns of federal and state authorities and other industry organisations have been included in updated agreements.

³ Australian Agrifood Data Exchange programme, <https://www.mla.com.au/research-and-development/reports/2023/australian-agrifood-data-exchange-phase-2-and-3/>, retrieved August 2023.

- b. Standardise on an authentication and authorisation platform that can be applied to all MLA and Integrity Systems APIs. A technology platform such as MyMLA can significantly streamline the process for producers to authorise access to their data. The use of a technical solution such as OAUTH 2 does not remove contractual requirements but provides a framework for them: software vendors and third parties must agree with MLA's data access terms in order to register as an OAUTH 2 client; OAUTH 2 scopes can limit access to different types of data; and the producer authorisation process can require producers to agree terms as they authorise access.
2. **Consider how MLA solutions such as NLIS could optionally capture or link additional data points that would benefit supply programmes and livestock genetics.** The ability for producers to opt into additional standardised data elements (in a similar way to using eNVD forms with additional questions) could make it easier for producers to capture and share relevant data with their supply chain or network. Key elements might include sex, date of birth or registration, and potentially parentage (sire or dam).
3. **Support producers and other industry participants to learn the principles and vocabulary of farm data exchange, including best practices for control, security, and terms.** The National Farmers Federation (NFF) Farm Data Code⁴ can provide producers with confidence that organisations which hold and interact with data about their farms have appropriate terms and conditions, and security controls. The Data Sharing Template developed by FoodAgility⁵ promises a comprehensive template that can be customised or drawn upon to deliver appropriate terms for use of data. Finally, *Pure Farming* provides a process whereby producers can review and agree to the specific terms under which a data consumer proposes to use data at the time of granting or declining data access.

In addition, the project team has identified recommendations for its own further research and development using *Pure Farming*.

⁴ NFF Farm Data Code, <https://nff.org.au/programs/australian-farm-data-code/>, retrieved August 2023.

⁵ FoodAgility Data Sharing Template announcement, <https://www.foodagility.com/posts/world-leading-data-sharing-initiative-to-overcome-trust-barriers-in-agriculture>, retrieved August 2023.

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