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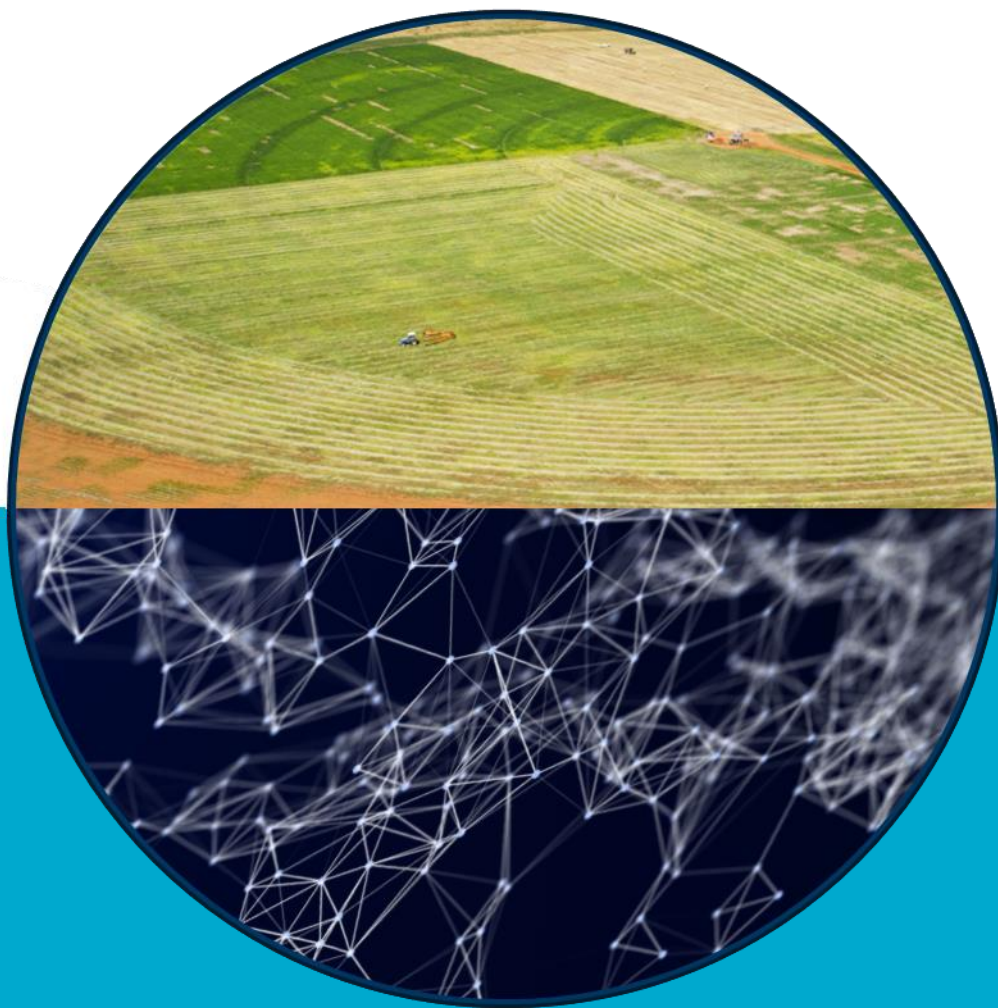
Australian Agricultural Sustainability Framework (AASF)

From Anarchy to Order

Data Ecosystem Design Project - Final Report

Laura Kostanski, David Lemon and Alyce Lythall

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Australia's National Science Agency

About this document

Purpose

This report contains proposals and recommendations for the creation of structures to support the activities of the Australian Agricultural Sustainability Framework (AASF) Data Ecosystem. These have been formulated through a series of research and co-design activities conducted from August 2023 to November 2024.

The report provides details on the context in which the project was established, and the stakeholders who have participated in the co-design activities. It outlines the information generated in early research stages, such as current-state insights and stakeholder requirements. The report also explains how this information was utilised to formulate the design of the recommended structures and the strategy for the AASF Data Ecosystem.

The final section of the report outlines the proposed strategy for shifting the AASF Data Ecosystem from a siloed, anarchic system towards a trusted, efficient and robust system which enables the exchange of sustainability data to become part of the culture across Australia's agriculture sector. A series of recommendations are also provided with regards to next steps to be taken to bring this vision to life.

Audience

The immediate audience for this report are the AASF stakeholders who have generously donated their time and knowledge to the development of the ideas which underpin the content contained herein.

The report has also been written as a guidebook for people who are positioned to enable the realisation of an effective and efficient AASF Data Ecosystem.

Finally, the report has also been written to document the outcomes of the many activities conducted by the CSIRO research team during their delivery of the Stage 2 AASF Data Ecosystem Project. The AASF is a joint initiative led by the National Farmer's Federation (NFF) and supported by the Australian Government Department of Agriculture, Fisheries and Forestry through the Agriculture Traceability Grants Program.

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Acknowledgements

This research project has benefitted immeasurably from the contributions of many people involved in research interviews, co-design workshop activities and working group sessions. The project team are grateful for the time, knowledge and insights they provided as we first explored whether data ecosystem structures were required, and then collaboratively envisioned what shape they might take. Many of those involved in these activities, and their organisations, are listed below as an acknowledgement of their participation and to thank them for their contributions. Some have chosen to stay anonymous. To all, we say thank you.

Note: listing here does not indicate that the individual or organisation has been involved in the writing of this report nor that they endorse the findings.

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1.0 Background

Development of the Australian Agricultural Sustainability Framework (AASF)
About the AASF Data Ecosystem project
Activities and outputs delivered to date
Research activities

Background

The Australian Agricultural Sustainability Framework

The Australian Agricultural Sustainability Framework (AASF) is the first country-specific framework to address sustainability from a whole-of-agriculture perspective. It is being developed by the National Farmer's Federation (NFF) to provide benefits to farmers and the community by promoting best practice in agricultural sustainability and ensuring these efforts can be recognised by international markets and the community.
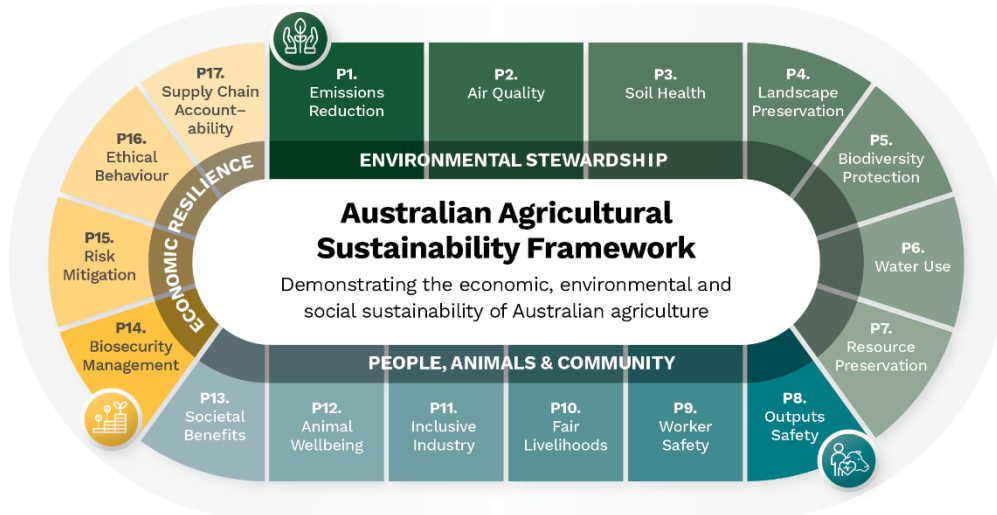
At present, the AASF identifies **17 overarching principles of sustainability for the Australian agricultural industry** under the themes of environmental stewardship, people, animals and community, and economic resilience. To operationalise these principles, the framework introduces **43 criteria that detail the conditions necessary for sustainability.** These criteria translate the high-level principles into clear, actionable areas that define sustainable practice across the agriculture sector. Each criterion represents a specific condition or requirement that must be met to align with the relevant principle, providing structure and clarity for implementation.

Together, **the framework's principles and criteria describe the Australian agriculture industry's sustainability status and goals**, offering a robust, transparent continuum that enables the industry to document and report on sustainability outcomes in a way that is consistent, credible, and adaptable to future challenges.
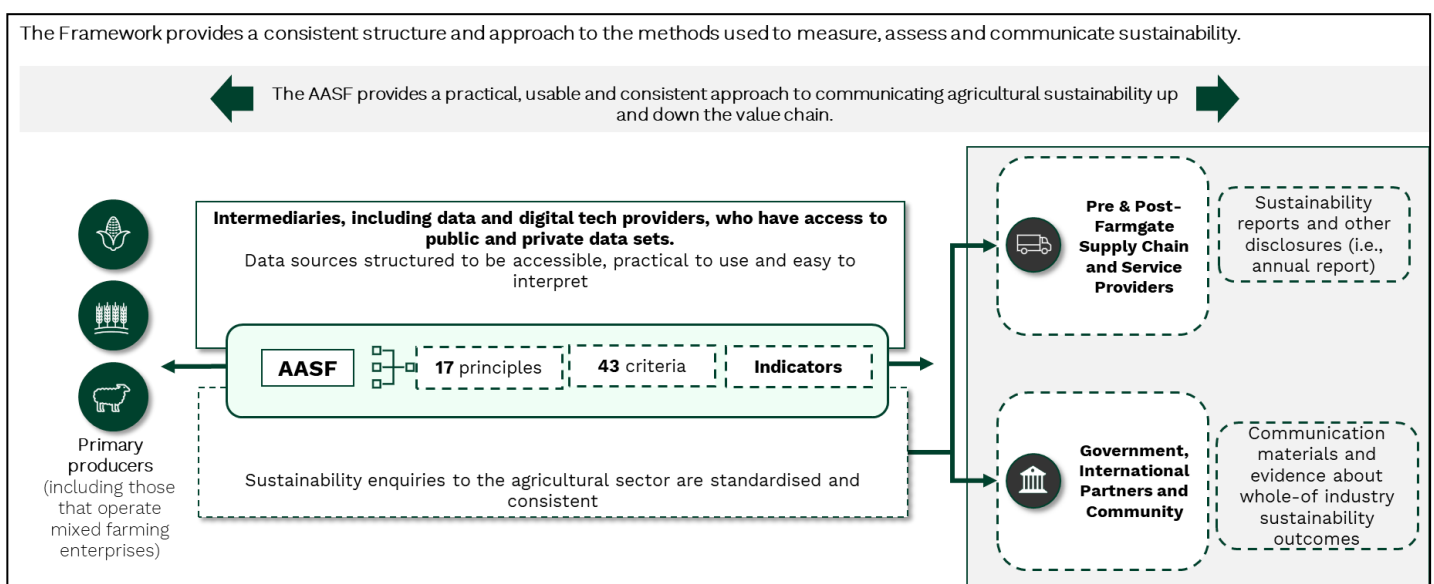
The diagram above was provided in the recent draft report of the AASF Pilot Program project, and explains the context in which this project was established. It was recognised by the community of practice that as AASF provides a consistent approach to communicating up and down the value chain – **the data ecosystem can provide the guidance, tools and evidence required to inform these narratives**.

Development of the AASF

Development of the AASF is being undertaken using a staged approach with each stage consisting of a set of discrete tasks.

Stage 1 of the AASF project (2020 – 2022) undertook several tasks including:

- *Developed the initial framework based on existing national and international schemes and frameworks*
- *Benchmarked existing industry programs (schemes and frameworks) against the new framework*
- *Investigated available sustainability data sets to determine their ability to be used with respect to the new framework;*
- *Created an agricultural sustainability community of practice enabling all stakeholders to meet and discuss sustainability issues; and*
- *Considered market opportunities and how the new framework could inform market-based decisions.*

Stage 2 (the current stage of work) was planned to develop the AASF towards operationalisation and includes tasks to:

- *Complete a materiality assessment against the AASF's 17 principles*
- *Develop a model report for the AASF*
- *Undertake a series of pilots using the framework and develop guidance materials for future users*
- *Continue the activities of the AASF Community of Practice*
- *Design a data sharing ecosystem to support the Australian agricultural sustainability sector*
- *Propose a governance structure for the operationalisation of the AASF*

This report describes the findings and recommendations of the data sharing ecosystem component of Stage 2.

Further information about the development of the AASF including all published outputs from the project can be found on the AASF website.

AASF Website - https://aasf.org.au/
AASF Published outputs - https://aasf.org.au/publications/

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This Project

The AASF Data Ecosystem Project

Analysis conducted by CSIRO in 2021/22[1] found that, within the Australian agricultural sustainability sector, there **are no uniform data sharing arrangements, no standards for data interoperability and varying levels of governance capability maturity** amongst data providers and users. It further found that publicly available data that might be of relevance to the AASF has varying levels of sustainability, usability, and accessibility.[2] Discussions with the AASF Community of Practice (CoP) led to the realisation that the **AASF needs to be supported with robust and logically connected mechanisms for governing data sharing activities**. This would require the definition of use cases, appropriate institutional arrangements, and instilling a culture of trust and collaboration that enables the AASF community, data policies, and information systems to effectively function.

Building on previous work, this AASF Data Ecosystem project aimed to:
- *Help primary AASF stakeholders understand the issues that the AASF data ecosystem will need to address*
- *Propose a governance model and set of institutional arrangements for the data ecosystem that have been co-designed, tested and endorsed by the AASF community*
- *Provide a clear path for implementing and supporting the AASF data ecosystem*

Ultimately, this project aimed to help stakeholders understand the mechanisms by which the data needed to support use of the AASF can be identified and assessed for suitability; and, have a robust approach to developing appropriate supply arrangements which support ongoing availability and use of this data.

Intent of this project

At the start of Stage 2 in August 2023, a series of goals and outcomes were identified to be achieved by December 2024, with broader long-term outcomes defined as goals for the project to deliver towards. These are described below, with associated activities and outputs described overleaf.

Project Intent	This project will bring together stakeholders from across the Australian agriculture industry to develop priority use cases and prototype methods for operating and governing the Australian Agricultural Sustainability Framework (AASF) data ecosystem. As a result of this project, priority stakeholders will understand the mechanisms by which the data needed to support the use of the AASF can be identified and assessed for suitability; and have a robust plan to develop appropriate supply arrangements which support ongoing availability and use of this data.				
Broader Outcomes	Primary AASF stakeholders have a clear path forward for implementing and supporting the AASF data ecosystem	Practices, frameworks and governance arrangements exist to deliver data for users of AASF	Established data supply chains that support use of indicators measuring trends in agricultural sustainability	Primary AASF stakeholders have capabilities and tools to undertake complex data system reviews	Australian agriculture industry sustainability statuses and goals are effectively communicated to markets and the community
Project Outcomes	Engagement from CoP and broader stakeholder community, in the development of data ecosystem project insights and recommendations	Clarity on what practices, frameworks and governance arrangements might be required and need to be tested with stakeholders	Understand the motivations for continuing with existing practices and the incentives which might build trust and enable change	Clear direction on priority requirements to be prototyped	Confidence in AASF data use cases to meet stakeholder requirements

1. Lemon, D; Tetreault Campbell, S; Whitten, S. (2022) Australian Agricultural Sustainability Framework - Data Analysis. National Farmers Federation: CSIRO. csiro:EP2022-0856.
2. Lemon, D. (2022) Australian Agricultural Sustainability Framework – Review of Publicly Available Data Sets. CSIRO, Australia

Activities and outputs

A series of activities have been pursued and outputs produced over the course of the project. Following the delivery of this report, a final set of activities will be undertaken to capture and publish knowledge gained between August 2023 and December 2024. More details regarding definitions of Data Ecosystem project activities, outputs and outcomes are available in documents provided at https://aasf.org.au/publications

Stage	Purpose	Activities	Outputs
1 **Planning** *Aug-Sept 2023*	**Agreed with primary stakeholders on timing, activities, outputs and outcomes for the project to enable development of detailed research plan and activities for Stages 2 and 3.**	• **Intent workshop** with primary stakeholders *(August 2023)* • **Ethics approval** from CSIRO Ethics *(Approval #144-17)*	**Project Intent and Research Plan** *Document including project impact strategy, activity and deliverable timeframes, research plan and initial lines of enquiry Stage 2 and 3 research and design activities.*
2 **Discovery** *Oct 2023 - Mar 2024*	**Engaged with key stakeholders to understand current expectations, concerns and desires for a potential AASF Data ecosystem. This included identification of key use cases; determining stakeholder requirements; and developing draft data ecosystem vision, objectives and principles**	• **One-on-one interviews** with key stakeholders *(Oct 23 – Feb 24)* • **Review of published literature** (academic, stakeholder websites, reports, etc.) • **Minor workshop** with key stakeholders *(Nov 15 2023)* • **Major workshop** *(March 20/21 2024)*	**Discovery Report** *Provides insights from literature review and interviews and provides recommendations for next activities.* **Major Workshop Report** *Details draft use cases and data ecosystem components along with draft strategy components.*
3 **Designing** *Apr – Dec 2024*	**Formed four working groups to develop concepts and test different AASF data ecosystem structure requirements to support nine priority use cases. Developed strategy and roadmap for data ecosystem and provided recommendations on next steps.**	• **Working Group Sessions (4)** to develop ideas and concepts *(September 2024)* • **Working Group Sessions (4)** to test and refine draft structures *(November 2024)*	**Group Materials** September – *ten stakeholder archetypes and nine priority use cases for working groups to develop concept solutions* November – *draft structures, cohorts and personas for working group members to critique* **Final report** *This report provides final recommendations for the AASF Data Ecosystem*
4 *Data Ecosystem Design Toolkit* *Feb – Jun 2025*	*We will capture and publish knowledge gained from the project, including details of methods used.*	*Co-design methods utilised in Stages 1, 2 and 3 will be written up and provided as a "toolkit"*	*Will include reference to, and analysis of, the co-design methods utilised in each stage of the project*

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Research Activities

Exploring the opportunities for change

Utilising iterative design methods, the project team have documented information generated by stakeholders and built upon this content in further co-design activities. The content of this report reflects the various elements of information which have been iteratively developed since the start of the project – with the final data ecosystem designs and recommendations a culmination of the evidence gathered, reviewed and collaboratively developed with research participants over eighteen months. The next sections of this report provide descriptions of these information elements in greater detail.

Starting point

At the start of Stage 2 in August 2023, a series of goals and outcomes were identified to be achieved by December 2024. These goals and outcomes informed the development of a set of research questions which were pursued through literature reviews, participant interviews, co-design workshops and a series of working group sessions. The research questions informed the basis of enquiry for all of these research activities, and include those listed below:

PROJECT OUTCOMES	Engagement from CoP and broader stakeholder community, in the development of insights and recommendations	Clarity on what practices, frameworks and governance arrangements might be required and need to be tested with stakeholders	Understand the motivations for continuing with existing practices and the incentives which might build trust and enable change	Clear direction on priority requirements to be prototyped	Confidence in AASF data use cases to meet stakeholder requirements
LINES OF ENQUIRY	*Who are the key stakeholders for the AASF? Who are the anticipated data collectors, data providers, data modellers, data users and end beneficiaries?*	*What types of governance arrangements for data supply chains are stakeholders currently involved in? What should be considered, in establishing and engaging in these arrangements?*	*How do existing data collection, distribution and usage practices work? And how were they established? Are there any legislative, policy or contractual instruments currently informing these practices?*	*What requirements do stakeholders have for the processes, governance arrangements and incentives to participate in the AASF data supply chain?*	*What use cases do stakeholder cohorts have for the AASF data ecosystem in the immediate term? Which of these use cases are a priority (and why)?*

Iterations

As information was gathered, analysed and synthesised throughout the project, a series of "How Might We …?" (HMW) questions were developed to guide exploration of the problems and opportunities in the data ecosystem domain. In the early stages of the project, these questions included, *HMW …*

- *… design a robust data ecosystem that delivers enduring value for a range of stakeholders?*
- *… develop components of the AASF data ecosystem so that stakeholders have equitable access and appropriate decision-making rights?*
- *… implement a data ecosystem such that it can be sustained (have sustained resourcing) into the long term?*
- *… continue to evolve the data ecosystem as requirements and technical maturity change?*
- *… appoint leaders and designate roles, responsibilities and accountabilities within the data ecosystem which link to (or communicate with) the AASF governance structures?*

In latter stages of the project, further questions evolved. These are, *HMW …*

- *… set guidelines/policies/rules to protect data privacy and ensure social licence?*
- *… facilitate permissioned access to data?*
- *… define, publish and maintain standards?*
- *… define, implement and maintain identifiers?*
- *… facilitate data creation, aggregation, sharing and discovery?*
- *… facilitate sharing of learnings and resources?*
- *… facilitate collaboration across the community?*

This report provides the answers to these questions.

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Stakeholders and ethics

Research activities were conducted in line with CSIRO's *Human Ethics Research Procedures* and complied with requirements of the *National Statement on Ethical Conduct in Human Research (*2023), *The Australian Code for the Responsible Conduct of Research*, and the *Privacy Act* (1988).

Throughout the course of the project, multiple participants were engaged in a range of research activities. These included a series of exploratory research interviews, an online workshop, a 2-day face to face co-design workshop and two rounds of face to face working group sessions. All information provided by participants in these activities has been de-identified and all reports contain anonymised quotes.

In all, over 150 individuals have participated in one or more of the project activities, including:
- *58 people in 33 interview sessions held between October 2023 and February 2024.*
- *More than 80 people involved in the two-day face to face workshop session held in March 2024.*
- *38 people involved in 4 working groups, who completed homework and met at face-to-face sessions in September and November 2024.*

Further to this, the research team presented at and participated in numerous AASF Community of Practice events throughout 2023 and 2024, interacting with 120-150 people in each of these activities.

58	80+	38
Interview Participants	**Workshop Participants**	**Working Group Members**
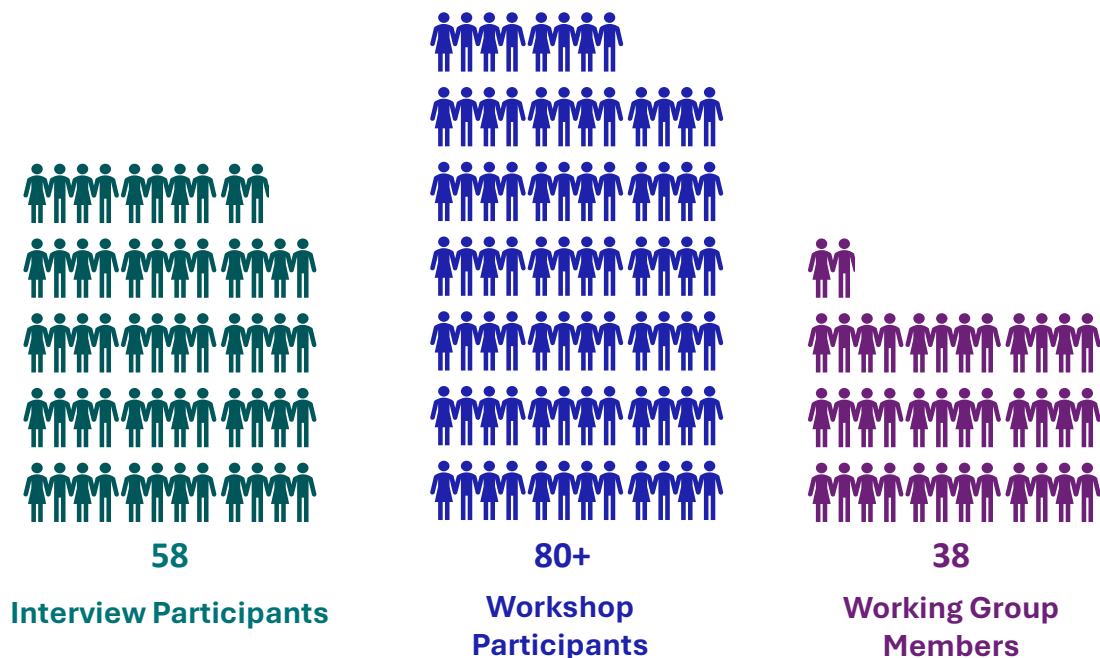
Representation

Since August 2023, a wide range of sectoral experts, industry representatives and sustainability specialists have contributed their knowledge, developed ideas and provided feedback on draft project materials. Participants have provided perspectives from a range of industries, including:

Finance, Fast-moving Consumer Goods (FMCG) companies, retailers, Research and Development Corporations (RDCs), processors, data and digital service providers, agricultural service providers, sustainability experts, agricultural producers, commodity sustainability frameworks and schemes, researchers, state and federal government departments and agencies, and more.

2.0 Current State

What is a "data ecosystem"?
Insights into the existing agricultural sustainability data ecosystem
Other relevant programs of work
Use Cases
Stakeholders – Current State

Data Ecosystems

What is a "data ecosystem"?

This project defines a data ecosystem as an interconnected, dynamic system comprising technical components and actors that collectively engage in the production, management, exchange, and consumption of data. They function through the interaction between data owners, users, and producers within a framework designed to facilitate data availability, reliability, and integrity for specific or broad purposes.

Wherever data is being exchanged between actors, a data ecosystem exists. An **effective data ecosystem** emphasises collaboration, sharing, and governance, enabling data to flow efficiently between different entities for mutual benefit.

'A successful ecosystem balances two priorities:
- Building economies of scale …
- Cultivating a collaboration network …' [3]

'the complex environment of co-dependent networks and actors that contribute to data collection, transfer and use' [4]

Typically, a data ecosystem will consist of a range of technical and social components, including:

- **Data Infrastructure**
  This includes physical and virtual data storage, databases, registries, cloud services, and networking facilities that enable the storage, discovery, retrieval, and processing of data.

- **Data Management Tools**
  Software applications and platforms that support the organisation, quality control, analysis, and visualisation of data.

- **Data Security Management**
  Technologies and protocols that ensure data privacy, permissioning, access, security and sovereignty

- **Integration and Interoperability Mechanisms**
  Technologies and protocols that ensure data can be shared and used across different systems, platforms, and organizations.

- **Data Owners, Producers and Custodians**
  People and organisations that own, create or steward datasets whether it be for themselves or others

- **Data Users, Scientists and Analysts**
  People and organisations with a need for data as evidence or to support analysis.

- **Technology Providers and Data Brokers**
  Organisations providing digital tools and services to support the ecosystem.

- **Policy Makers and Regulators, Standards Bodies and Consortiums**
  Organisations with an interest and/or responsibility for developing and implementing rules, policies and guidelines around data sharing

No data ecosystem is likely to include all these components and actors. Rather, it will include those components necessary to achieve its vision. A key activity in realising an effective data ecosystem therefore is to determine which of these components and actors need to be involved and how they will be engaged in the future.

Initial research for this project identified that **an agricultural sustainability data ecosystem already exists. However, it is not fit to meet the current and emerging needs of AASF stakeholders and Australian agriculture more broadly.** These insights are described more fully overleaf. Further details on the components of a data ecosystem, and what informed the research activities and co-design of outputs for this project, can be found in Lemon *et al* 2024.[5]

3. Oliveira, Marcelo Iury S.; Lóscio, Bernadette Farias (2018-05-30). "What is a data ecosystem?". *Proceedings of the 19th Annual International Conference on Digital Government Research: Governance in the Data Age*. New York, NY, USA: Association for Computing Machinery. pp. 19. doi:10.1145/3209281.3209335
4. Abdulla, Ahmed (March 8, 2021). "Data ecosystems made simple". *McKinsey Digital*
5. Lemon D. and Kostanski L. (2024). *AASF Data Ecosystem Design – Insights Report.* CSIRO, Australia.

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Insights

How does the AASF data ecosystem currently function?

The discovery phase of this project found that the current agricultural sustainability data ecosystem in Australia lacks any form of coordination or organisation. There is no single driver that is influencing all agriculturally focussed organisations in their activities around sustainability. The system is **truly anarchic** in nature.

As a result, individual organisations, whether they be commodity specific sustainability frameworks, supply chain participants or others with a need to access and use sustainability data are acting unilaterally with respect to data collection and management activities. The result is significant costs across the ecosystem due to duplicative data collection, lack of consistency around what is being collected and asked for, and **an increasing burden on those being asked to provide data** with a subsequent degradation in data quality.

Currently, the primary approach to sharing data within the agricultural sustainability sector is to employ 'point-in-time' or siloed solutions. That is, solutions that support a specific need at a point in time rather than general solutions. This applies to both the data being shared and the methods by which it is shared. The result is a complicated array of, often, **incompatible data and applications, addressing very specific needs, applications, and resultant costs** for both data producers and users.

There is a great deal of interest in the AASF, and many are looking forward to being able to use it for their purposes. However, there are many areas of distrust when it comes to data and data sharing within Australia's agricultural sector. Stakeholders have indicated that the **AASF Data Ecosystem can potentially be used as a vehicle for building trust within the sector** as stakeholders will need to work together to achieve the collective benefits on offer. However, this trust could easily be compromised if the implementation of the data ecosystem does not meet stakeholder expectations. These **expectations include transparency, equity, inclusion and that the value of the system needs to be enduring**.

Most stakeholders are generally enthusiastic about improving the ability to more easily supply/access data related to agricultural sustainability. They also agreed that working as a community was the best way to achieve this outcome. In most cases, they can see benefits for themselves and acknowledge that there will be benefits for others as well. **All are keen to remain involved in improving the effectiveness of the existing ecosystem**.

"we need a way to reduce the burden on producers to report. And for this to be easy and I can send to whoever I need to send it to"
- Farmer

"the review said that existing information published about agriculture isn't meeting needs ... and there were issues there about reporting by non-farmers, not getting data out fast enough, not getting enough detail"
- Government Program Representative

"... we recognise there is diversification on farms across multiple commodities ... if there is a way for some of that data to be centrally collected and divvied out to the individual commodities, then that is something we'd have an interest in"
- Commodity Sustainability Expert

"I am concerned about misrepresentation of the data - if we are the ones who control and understand the data and we're putting it out there we have not full but greater control of the messaging that goes with it"
- Commodity Sustainability Expert

"... for banks to report against the taxonomy- they need a definition, and they're all doing it differently ... at the moment the international markets are saying use the EU definitions, but they miss a lot of the nuance of the Australian context"
- Finance Sector Representative

"that is something we need a partnership on...because the certification bodies all have different programs in terms of how they enter, store and oversee the data ... so it makes it difficult for us to make recommendations on the data types we might need to have and how"
- Certification Expert

"the challenge is that everyone is coming from a slightly different perspective - different industries, international markets, environmental lens, social lens etc....that is where it is hard, because it is hard to make everyone happy"
- Sustainability Reporting Expert

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Broad themes of current problems and opportunities

Seven key insights were derived from information gathered during research activities into the current state of the existing Australian agricultural sustainability data ecosystem. Each of these insights, and their nuances, informed the design of the future state structures and the broader data ecosystem strategy. These are described in the next sections of this report.

The current agriculture sustainability data ecosystem is anarchic in nature	There are multiple approaches to data collection; multiple approaches to data management and use; a lack of coordination (leadership) for data and data related activities across the sector; and the ag tech sector lacks maturity when it comes to interoperability and reuse of data.
Different users will engage with and use the AASF and hence the AASF Data Ecosystem in different ways	The data ecosystem will need to support a range of use cases; a high priority for the data ecosystem is a standard set of AASF indicators that can be adopted by users; there is no consensus on the form of the ecosystem; while there are a number of identified use-cases, further applications for the data ecosystem will emerge over time; There is a need to distinguish between the governance of the AASF and governance of the data ecosystem.
Different drivers are informing how organisations develop their data practices, frameworks and governance arrangements	There is a significant difference in focus between those parts of the industry that are trade exposed and those which primarily operate domestically; Those organisations that are exposed internationally are looking to a range of different standards (SBTi, TNFD, GRI, TCFD, etc); An important driver is the availability (or not) of data to support reporting; there does not appear to be any regular ongoing dialogue between government and industry about data collection; Many are looking for exemplar approaches that they might follow; and, most existing sustainability frameworks focus on a single commodity with minimal ability to account for multi-commodity farms.
Data sharing within the agricultural sustainability sector is undertaken on an ad-hoc basis	There are many initiatives within agriculture seeking to solve the problem of data sharing along supply chains; data collection methods vary, some of increasingly lower quality and value; there are many assumptions about the roles of key stakeholders within the sector; numerous governance patterns emerging within parts of the industry or along supply chains.
In general, stakeholders can see a range of benefits coming from the AASF Data Ecosystem	A key benefit will be the ability to provide consistency, clarity and ultimately efficiencies around data collection and sharing; The data ecosystem will also provide a mechanism through which the community can identify and address gaps in national data sets and infrastructure; The data ecosystem will enable greater engagement across the industry to address myths and misconceptions, and collaborate to solve problems; The data ecosystem may also provide the opportunity for stakeholders to benchmark themselves against their peers; Ultimately, the data ecosystem may also enable the community to find ways to return value to data producers.
The greatest opportunity of, and the greatest risk to, the data ecosystem is trust	Getting leadership of the data ecosystem right is essential: key characteristics of any leading organisation would be: trusted, reputable, respected, independent, apolitical and understand the problem; A data ecosystem must specifically address, and have ongoing solutions for, privacy/security and the prevention of misuse; The data ecosystem community needs to provide strong guidance to the ag tech sector on its needs and expectations.

Further details on the current state of the Australian agricultural sustainability data ecosystem, and the insights gathered during the initial research activities, can be found in Lemon and Kostanski (2024).[6]

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6. Lemon D. and Kostanski L. (2024). *AASF Data Ecosystem Design – Insights Report*. CSIRO, Australia.

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Other relevant programs of work

AASF Stage 2 Projects

Stage 2 of the AASF Project is a suite of related projects focussed on furthering the AASF concept. Within this suite are 3 projects, the results of which will have important implications for the AASF Data Ecosystem project. These are:

1. **AASF Model Reports project** (AFI) – Commenced in September 2023, this project aims to add further specificity and utility to the AASF, develop an initial set of AASF Indicators and Metrics from these develop a prototype AASF report. Of importance to the Data Ecosystem project are the initial set of indicators which will describe what could or should be measured to address AASF Principles and Criteria. It is these indicators that guide what data should be core to the AASF Data Ecosystem.
2. **AASF Guidance and Pilots** (KPMG) – this project is developing and testing, through a set of pilot activities, guidance materials for potential users of the AASF. This guidance includes data collection. One of the findings of the pilot activities has been that users need direction on indicators to enable data collection
3. **AASF Strategy and Operations** (Schuster Consulting Group and KPMG) – this third activity is exploring options for operationalising and hence sustaining the AASF. This includes the design and formation of a AASF Entity that will govern the AASF. It is likely that elements of the AASF Data Ecosystem will fall under this governance.

Other Relevant Activities

Beyond the current AASF project are a set of projects being undertaken for different reasons and by different organisations all with some focus on Australia's agricultural data ecosystem. Many of these activities are relevant to the Data Ecosystem in that they are developing necessary capabilities for the AASF Data Ecosystem and/or there could be mutual benefit from closer engagement. Importantly, failure to engage risks the creation of duplicate capability and reinforces the anarchic nature of existing ecosystem dynamics.

Below is a description of some of the activities more frequently mentioned during the discovery phases for this project. These have been chosen to demonstrate the diversity of activities currently underway. A full list of the discovered activities is provided in Appendix C.

Australian Agriculture Traceability Alliance

The Australian Agriculture Traceability Alliance is tasked with implementing Australia's *National Agricultural Traceability Strategy* (2023-2033). This strategy includes a focus on data and aims to 'increase trust and transparency by redesigning how data are collected across the supply chain.'[7]

Numerous projects and activities have been funded by the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) to explore aspects of agricultural traceability including key data projects.

Under the auspices of the Alliance, three technical working groups have been established to provide technical, operational and strategic advice on agricultural traceability. Of these the Data Standards Working Group (DSWG) and Assuring Sustainability Claims Working Group (ASCWG) are particularly relevant to the AASF Data Ecosystem.

> *Data Standards Working Group*
> *Led by the Food Agility CRC, this groups first output was a Consultation Paper focussed on a data interoperability framework for agricultural traceability[8]. This paper explores the issues of and proposes a framework, including governance, for achieving semantic data interoperability across the agriculture sector. These same standards will be necessary within eh AASF Data Ecosystem*

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7. https://www.agriculture.gov.au/biosecurity-trade/market-access-trade/alliance#data – accessed 12/12/24
8. Ceregra, G 2024, *Data interoperability framework for agricultural traceability and product data: consultation paper*, prepared by Food Agility Co-operative Research Centre for the Department of Agriculture, Fisheries and Forestry, Canberra. CC BY 4.0.

Assuring Sustainability Claims Working Group
Led by the National Farmers' Federation, this working is seeking to understand the evidence of sustainable practices being sought by Australia's agriculture export markets and from here propose how Australia might respond to these growing expectations. This is potentially an important use case for the AASF Data Ecosystem to support.

AgTrace Project

Also funded by DAFF, this project has developed and is testing the Australian Agricultural Traceability Protocol (AATP) for the sharing of credentials along supply chains. This includes proposing a governance model to manage the protocol.

A key objective of this is to work is is to encourage and empower farmers as land stewards and data owners to securely capture, reuse and share data across the supply chain, providing an efficient and cost-effective method to prove their credentials and enable market access.

From an AASF Data Ecosystem perspective, the AATP and associated governance framework are likely to havea significant influence on the way sustainability data is exchanged.

Farm-level emissions reporting standards

Within the agriculture sector numerous inconsistent methods for calculating on farm GHG emissions are available to Australian farmers. These inconsistency raise concerns and doubt about the accuracy of the various methods in use and so industry is seeking greater assurance around available calculators. DAFF has commenced a 10 year program to develop national emissions estimation and reporting standards with the goal to increase the proportion of producers that know and understand their business' net emissions profile, and the on-farm activities and practices that affect their net emissions.

These standards are likely candidates for future AASF Indicators and so influence the data collected and shared on this subject.

Geolocation Data Sharing Cross-Jurisdictional Taskforce

Many jurisdictions around the world are currently developing solutions to respond to the European Union's Deforestation Regulation (EUDR) which requires, among other things, that producers provide geolocation information for where a product has been produced. In Australia, the above taskforce is investigating opportunities to implement an opt-in 'tell us once' approach to geolocation data sharing within agricultural supply chain. The aim is to improve the ways data are collected and managed and to help with interoperability across all Australian jurisdictions

A key aspect of this system will be the adoption of identifiers for entities within these supply chains and, in particular, identifiers for farm properties. There are existing systems for property identification (called Property Identification Codes - PICs) in use to support biosecurity purposes. However, these identifiers are not consistent between states and territories, are only used for some commodities (livestock), and there are various privacy and security regulations limiting their use.

Published, unique, verifiable and resolvable identifiers are essential for any traceability system and hence needed to support the AASF Data Ecosystem. The work of this task force and others like it need to be tracked closely.

Australian Agricultural Data Exchange

The Australian Agricultural Data Exchange (AADX) is an initiative of Australia's agriculture industry to enable data from disparate sources to be securely discovered, shared, merged and re-used to support a range of purposes. The initiative is being governed by a consortium of organisations including: Australian Wool Innovation, Charles Sturt University, CSIRO, Fisheries Research and Development Corporation and Meat and Livestock Australia. The capability is currently in a development phase using a case study driven approach.

From a AASF perspective, the ability to exchange agricultural sustainability data is a key need. Data exchanges such as the AADX have the potential to meet this need.

Stakeholders – *Current State*

Cohorts of the AASF Data Ecosystem

The AASF Data Ecosystem consists of many different stakeholders. These stakeholders have different levels of capability, different goals, and different requirements of the data ecosystem. However, in amongst the many roles there are three key cohorts which can be distinguished based on their sharing of common experiences. These are: primary producers and processors; data and digital service providers; and, evidence requestors.

Primary Producers and Processors

Are at the forefront of producing data and information about sustainability practices within their operations; use a diversity of digital services to manage operations and communicate with evidence requestors; and, have variable levels of digital literacy and knowledge of the AASF.

Current experiences of the data ecosystem for this cohort include:

- *Bearing the cost* to collect data with little direct return to the business

- Fielding multiple *inefficient requests* for data, from different industry actors.

- Confused and frustrated by *inconsistent guidance* on what data to collect

- *Distrustful* of what others will do with their data and who will have access.

- Frustrated by *generalist digital tools* that aren't always fit for purpose, especially in the Australian context.

- *Reticent to implement solutions* and/or change behaviour as data and data sharing are seen as a secondary concern to farming

- Feeling *disempowered* by power imbalances across the system that are not in their favour
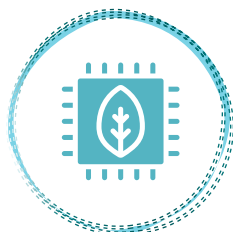
Data and Digital Service Providers

Provide digital systems, analytical tools and/or value-added datasets for a range of agricultural and sustainability related sectors; and, enable multiple connection points between Primary Producers & Processors with Evidence Requestors.

Analysis of this cohort indicates they share many experiences and requirements, including:

- Sector *maturity is still developing* resulting in technology not always being fit for purpose, especially when applying international digital products in an Australian context

- *Lack of standards* or inconsistent application of "standards" resulting in lack of interoperability between tools

- Concern about *detrimental impacts* to existing commercial advantages from standardisation

- *High cost* of maintaining systems, particularly due to proliferation of standards, and disparity of data

- *Lack of coordinated guidance* and standards inhibits confidence in what future features/directions to invest in

Evidence Requestors

Require data and information about agricultural sustainability practices for multiple purposes; use a variety of digital services (including in-house services) to request information, analyse data and communicate findings.

Assessment of the multiple use cases of this cohort indicate some common frustrations and requirements:

- *Data quality is degrading* as result of inconsistent or inappropriate data collection methods being used.

- Lack of standards and guidance around what to collect means there is a need to *determine this for themselves*

- *Data gaps exist* at various points along the supply chain, either through a lack of collection or incorrect level of detail to support interrogation

- Can be difficult to discover fit for purpose data due to *access restrictions or inconsistent language*

- Difficult to use/re-use data due to *restrictive licensing or lack of interoperability*

- *Difficulty in comparing* and integrating datasets, particularly for longitudinal analysis

Personas of the AASF Data Ecosystem

Within each of the three stakeholder cohorts, there are many different groups with requirements of the AASF Data ecosystem. A series of personas have been developed to describe the nuances of the roles of these various groups.

The personas were developed from the information generated during interviews, workshops and working group sessions. They do not represent real-world individuals, rather they are intended to describe the many and various experiences that a range of primary producers and processors, data and digital service providers and evidence requestors have across the data ecosystem. These personas describe those who currently experience problems with the data ecosystem and would benefit from coordinated approaches and efficient structures being developed.

It is noted that significantly more Evidence Requestor personas have been created than for the other two cohorts. This represents the reality of the current data ecosystem – many more data request variations and demands than there are types of providers.

The personas were originally developed to assist with the research and co-design activities. They are provided here with the intention for them to be utilised in future AASF design activities – for the moments when certain stakeholders are not present in a meeting room and their requirements need to be considered by decision makers. A snapshot of their details are provided overleaf, with full details of their current and future experiences provided in Appendix B.

Primary Producers and Processors

Heather | Amandeep | Allan

Marcus | Alejandro | Tayla

Mary

Data and Digital Service Providers

Jane | Ben | Arina

Omid | Roger

Evidence Requestors

Bob | Fiona | Daniel

Pravin | Kahu | Rebecca

Maria | Saeed | Helen

Garry | Troy | Paris

Paul | Connie | Fatimah

Nikola | Prue | Jasmin

PRIMARY PRODUCERS & PROCESSORS

These personas represent a range of primary producers and processors who currently experience problems with the data ecosystem and would benefit from coordinated approaches and efficient structures being developed. A snapshot of their current experiences are described below, further details in Appendix B.

Heather

ROLE

Runs a sheep station in Tasmania

CURRENT EXPERIENCES

Heather spends **a lot of time manually providing her sustainability credentials to requestors** as there is no way for them to be automatically discovered.

Amandeep

ROLE

Has a blueberry farm and packhouse on the NSW mid-north coast

CURRENT EXPERIENCES

Amandeep **is frustrated by the resourcing required** to provide similar, but not the same, data to different retailers in different systems in different ways.

Allan

ROLE

Is a wool grower in southern NSW

CURRENT EXPERIENCES

Allan is **confused by the inconsistent guidance** provided by sustainability advisors about how to collect and share data about his practices and is **distrustful of what others will do with his data.**

Marcus

ROLE

Sustainability Manager for a corporate farming operation

CURRENT EXPERIENCES

Marcus needs to provide reports to shareholders and export markets, but **the process is resource intensive** as he needs to identify the indicators he is going to use and collect relevant data. The task is seen as a cost by the organisation with little visible return on investment.

Alejandro

ROLE

Processor (1st Level)

CURRENT EXPERIENCES

Alejandro is **overwhelmed by the amount of different types and formats of data** he receives from his suppliers and the resourcing required to aggregate and then share with others along the supply chain.

Tayla

ROLE

Grows wheat in WA

CURRENT EXPERIENCES

Tayla is exhausted by using multiple different digital systems which **are not fit for her purposes,** and which do not interoperate. She also feels **disempowered by lack of control** over the use of her data by others in the supply chain.

Mary

ROLE

Runs a mixed-commodity farm in Western Victoria

CURRENT EXPERIENCES

Mary needs to have multiple sustainability certifications for the supply chains she is involved in and is **fielding a multitude of different requests for her sustainability data**. This is time consuming, and Mary **doesn't have a line of sight to long-term benefits** from the data collection and reporting activities she undertakes.

DATA & DIGITAL SERVICE PROVIDERS

These personas represent a range of data and digital service providers who currently experience problems with the data ecosystem and would benefit from coordinated approaches and efficient structures being developed. A snapshot of their current experiences are described below, further details in Appendix B.

Jane

ROLE

Director at a company supplying farm management software

CURRENT EXPERIENCES

Jane is **unable to easily distinguish the value** of her sustainability data collection product offerings for Australian ag producers and processors.

Ben

Value added re-seller of data and data products

Ben is unable to develop the best possible analysis products for their clients, because of **limited data supply, reliability and/or quality.**

Arina

Technical Product Manager at an industry-owned company that manages farm-level data

Arina finds it **difficult to verify claims** because identifiers are not consistent. This impacts the value proposition of her company's system as a traceability and identity assurance tool.

Omid

ROLE

Systems-Level Data Exchange Company

CURRENT EXPERIENCES

Omid finds there is a high cost / difficulty in providing a true systems-level offering as industry data or **products are not interoperable or compatible**, therefore they have to build bespoke mappings for all digital service providers within the sector.

Roger

Data product owner from a government data agency

Roger is unable to create high quality national datasets due to changing requirements from policy makers and limited engagement from primary producers and processors in supplying data through national surveys. This **restricts the utility and increases resourcing required** to develop national datasets.

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EVIDENCE REQUESTORS

These personas represent a range of evidence requestors who currently experience problems with the data ecosystem and would benefit from coordinated approaches and efficient structures being developed. A snapshot of their current experiences are described below, further details in Appendix A.

Bob

ROLE

An ag finance specialist at an Australian bank

CURRENT EXPERIENCES

Bob struggles to define his bank's sustainable product offerings and **assess applications from primary producers**. He finds it difficult to meet his KPIs with regards to sustainability products and hence help his organisation meet their sustainable investment targets.

Fiona

ROLE

Sustainability report developer at an FMCG

CURRENT EXPERIENCES

Fiona finds it difficult to report on certain aspects of sustainability across her organisation as **the data is either unavailable** or requires intensive resourcing to access and analyse.

Daniel

ROLE

Supplier of fertiliser for on-farm use

CURRENT EXPERIENCES

Daniel is **not able to confidently trace his product** through the supply chain as his PDF product documentation is manually re-typed by primary producers into their on-farm reporting systems, potentially losing or misrepresenting critical information.

Pravin

ROLE

Representative of a non-government organisation (NGO)

CURRENT EXPERIENCES

Pravin wants to use benchmarking data in their consumer-facing app to raise awareness about how sustainable different Australian agricultural commodities are but **can't easily find or use reliable data.**

Kahu

ROLE

Consumer of Australian agricultural goods

CURRENT EXPERIENCES

Kahu wants to make informed choices about the types of goods she buys in regard to sustainability of the product but isn't sure if she can trust what is printed on the label on the products.

Rebecca

ROLE

Research Scientist

CURRENT EXPERIENCES

Rebecca finds discovering and accessing data to support her analysis is time consuming, expensive and sometimes unsuccessful leading to poor, unreliable or unusable results.

Helen

ROLE

Sustainability Manager at a Retailer

CURRENT EXPERIENCES

Helen lacks confidence in sustainability claims of products she is buying, which is a risk for her organisation to meet its sustainability targets with respect to its sales.

Saeed

ROLE

Develops insurance products for the agriculture sector

CURRENT EXPERIENCES

Saaed is unclear as to how sustainable practices can be accounted for in assessing on-farm insurable risk with no standard approach defined in Australia.

Maria

ROLE

Owner of a Commodity Framework

CURRENT EXPERIENCES

Maria is using unreliable survey or repurposed publicly available data to produce commodity sustainability reports which still have data gaps.

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Garry

ROLE

Market Access and Trade Government Policy Advisor

CURRENT EXPERIENCES

Garry **needs policy decisions and program investments** to be informed by robust intelligence to address priority issues for industry, however he cannot always access the data he needs to undertake his assessment. This can reduce community trust in decisions.

Troy

ROLE

Agronomist / Trusted Advisor

CURRENT EXPERIENCES

Troy struggles to provide advice to clients with respect to sustainability as there is **currently a plethora of conflicting information** from various sources. He wants to be more confident they are providing trustworthy, current and relevant information to individual clients.

Paris

ROLE

Procurement Manager at an International Hotel Chain

CURRENT EXPERIENCES

Paris needs to align procurement practices with sustainability goals of her organisation but is **unable to access consistent trusted evidence** of sustainability claims for individual products.

Paul

ROLE

Agricultural investor

CURRENT EXPERIENCES

Paul needs up to date, trusted and accurate information regarding sustainability to inform his investment decisions in products or markets, however the **accuracy of this and timeliness doesn't** always meet his needs.

Connie

ROLE

Compliance manager for an importer in Europe

CURRENT EXPERIENCES

As the accountable party in the supply chain, Connie has **difficulty in verifying sustainability claims** for a product and needs access to product data that is comparable and interoperable with their own for assessment and approval.

Fatimah

ROLE

Australian government policy analyst

CURRENT EXPERIENCES

Fatimah often gets requests from the Minister to assess the impact of a policy change but **can't determine if she's found all of the data** she needs.

Nikola

ROLE

Australian agricultural sustainability champion

CURRENT EXPERIENCES

Nikola is a champion of the sustainability of Australian agriculture. She uses the AASF to describe agricultural sustainability practices but is **not able to readily access evidence** to help her demonstrate progress against it.

Prue

ROLE

Verifies Sustainability Processes and Systems

CURRENT EXPERIENCES

Prue needs to **expend significant resources to go on farm and physically inspect** practices, infrastructure, equipment and documentation. This is intrusive and returns limited value to producers and processors.

Jasmin

ROLE

Journalist

CURRENT EXPERIENCES

Jasmin has been tipped off about a greenwashing claim and has decided to investigate. **She wants to be able to access information to verify the claims** being made but finds this very difficult.

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Use Cases

Identifying use cases for the future AASF Data Ecosystem

At the co-design workshop held in March 2024, participants explored potential future scenarios and benefits which could be derived from an effective, efficient and trusted data ecosystem. Analysis of these scenarios and benefits revealed **nine distinct use cases** for the development of the AASF Data Ecosystem. These use cases have informed, and will continue to inform, the design of future structures which will be required to deliver on these requirements and enable stakeholders to realise benefits of their contributions and collaborations within the AASF data ecosystem. Below is a summary of the nine use cases. Specific details of each use case is available in Appendix A.

Develop National Scale Sustainability Data Standards	Users seek to access nationally relevant standards to reduce risks associated with their sustainability related data and information. This includes, but is not limited to, data exchange, data collection, and data use.
Develop National Scale Sustainability Data Sets	These data sets will be used for a range of national level sustainability related reporting and analysis activities. Users are likely to be government and commodity-oriented sustainability frameworks, who wish to address the challenges associated with discovering, accessing, developing and using national scale sustainability data.
Access Subsetted Aggregated Sustainability Data	Users are undertaking some activity for which they require a subset of aggregated sustainability data. This may be to support policy development, undertake research activities, develop local/regional benchmark information, monitor programme outcomes or similar.
Benchmark Sustainability Credentials	Users seek to conduct benchmarking to understand the current sustainability credentials of their organisation in the context of their industry peers. This may be for reporting purposes or to identify where gains within their organisation might be made.
Trace Sustainability Credentials Along Supply Chains	Users seek to understand and track the sustainability credentials of a product or products that has traversed part, or all, of a supply chain. This might be to support sustainability reporting or to meet export regulatory requirements.
Assess Sustainability Credentials	Users seek to understand the sustainability credentials of a client to assess an application of some form. This might be for finance or similar.
Assess Farm Sustainability	The user seeks to understand the current sustainability credentials for the property (farm) they are responsible for. This may be for a range of purposes including reporting, internal research and development, or other reasons.
Improve Farm Sustainability	Users seek to improve aspects of sustainability of the property (farm) they are responsible for. They might be a farm owner, a sustainability officer or resource manager, or another professional based at the organisation.
Reporting	Users seeks to produce an organisational sustainability report and needs to access sustainability data from along supply chains they are involved in or from their clients. These reports may be for regulatory purposes or to inform the organisation's stakeholders

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3.0 Future State

Data Ecosystem – Future State
Structures
Governance
Stakeholders – Future State

Data Ecosystem - Future State

Greater confidence to invest in product development for agriculture sector

Clear guidance on standards and protocols

Ability to identify and meet market demands

Efficient data collection & use

Tools do what is needed

Can make informed decisions about what tools to use

DATA & DIGITAL SERVICE PROVIDERS

Can innovate and value-add on standards

Greater customer uptake

Opportunity to be involved in forums

System update costs reduced

Clarity on data provenance and use

Data can be discovered and used confidently

Data gaps can be addressed

Can plan for future changes

DATA ECOSYSTEM STRUCTURES MANAGED BY AASF "ENTITY"

CROSS-SECTOR DATA ECOSYSTEM STRUCTURES

PRIMARY PRODUCERS & PROCESSORS

EVIDENCE REQUESTORS

Can choose who can access and use their data

Additional access to sustainability tools and offers

Clear ROI on data collection and reporting activities

High quality data is available

Confidence in data

Clarity on what data to request and how

Through exploration of Australia's existing agricultural sustainability data ecosystem, it has been identified that there are multiple processes, methods, standards and datasets being used by an extensive range of stakeholders who have varying requirements for the AASF. For the current data ecosystem to shift from being siloed and anarchic towards something which is trusted, effective and efficient, a set of structures need to be developed and implemented. This is particularly important if the ecosystem is to reduce the burden on primary producers and processors for data collection and reporting activities and return benefits to these stakeholders.

This chapter describes the proposed structures in detail and provides insight into the various governance processes which will be required to ensure the future data ecosystem is trusted. Finally, this chapter provides details of the proposed benefits individual stakeholders and their organisations will receive as the Australian agricultural sustainability data ecosystem shifts towards collaborative coordination.

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Structures

BROADER DATA ECOSYSTEM STRUCTURES
Collection of structures required to ensure the Data Ecosystem is fully enabled. The AASF "entity" has collaboration role here

DATA ECOSYSTEM STRUCTURES MANAGED BY AASF "ENTITY"
A collection of AASF Data Ecosystem structures managed by a future AASF-specific "entity" (i.e. governing body or organisation)

REGISTER OF INDICATORS

CATALOGUE OF METHODS

CATALOGUE OF DATASETS

AASF DATA GUIDANCE

AASF DATA ECOSYSTEM PORTAL

GOVERNANCE GROUPS

PROCESSES

FORUMS

GUIDELINES & RULES

INTEROPERABILITY STANDARDS

IDENTIFIERS

SUSTAINABILITY ADVICE PLATFORMS

PLATFORMS FOR DATA EXCHANGE

Structures of the AASF Data Ecosystem

It is proposed that at the core of a functioning, effective, efficient AASF data ecosystem there needs to be:

- a **register** of AASF Indicators.

Supporting the development, maintenance and use of this register the AASF data ecosystem also needs to provide:

- A **catalogue** of appropriate methods by which these metrics can/should be measured
- A **catalogue** of datasets which contain observations of these indicators and that can be utilised to support sustainability related activities
- **Governance** groups responsible for overseeing the implementation of AASF Data Ecosystem governance **processes**, including :
  - The maintenance of the register of indicators and the catalogues of methods and datasets; and
  - Identifying opportunities for the creation of new datasets
- A digital platform containing **curated AASF data guidance**, advice and other information to help stakeholders use the register and catalogues and their content or develop their own data sets
- An **AASF Data Ecosystem Portal** that enables stakeholders to discover and access the various information artefacts and tools for the AASF Data Ecosystem
- A set of stakeholder **forums** for sharing knowledge and resources

Further to this, given the breadth of stakeholder requirements in this ecosystem, it is critically important for AASF to have a collaborative leadership role in the design, implementation and maintenance of key structures provided by the broader agricultural and sustainability data ecosystems. These include:

- **Guidelines and Rules**
- **Interoperability Standards**
- **Identifiers**

Finally, given the nature of the AASF data ecosystem, it is important for AASF governance mechanisms to continually remain engaged with groups and organisations which develop and maintain **platforms for data exchange** and **platforms for sustainability advice**.

Data Ecosystem Structures managed by the AASF "entity"

Each of the proposed structures would be developed, implemented and maintained by the future AASF entity. Key details and considerations are described below, with more information provided in various subsections of this chapter.

Structure	Description	Considerations
Register of Indicators	Well governed list of indicators aligned with AASF Principles and Criteria along with details of contexts in which they are relevant	This is the core of the data ecosystem. Provides guidance and confidence to all stakeholders on what to measure with respect to a particular AASF criterion, within a specific context Governance of this register needs to be open, transparent, and trusted.
Catalogue of Methods	Maintained list of context-specific methods for measuring AASF indicators	Guidance to stakeholders on accepted/preferred methods to measure individual indicators (within different contexts). This is not a definitive nor mandatory list, it is guidance material for AASF stakeholders.
Catalogue of Datasets	Maintained list of datasets (and their locations) that contain data related to specific AASF indicators	A service for stakeholders enabling them to identify existing datasets and encouraging data reuse Includes access information and/or reference to locations of data available for purchase/provision through licencing agreements. This is not a definitive list, it is guidance material for AASF stakeholders, with an assessment of suitability for different contexts of use
Governance Groups	Indicator and Data Advisory Council (IDAC); Expert Working Groups (EWGs); and, Sustainability Data Working Group (SDWG)	IDAC - responsible for implementing governance processes for AASF Data Ecosystem. EWG - experts providing advice to support the maintenance of content in the AASF Registers and Catalogues. SDWG - Panel of experts appointed to address broader data issues.
Processes	Processes for developing and maintaining AASF Registers and Catalogues	These processes need to be clear, open and transparent. Overseen by the IDAC. Implemented by the working groups or the AASF entity. At the core is a Task List which defines the priorities and timeframes within which they will be addressed.
AASF Data Guidance	Documents, tools and other advice for the creation and assessment of AASF-aligned datasets	Guidance materials for AASF stakeholders involved or interested in data capture, use and reporting. Includes links to tools, relevant standards, descriptions of how to design datasets, lists of experts who can be contacted for assistance etc.
AASF Data Ecosystem Portal	Entry point for stakeholders to discover and access the various information artefacts and tools for the AASF Data Ecosystem	Standalone capability necessary to support users to find information and build their capability to utilise AASF for their specific purposes. The primary function here is discovery of content with the register, catalogues and guidance materials.
Forums	Opportunities for community members to gather and share knowledge, discuss issues and build capability around AASF aligned data	Consists of events and activities both face-to-face and online. Includes regular (annual or biannual) symposium Some will be topic specific (e.g. for specific criteria or for digital technology providers).

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Broader Data Ecosystem structures

It is recognised that the AASF data ecosystem exists within broader Australian agricultural and sustainability data ecosystems. To be successful it will be critical for key enabling structures to be implemented within these ecosystems. Key details and considerations for these structures are described below, with more information provided overleaf.

Due to the importance of these structures for the effective functioning of the AASF Data Ecosystem, it is proposed that the AASF entity play a collaborative leadership role with existing and/or future expert groups to design and reference AASF-aligned implementation of these structures.

Structure	Description	Considerations
Guidelines and Rules for Data	Whole of agriculture sector guidance/rules /policies around the capture, storage and use of data.	Guidelines, policies and rules for data sharing need to be set and maintained at a level within the ecosystem that brings greatest value for stakeholders. There are many activities within Australia agriculture that require data sharing, and the same rules should apply for all including AASF. Therefore, the AASF Entity has a role to collaborate and guide development and usage of data sharing guidelines, policies and rules across the ag sector.
Interoperability Standards	Standards supporting the exchange of data within the agriculture sector. Includes but not limited to interoperability standards, ontologies, etc	Standards need to be governed and maintained at scale that is most efficient for the agriculture sector. There are many activities within Australia agriculture that require data standards, and the same rules should apply for all including AASF. Therefore, the AASF Entity has a role to collaborate and guide development and usage of standards across the ag sector.
Identifiers	Labels/names for the important things (parties, places, products and processes) within the agriculture sector	Like standards, identifiers need to be managed and deployed at a scale that is most efficient from both a use and governance perspective. This is a 'whole of Australian agriculture' scale concern, as it relates not only to sustainability but also biosecurity and food safety. Therefore, the AASF Entity has a role to collaborate and guide development and usage of identifiers to ensure they are accessible and maintainable by all stakeholders. These identifiers need to be discoverable, verifiable, globally unique, and resolvable.
Platforms for Data Exchange	Online platforms enabling parties to exchange data in an efficient, effective and secure manner.	Can also be referred to as dataspaces, data warehouses, data repositories, or data portals. Will need guidelines/policies for how these platforms operate to ensure data owner rights are protected. Some commercial platforms are in operation or are being developed. AASF Entity should seek to ensure that platform owners are aware of and enabled to update systems to support AASF users
Sustainability Advice Platforms	Online platforms publishing benchmark data and advice regarding agricultural sustainability	Likely to be commodity or regionally specific. These tools represent a primary return of value to producers. They provide information on benchmarks; connect to resources for uplifting sustainability practices; and access to experts who can advise on programs and grants available to assist in meeting reporting or other requirements.

Why we need these structures, and how they can be developed

The primary need of all stakeholders within the AASF community is to know 'what data?'. *What data should be collected by producers and processers*. *What data can be asked for by evidence seekers*. *What data should be supported by digital tools and services*. We need to bring **order to the current state of anarchy** around current data collection and requests within the data ecosystem.

To achieve this order, at the core of the future AASF Data Ecosystem is a well governed list (register) of indicators. This is supported by other structures (managed lists, governance structures, agreements, standards, and technical infrastructure) that enable AASF stakeholders to discover, share and use sustainability data.

For stakeholders to be able to know "what data" requires agreeing on what indicators might be used to measure individual criteria within specific contexts. Here an indicator is defined as: "a measure of specific quantitative and qualitative attributes, reflecting values as seen by the interest group defining each criterion and helping monitor trends over time"[7]. In other words, an indicator is a parameter that can be measured, and which can be used to monitor the status of and changes in a specific AASF criterion.

An agreed set of indicators provides the ability for all AASF stakeholders to determine what data is required to meet their specific sustainability use cases. Thus, a Register of Indicators is required within the AASF Data Ecosystem to provide stakeholders with a trusted, reputable and consistent reference source for these purposes.

Beyond the Register of Indicators, AASF stakeholders require:
- Confidence in the processes used to populate and manage the Register (ie *Governance Groups and Processes*)
- Guidance on how to collect data for individual indicators (within their context) (ie *Catalogue of Methods*)
- Support to discover and access common datasets (ie *Catalogue of Datasets*)
- Confidence that they are speaking a common language (ie *AASF Data Guidance* including vocabularies and glossaries)
- Opportunities to build capability and share knowledge (ie *Forums*)
- The ability to exchange data in a trusted and secure manner (ie through sector-wide data *interoperability*, *identifier* and other *data standards*; and other infrastructure in place – ie *data exchanges* etc)

The governance mechanisms and processes for the AASF Data Ecosystem and sector-wide structures are described later in this report. Overleaf, we provide details of the Register, Catalogues and the other structures which are proposed as the immediate responsibility of the AASF 'Entity' to establish and maintain for the benefit of all stakeholders.

7. Namkoong, G., Boyle, T., El-Kassaby, Y. A., Palmberg-Lerche, C., Eriksson, G., Gregorius, H.-R., Joly, H., Kremer, A., Savolainen, O., Wickneswari, R., Young, A., Zeh-Nlo, M., & Prabhu, R. (2002). *Criteria and Indicators for Sustainable Forest Management: Assessment and Monitoring of Genetic Variation*.

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AASF Structures –
Technical

Technical Data Ecosystem Structures managed by the AASF "entity"

Each of the proposed technical structures would be developed, implemented and maintained by the future AASF entity. Key details and considerations for each of the technical structures which need to be designed, implemented and maintained are described in the sections below and overleaf.

Register of AASF Indicators

This contains the definitive set of sustainability indicators that can be used for AASF related activities. For each indicator, the register includes the criterion that the indicator is associated with, the expected units of measure, and the contexts (commodity, region, etc) in which the indicator is relevant.

The register may also include further metadata describing each indicator to enable potential users to assess whether it will support their use cases. This may include parameters such as: if it is a leading or lagging indicator, if it's a dependency or impact indictor, and so on.

The purpose of this register is twofold:
1. Firstly, it provides guidance to both producers/processors and evidence requesters on what data might be collected/requested, for a specific context, to provide evidence of the current state or changes in the state of a particular AASF criterion. That is **what to measure** and **what data to ask for**.
2. Secondly, the register provides confidence to digital service providers to invest in enhancements to their service offerings to support data capture and storage. That is, they know **what data will be shared** and can enhance their tools to support this.

Governance of the register of indicators is paramount. Users must have complete confidence in the register's content and that the processes and individuals involved in the maintenance of the register are beyond reproach. To this end, the governance bodies and processes for the register must be open, transparent, and independent from political or commercial interference.

Standards exist for the management of registers and the registries in which they are managed (cf. ISO 19135). These standards often require separation of the processes to recommend changes, and the decision to change processes. Overall management of register is responsibility of AASF Entity. We propose an Indicator and Data Advisory Council (IDAC) to be accountable for the maintenance of register content, and Expert Working Groups to be responsible for developing recommendations on changes to register content.

A possible starting point for the register's content is the AASF Preliminary Indicator Set (developed by AFI) – noting this will need review. It will be the role of the IDAC to determine the priorities for this review in acknowledgement that it will not be feasible to manage a review of the entire list at the same time.

See later in this section for information describing the proposed governance bodies and processes for creating and maintaining the register of indicators.

Catalogue of Methods

While the register of indicators informs users on *what* parameters can be measured, it does not describe *how* they might be measured. The Catalogue of Methods therefore provides guidance to users on appropriate measurement approaches for each registered indicator.

It is recognised that more than one method can be appropriate for measuring individual indicators and that measurement approaches are continually evolving. Furthermore, different measurement methods may be more or less appropriate within different contexts. Therefore, rather than being a prescriptive structure (ie. a register), this is a list of options for users to consider (ie. a catalogue) and is updated as required.

The purpose here is, once again, to provide guidance to users of AASF indicators. However, here the list is not definitive, and the governance processes differ to those of the register of indicators. Methods are included in the catalogue if:

- *They have wide industry adoption and use*, OR
- *They have met a pre-determined level of scientific validation (eg peer reviewed in scientific literature)*

It is important, for transparency reasons, to recognise that methods to measure indicators and the tools (commercial or otherwise) that implement these methods are different things. Initially, it is recommended that the catalogue include only methods and not tools. However, the catalogue will be more useful to a wider range of stakeholders if tools are discoverable. It will need to be determined, at a future date, if the catalogue should be extended to tools that implement these methods and processes developed to support this.

Overall management of this catalogue is the responsibility of the AASF Entity through application of a pre-determined and agreed assessment process. Candidate methods for inclusion will be identified through the work of Expert Working Groups or through direct submission from the community.

There is no obvious starting point for initial content for this catalogue. However, there numerous methods already in existence that could be prioritised for consideration of inclusion (eg. Uni of Melbourne GAF tool).

Refer to governance process descriptions for further details on the various ways methods can be identified.

Catalogue of Datasets

The Catalogue of Datasets is a list of datasets containing data relating directly to AASF Indicators. These datasets may be public or commercial and may be national or regional in scope.

The purpose of this catalogue is to enable those seeking to use AASF indicators to discover and access datasets that are known to contain data related to these indicators. This is provided as a service to stakeholders to reduce/remove the costly process of data discovery.

This list will neither be definitive nor comprehensive.

As with the Catalogue of Methods, overall management of this catalogue is responsibility of AASF Entity through application of a pre-determined and agreed assessment processes (based on the AASF Data Assessment Framework). Candidate datasets for inclusion will be identified through the work of Expert Working Groups or through direct submission from the community.

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Governance Groups & Processes*

As these are not strictly technical structures, they are described in the subsection *Structures & Processes – Governance* later in this chapter.

AASF Data Guidance

A key finding of the AASF Data Ecosystem project has been that stakeholders often need guidance on a range of subjects related to sustainability. This includes, but is not limited to:

- what terminology to use
- what tools to use
- where to find advice on sustainability practices
- how to access key AASF Data Ecosystem APIs
- how to create and publish datasets
- how to assess a dataset for use; and
- most importantly, who might be able to help

An important activity then for the AASF Entity is to ensure all AASF stakeholders can access guidance and tools (including experts) to help with use of the AASF, AASF Indicators and sustainability data. This guidance might be delivered in the form of: AI driven chatbots, "Ask An Expert" functions, vocabulary services, and catalogues of tools and guidance documents.

AASF Data Ecosystem Portal

Users of the various AASF structures (registers, catalogues, guidance services) will need some mechanism by which to discover and access them. The AASF Portal is proposed as the entry point to key AASF Data Ecosystem data and information. Through this online portal users will be able to:

- Access variance guidance documents
- find definitions of terms,
- locate standards applicable to their context
- sign up to forums
- find contact details for experts
- understand who is making decisions about the AASF, and what decisions might be coming up in the future
- read latest news; and
- access the register of indicators and data ecosystem catalogues.

The portal may also contain private areas where secure content is placed. This may be necessary to support the work of the IDAC and EWGs.

Accountability and responsibility for maintenance of the AASF Portal rests with the AASF entity.

Forums

Communication is one of the most important aspects of any ecosystem. Patterns and processes of communication between individuals, groups and organisations inform the direction, pace and outcomes achieved by people in complex systems.

It has been identified that for the AASF Data Ecosystem to thrive, it will need to provide regular opportunities for stakeholders to communicate their learnings, their successes, their requirements and their knowledge of AASF indicators, methods, data and systems.

Given the range of industries with an interest in the AASF, and the variety of stakeholder requirements of the data ecosystem, it is recommended that forums are established and maintained by the AASF Entity for the purposes of:

- Enabling regular discussion and feedback on the data ecosystem strategy, IDAC decisions and Expert Working Group recommendations (ie quarterly meetings)

- Building stakeholder capabilities in the use of data ecosystem register, catalogues and guidance materials (ie training sessions)

- Providing opportunities to capture insights into upcoming international/national regulatory, policy or system changes which need to be accounted for in the data ecosystem (ie sector-specific strategy sessions)

- Sharing success stories and enabling stakeholders to familiarise themselves with multiple emergent use cases for the AASF data ecosystem (ie 'meet an expert' forums, annual symposiums for interest groups)

Broader Structures – *Technical*

Success for the AASF Data Ecosystem will also depend on the existence of structures that have application beyond the AASF. These structures will likely have application across the agriculture sector, and potentially beyond, as they enable general data sharing.

For these structures, leadership by the AASF Entity is not appropriate nor advisable. Rather, leadership should come from the level at which they are operated. That is, the entire agriculture sector or similar. However, given the importance of these structures to the AASF Data Ecosystem, is important the AASF community be involved in their governance and development to ensure they meet AASF needs.

The following section describes each of these required structures in terms of the need(s) for the AASF Data Ecosystem, as well as identifying current or emerging activities within the agriculture sector that may provide solutions. As per previous descriptions of activities underway in this domain and beyond, please note that discussion below has been limited to select activities only and a full list of broader structure activities can be referred to in Appendix C.

Rules, Policies and Guidelines

To protect both data owners and users, and to enable the sharing of data for valid uses, it is essential that the AASF Data Ecosystem be underpinned by agreed rules, guidance and policies. These need to address issues such as privacy, security, fair use, and the rights and obligations of both data owners and users.

The need for these rules, guidelines and policies is much broader than the AASF Data Ecosystem. It crosses the entire agriculture sector and potentially beyond. As such, a consistent set of rules, guidelines and policies would ideally be developed, adopted and governed at the 'whole of agriculture' level. This then enables any data sharing activity within agriculture to be undertaken using the same rules.

The Farm Data Code, developed by the National Farmers' Federation is intended to inform the data management policies of digital product and service providers who manage data on behalf of farmers. It is also a tool with which farmers can evaluate the data terms and policies of those providers. For the purposes of the AASF Data Ecosystem, the code is perfect for the aspects of data it covers. However, it is currently limited in scope to data collected on farm and hence does not cover data collected pre or post farm-gate which will also be important for sustainability reporting.

There are many instances of rules, policies and guidelines governing or informing various data activities across agriculture and other sectors. The Farm Data Code demonstrates that the agriculture industry is able and willing to develop and adopt rules, guidelines and policies to enable and support data sharing at the whole of industry level. To support the needs of the AASF Data Ecosystem, this code needs to be expanded to encompass non-farm data sets.

Given the importance of broader rules, policies and guidelines to the effectiveness of the AASF Data Ecosystem, the Sustainability Data Working Group (SDWG) should be tasked with ensuring that this code is fit for purpose, and work with the maintainers of the code to develop any required enhancements.

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Data Interoperability Standards

Efficient and effective technical data sharing across many industries is underpinned by the development, adoption and maintenance of data interoperability standards across that industry. Around the world industries as diverse as defence, health and astronomy rely heavily on interoperability standards to seamlessly share data between stakeholders. Interoperability standards are not only the most effective approach to supporting technical data sharing, but their adoption within industries has also led to greater data innovation within those industries as more data becomes available.

While there are efficiencies to be gained through the adoption of standards, there is a cost involved with their initial implementation as often many systems across many organisations need to be adapted to support them. As such, it is preferred to adopt standards at an industry or higher level so as to minimise these implementation costs. That is, implement once to support as many use cases as possible.

Within Australia's agriculture sector, little development and adoption of data interoperability standards has occurred. However, in recent times, two DAFF funded activities have focussed on the need for and development of such standards.

- The Australian Agricultural Traceability Alliance's Data Standards Working Group has proposed the adoption of mechanisms for developing, implementing and maintaining data interoperability standards for the agriculture sector.
- The Food Agility CRC led AgTrace project has developed and demonstrated a profile of the UN Traceability Protocol (UNTP) called the Australian Agricultural Traceability Protocol (AATP) to support the sharing of credentials along supply chains.

Both these activities are focussed on delivering standards at the whole of Australian agriculture and, importantly, include proposals for governance and maintenance. Given the importance of interoperability standards to the AASF Data Ecosystem, the Sustainability Data Working Group (SDWG) should be tasked with supporting the development of these mechanisms and be an active participant in their maintenance.

Identifiers

Just as data interoperability standards are essential for efficient and effective data sharing, identifiers are essential for supporting data integration. The ability to confidently identify the various entities (places, parties, processes and products) within a system enables data about these entities to be readily accessed and integrated.

Strong governance and effective maintenance of identifiers within a system is vital. Research for this project found[9] that identifiers should be:

- Discoverable – *for any entity, it should be possible to determine what its identifier is*
- Verifiable – *it should be possible to verify that the given identifier for an entity is in fact, the correct identifier*
- Globally Unique – *no two entities should have the same identifier*
- Resolvable – *given an identifier, it should be possible to determine what entity it refers to*

The issues associated with the adoption of identifiers within agriculture are complex and at present there is no formal activity to address these challenges. Therefore, the AASF Entity should take a leadership role to collaborate across agriculture to develop a program of activities to resolve these issues for all agricultural purposes.

9. Recommended by the working group on identifiers convened as part of this project

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Platforms for Data Exchange

The primary goal of the AASF Data Ecosystem is to support the effective and efficient sharing of sustainability data for valid uses between data owners and data users. While rules, guidelines, policies, standards and identifiers are all necessary to protect data owners and users and to realise efficiencies in this data sharing, the core artefacts are the data themselves. For the AASF Data Ecosystem to achieve its primary function, the data need to be stored and available via some forms of technological platforms.

Data exchanges and dataspaces initiatives, both commercial and not for profit, are currently in development across the agriculture sector. These include: the Australian Agricultural Data Exchange (AADX); activities with the cotton and horticulture sectors; activities within the Australian research sector (AgReFed and ARDC Planet) as well as existing commercial providers. These initiatives all provide data storage and sharing capabilities along with data sharing agreements and protocols, licencing arrangements and other materials adaptable for data sharing purposes.

The AASF Entity should not seek to compete with these initiatives, especially not through building a specialised data exchange platform exclusively for AASF purposes. Rather, the Sustainability Data Working Group (SDWG) should work with existing and emergent data exchange platforms, programs and activities to ensure they support the effective and efficient sharing of agricultural sustainability data and adopt relevant industry rules, guidelines, policies, standards and identifiers.

Platforms for Sustainability Advice

The nature of what it means to be sustainable in agriculture is highly dependent on the nature of the organisation seeking to be sustainable. This includes: the commodity being produced/processed and the approaches by which it is being produced/processed, the geographical region it is operating in, the scale of the operation and much more.

It is not feasible for the AASF Entity to provide specialised sustainability advice for each of the possible permutations of agricultural operation. However, it is possible for the AASF Entity to encourage the development and publication of industry specific advice. Further, a reference list of advice available from other groups could be published on the AASF Data Ecosystem Portal.

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AASF Structures & Processes - *Governance*

Successful development and long-term maintenance of the AASF Data Ecosystem will require the establishment of robust governance mechanisms. It is proposed that different governance structures and processes will be necessary to ensure the quality, consistency and relevancy of the Register of Indicators, Catalogues and Data Guidance materials.

Structure	Level of Governance	
Register of Indicators	HIGHEST	This register requires strong governance oversight to ensure quality and consistency of content, and in turn provide confidence and trust to stakeholders.
Catalogue of Methods	MEDIUM	Require oversight that enables flexibility and regular adaptation of the content, while ensuring quality and consistency.
Catalogue of Datasets		
Data Guidance	LOW - HIGH	Levels of oversight will vary depending on the item to be included.

The AASF Data Ecosystem is a dynamic system and, as such, is constantly evolving depending on the drivers of change which are influencing the behaviours and activities of its stakeholders. With this in mind, it is recognised that the requirements for the Data Ecosystem structures will change over time – with new needs and ideas coming to light over the years ahead. Therefore, **it is also proposed that a "Task List" be implemented by the AASF Entity** – with input of the governance structures and general community – to consistently capture and document change requests and emergent requirements.

The Task List should be managed by the AASF Entity and updated through feedback mechanisms whereby members of the community can log requests, and governance bodies can prioritise actioning of these requests within their strategic plans and activities. The details of the Task List should be published on the AASF Data Ecosystem Portal so that stakeholders can access the information and contribute further information and/or plan for future implementation requirements which might be implicated by proposed changes.

The following pages describe the proposed governance structures and their roles in providing oversight of the above AASF Data Ecosystem structures and in actioning items listed in the Task List.

> **Governance Scope**
>
> It should be noted that other aspects of the AASF, specifically the AASF Principles and Criteria will also require governance structures and processes. These aspects, however, are beyond the scope of the Data Ecosystem project and will not be addressed in this report.

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Governance Mechanisms

It is proposed that a future AASF Entity establish an Indicator and Data Council (IDAC) to be responsible for decisions relating to the AASF Data Ecosystem. The IDAC will be responsible for AASF register of indicators, catalogues of methods and datasets, and have a role in appointing Expert Working Groups and a Sustainability Data Working Group for specific activities. The proposed reporting lines and details of these governance structures are summarised below, with further detail provided overleaf.

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┌─────────────────────────────────────────────────────────────────┐
│   Australian Agricultural Sustainability Framework (AASF) Entity   │
└─────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────┐
│            Indicator & Data Advisory Council (IDAC)               │
└─────────────────────────────────────────────────────────────────┘
                    │                            │
        ┌───────────────────────┐    ┌───────────────────────┐
        │  Expert Working Groups │    │   Sustainability Data  │
        │         (EWGs)         │    │     Working Group      │
        │                        │    │        (SDWG)          │
        └───────────────────────┘    └───────────────────────┘
```
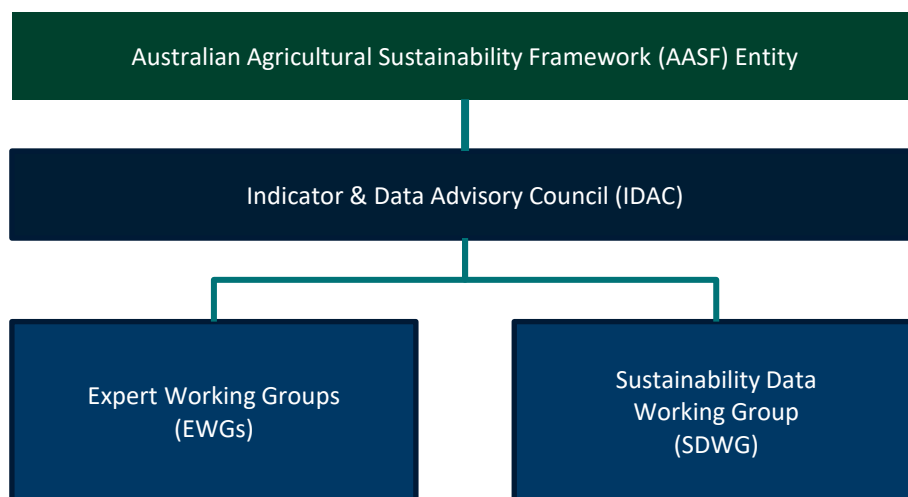
Governance Structures	Description	Considerations
AASF Entity	Provides overall governance and operations activities for the AASF.	Designing the operations and governance of this body are out of scope for this project to design. However, for the AASF Data Ecosystem to become effective and achieve its vision, there are necessary functions this entity will have to be accountable and responsible for. These are described later in the report.
Indicator and Data Advisory Council (IDAC)	Panel of trusted experts with skills in sustainability indicators and data responsible for decisions relating to the AASF Data Ecosystem	Scope of this group includes AASF indicators, methods and data sets as well as guidance materials. Responsible for developing the AASF Indicator review plan and overseeing its implementation Responsible for the appointment of Expert Working Groups and the Sustainability Data Working Group.
Expert Working Groups (EWGs)	Groups of experts responsible for proposing recommendations on AASF Indicators	Different models will exist for how these groups might be formed/identified. These include: appointment by IDAC, identification of existing programmes of work aligned with AASF needs, direct contracting of specific pieces of work or self-initiated groups. Provides recommendations to the IDAC.
Sustainability Data Working Group (SDWG)	Single group of experts responsible for representing AASF interests in broader cross–sector data activities	Primary purpose is to engage with broader activities within the ag sector related to data rules/policies, standards and identifiers. Will represent AASF interests/requirements in these initiatives and translate outputs back into AASF Data Ecosystem. Provides recommendations to the IDAC.

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Indicator and Data Advisory Council (IDAC)

The IDAC is established by and reports to the AASF Entity. The primary role of the IDAC to be the custodian of the AASF Register of Indicators. It prioritises the identifier review process, makes decisions on what indicators are registered, what changes to indicators are needed and what indicators should be deprecated.

The IDAC consists of a group of 8 – 10 individuals, who collectively are generally representative of:
- the 3 AASF Data Ecosystem cohorts (primary producers and processors; data and digital service providers; and evidence requesters)
- Government agencies with portfolio responsibilities for agriculture, sustainability, and data/information systems
- the Australian agriculture industry
- International sustainability and agriculture standards and reporting organisations

Councillors need to be respected members of their professional communities and have expertise in:
- Collaborative decision making
- Risk assessment and mitigation
- Quality assessment and assurance
- Strategy development and implementation
- Stakeholder engagement and networking

The roles of the IDAC are to:
- Develop and oversee the 3-year strategy for the AASF Data Ecosystem
- Undertake 6 monthly review of strategy and adjust as needed
- Review and endorse recommended changes to AASF Data Ecosystem Register, Catalogues and Guidance materials
- Appoint EWGs and the SDWG
- Oversee community consultation processes as part of reviewing recommendations from EWGs
- Monitor the work of EWGs and the SDWG and resolve issues where necessary
- Provide advice to AASF Entity on identified gaps in datasets and/or tools for which a funded programme of work may be required.
- Present at relevant AASF fora on both work completed and the forward workplan
- As part of their role to manage the Register of Indicators:
    - *Consider the impact of decisions on the data and digital service provider cohort. In particular, adverse outcomes.*
    - *Consider the impact of decisions with respect to market expectations of AASF. In particular in setting the strategy for prioritisation of indicators to consider including/reviewing/deprecating in the Register*
    - *Assess quality and completeness of EWG recommendations prior to endorsement. In particular in ensuring all relevant stakeholder contexts have been accounted for and/or considered.*

Other considerations for the formation and running of the IDAC include:
- It is suggested that the IDAC meet on a quarterly basis
- It is recommended that terms on the IDAC are limited such that no individual can be a member of the IDAC 'for life'.
- It is further recommended that IDAC membership is rotated on a regular basis – with half of all appointments changed on a rotating basis to ensure continuity of knowledge and activities throughout the lifecycle of the Council

In addition to the high-level activities of the IDAC described in the AASF Data Ecosystem Blueprint in section four of this report, it is also suggested that IDAC:
- Commence their strategy development activities with a review of the *AASF Preliminary Indicator Set* (developed by AFI in 2024)
- Regularly review the Task List maintained by the AASF Entity, and communicate with stakeholders about prioritisation/reprioritisation of EWG and SDWG activities

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Expert Working Groups (EWGs)

The primary role of Expert Working Groups is to develop and provide recommendations on changes to the AASF Register of Indicators to the Indicator and Data Council (IDAC) for their consideration. Four different models for Expert Working Groups are envisaged:

1. **Appointed Groups of Experts** – here the IDAC appoints an appropriately sized committee with recognised skills with respect to a specific AASF criterion or set of AASF criteria and tasks them to develop recommendations on appropriate indicators for these. These recommendations might include addition, removal or changes to registered indicators.

2. **Existing aligned programme of work** – here an existing programme of work developing agricultural sustainability indicators is identified by IDAC with support from the AASF Entity. IDAC seeks to collaborate with this programme and then endorse recommendations from it as fit for AASF purposes

3. **Contracted research** – here it is recognised that significant research is first required before recommendations on indicators can be developed. As such funding is sought by IDAC via the AASF Entity to enable the contracting of this research.

4. **Self-initiated Groups** – in some cases, groups of interested parties may form to address to define indicators for specific AASF criteria. These groups approach the IDAC via the AASF Entity and IDAC determines whether or not, to consider their recommendations.

In all cases, an EWG:

- is **time bound** – the work must be completed within s set time frame to give confidence to AASF stakeholders and enable these stakeholders to anticipate changes to the AASF Register of Indicators

- is **open and transparent** – ensuring that the scope, timeframes and membership of current and future EWGs is published

- must be **responsive to the needs** of the all AASF stakeholders and ensure different contexts of application are considered. This includes ensuring a round of public consultation as part of their work.

- should **consider and recommend related methods and datasets** for inclusion in the catalogues as part of their work

- must respond to feedback/suggestions from IDAC

- will provide updates on progress, learnings an outcomes at relevant AASF Data Ecosystem fora

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Sustainability Data Working Group (SDWG)

The AASF Data Ecosystem exists within the broader Australian agricultural data ecosystem and, as such, needs to work within that environment. This project has identified that there are a set of broader data ecosystem structures that need to exist to support the broader data ecosystem. These are: broader structures developing and managing rules, policies and guidelines for data; broader structures developing and managing data interoperability standards for agricultural data; and broader structures for implementing identifiers. It has also been identified that there are existing activities within the agriculture sector that have developed or are developing these broader structures. (cf. Farm Data Code, Ag Trace project, AAT Data Standards Working Group).

The AASF Data Ecosystem needs to participate in these broader activities to ensure they are both: meeting AASF needs as well as the outputs from these activities are translated back into the AASF community. It is the role of the AASF Sustainability Data Working Group to perform this role.

The SDWG is appointed by the IDAC and consists of 8-10 members who have expertise in:

- Data interoperability
- Data sharing and licencing arrangements
- Identifiers and identity management
- Traceability of credentials
- Data exchange protocols
- Requirements for providing data as evidence of sustainability practices for market access purpose
- Data security and privacy
- Intellectual Property
- Requirements of AASF data and digital service providers

The role of the SDWG is to:

- play a collaborative leadership role with existing and/or future cross-sector data ecosystem activities to design and reference AASF-aligned implementation of these materials
- regularly present at relevant AASF fora regarding their activities, successes and plans – with a particular focus on engaging with data and digital service providers
- report to IDAC on current and emerging broader activities that are relevant to the AASF Data Ecosystem
- suggest update to AASF Data Ecosystem guidance materials
- engage with data and digital service providers with respect to implementation of emerging technical standards around sustainability data as well as to understand their technical needs

Other considerations for the formation and running of the SDWG include:

- It is suggested that the SDWG meet on a quarterly basis in addition to their engagements in broader groups
- It is recommended that terms on the SDWG are limited such that no individual can be a member 'for life'.
- It is also recommended that SDWG membership is rotated on a regular basis – with half of all appointments changed on a rotating basis to ensure continuity of knowledge and activities throughout the lifecycle of the SDWG

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Stakeholders – *Future State*

Benefits to be enjoyed in the future AASF Data Ecosystem

The shift towards a trusted, efficient and effective AASF Data Ecosystem will involve and directly benefit a broad range of stakeholders. Each stakeholder engaged to date has described a range of requirements and use cases for the data ecosystem. Summaries of the key benefits to be experienced by cohorts are described below, with more detail provided for specific personas in Appendix B.

Primary Producers and Processors

In the future, with AASF data ecosystem structures in place, this cohort will be able to:

- See the **connection** between data collection activities and utility for their organisation
- **Demonstrate improved sustainability practices** and outcomes leading to additional market opportunities
- Make **informed decisions** around digital tool/technology systems
- Benefit from **improved utility of digital products** and services which better meet needs.
- Benefit from **efficient data collection,** sharing and use
- **Effectively engage** with market offerings related to sustainability practices that may improve their commercial advantage, including benchmarking, access to finance opportunities, additional export markets and practice guidance
- Be **confident** that they have control of their data and can manage who has access to it and what they may do with it.

Data and Digital Service Providers

In the future, with AASF data ecosystem structures in place, this cohort will be able to:

- Have **greater confidence** to invest in system/product development that is relevant to agricultural sustainability for Australia
- **Implement community agreed** standards opens market opportunities, and product differentiation
- **Innovate and value–add** on top of stable base of standards
- Improve the usefulness of products leading to **greater customer uptake**
- **Become involved** in forums to discuss data and digital system relevant content and discuss/influence/develop standards
- Benefit from system update costs being reduced through **shared knowledge and capability**
- **Anticipate future market demands** through greater clarity on market requirements and needs

Evidence Requestors

In the future, with AASF data ecosystem structures in place, this cohort will have:

- **Access to higher quality data**, which is FAIR (Findable, Accessible, Interoperable, Reusable)
- **Confidence** that enduring / longitudinal data will be available
- **Clarity** around what data should be sought, and how it can be used
- **Understanding** of how data has been collected, how it was created, how it can be used, and how it must be handled
- The ability to **confidently use data** because it can be assessed for fitness for purpose
- The confidence that **data gaps can be addressed**
- The ability to **understand the marketplace** for additional data or sustainability services that could be provided

4.0 The Shift/Getting There

Strategy
Blueprint
Responding to Insights
Recommendations

Over the coming years the AASF Data Ecosystem will need to shift from supporting *practice-based data activities to* enabling *impact-focussed data collection and use*.

By implementing new data ecosystem structures, stakeholders can be assured that the future will see *sustainability become part of the culture across agriculture* and …

… Primary Producers and Processors *realise benefits from their data collection activities …*

… Data and Digital Service Providers *effective in enabling the ecosystem to thrive …*

… Evidence Requestors *confident they can access evidence of Australia's agricultural sustainability practices …*

The strategy and blueprint for achieving these outcomes are described in this section.

AASF Data Ecosystem Strategy

VISION	Ensure informed decision making, foster continuous improvement and create enduring benefit through a trusted, interoperable agricultural sustainability data ecosystem			
OBJECTIVES	Sustainability data is interoperable, used and re-usable	Sustainability data is reliable and trustworthy	Stakeholders are collaborating across the data value chain	The value of sustainability data is realised by "investors"

PRINCIPLES

Data for the AASF Data Ecosystem will be designed to ensure it is: **Secure & Private** **Usable & Value Additive**	Processes of the AASF Data Ecosystem will be designed to ensure they are: **Equitable** **Ethical** **Reducing the burden**	Governance of AASF Data Ecosystem will be: **Trusted & Transparent** **Inclusive & Connected** **Agile & Responsive**

STRUCTURES

Register of Indicators	Catalogue of Methods	Catalogue of Datasets	Data Guidance	Forums	Portal

GOVERNANCE

INDICATOR AND DATA ADVISORY COUNCIL (IDAC)
EXPERT WORKING GROUPS (EWGs)
SUSTAINABILITY DATA WORKING GROUP (SDWG)

These objectives will be achieved through the governance bodies designing, implementing and maintaining the structures, which themselves are designed based on the principles.

Activities and resourcing for developing these structures are described in the Blueprint overleaf.

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Strategy in detail

The strategy describes AASF stakeholder ambitions for the future of the data ecosystem. It outlines where the data ecosystem needs to be in 5 years' time, and the benefits stakeholders will derive from new structures being designed, tested and implemented over the years ahead. Importantly, it defines the values which must be reflected in all structures (data, processes and governance) to ensure that the data ecosystem is trusted and interoperable for all stakeholders in the future.

Vision

Ensure informed decision making, foster continuous improvement and create enduring benefit through a trusted, interoperable agricultural sustainability data ecosystem

This is the ideal-future-state description of the data ecosystem. This statement describes the benefits which will be delivered for all stakeholders through development of the structures which embed the principles in their design, and ultimately through achievement of the objectives.

To develop this vision, AASF stakeholders described ambitions for the data ecosystem to empower sustainable performance; enable demonstration and reporting of sustainable practices; and support data-driven decision making through an interoperable value chain. They also described aspirations for the data ecosystem to provide mechanisms for standardised and interoperable data; provide guidance on securing systems for data sharing; and set standards to ensure data could be connected, open and available; relevant, accurate and trustworthy; economically produced and used for multiple purposes (equivalency).

Objectives

These four objectives describe the goals the stakeholders of the data ecosystem want to achieve over the next 3-5 years, on the pathway to achieving the vision. In developing these objectives, stakeholders described a comprehensive set of requirements which would need to be met for them to trust, value and use new structures in the data ecosystem. These requirements were synthesised into the objectives now listed in the strategy, and are described as:

- *Sustainability data is interoperable, used and re-usable*
  In keeping with existing global best practice, data in the data ecosystem needs to be Findable, Accessible, Interoperable, Reusable (FAIR) in nature and have the appropriate infrastructure necessary to enable this. Further, in the future, the data ecosystem needs to enable discovery and re-use of data through agreed interoperability standards, licencing mechanisms and data sharing agreements.

- *Sustainability data is reliable and trustworthy*
  To improve levels of trust in, and reliability of, data in the ecosystem the AASF indicators will need to be standardised for different contexts, and guidance provided on preferred analysis tools, methods for data collection and usage. Further to this, the mechanisms by which the indicators, tools and methods are defined and agreed will need to be trusted to ensure there is uptake and usage by stakeholders (these items will be listed in the *Register and Catalogues*).

- *Stakeholders are collaborating across the data value chain*
  With a multiplicity of use cases and requirements, bringing order to the existing anarchy will require stakeholders to effectively and efficiently collaborate to deliver and maintain the data ecosystem structures. This collaboration will need to include coordination between government and industry as well as across the agriculture sector and aligned industries including technology, sustainability and finance.

- *The value of sustainability data is realised by "investors"*
  The term "investor" means many things in the AASF Data Ecosystem. It can refer to those who fund the development and maintenance of new structures and datasets. It can refer to evidence requestors who deploy resources to discover and analyse data; or to data and digital service providers who invest in system updates; and, it can also refer to primary producers and processors who spend considerable time and effort collecting and sharing their data. For all of these stakeholders, the objective is to ensure they realise returns on their investments, whatever form they might take.

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Principles

Supporting the vision and objectives of the AASF ecosystem, the principles define the rules, patterns, and boundaries for how structures of the AASF Data Ecosystem will be designed to ensure they meet stakeholder requirements. These principles must be apparent when developing any new structures, standards or guidelines for the AASF Data Ecosystem, and baked into the final designs. They act as a "rule list" for designing and also for reviewing and endorsing the final designs of any new structures or changes to them. Thus, these principles are intended to be a reference tool for future governance groups and the AASF entity when developing, implementing and maintaining the AASF data ecosystem structures and components.

As with the objectives, stakeholders described a comprehensive set of "rules" which would need to used in the design of data ecosystem structures to ensure they could trust, value and use them. These requirements were synthesised into the principles now listed in the strategy, and are described as:

- ***Data for the AASF Data Ecosystem will be designed to ensure it is Secure and Private; Usable and Value Additive***

    Secure – Data designed and used within the AASF Data Ecosystem should be secured against cyberphysical threats (i.e. cybersecurity issues), and have appropriate security measures in place to ensure safety of data collection, sharing and use for all stakeholders involved.

    Private – Data developed and used within the AASF Data Ecosystem should be designed with privacy in mind, establishing and maintaining privacy controls for participants and respecting their privacy choices.

    Usable – Data described for use within the AASF Data Ecosystem must support the multiple use cases and practices of stakeholders to ensure usability and relevance.

    Value additive – Data defined for AASF indicators should provide clear value to stakeholders by minimising transaction and participation costs while creating value in a non-exclusive way.

- ***Processes of the AASF Data Ecosystem will be designed to ensure they are Equitable, Ethical and Reducing the burden***

    Equitable – Processes described within the AASF Data Ecosystem should be equitable in nature, and promote equitable outcomes for all stakeholders. This includes ensuring that workloads and benefits associated with data requests are fairly distributed; data exchanges are operating in a non-extractive manner; and data analysis is not disadvantaging stakeholders at any point in the value chain.

    Ethical – It is of paramount importance that the processes of the AASF Data Ecosystem do no harm, and adhere to ethical principles of data use and collection (i.e. informed consent). Further to this, the processes of the ecosystem need to be accessible to all, no matter their capabilities or circumstances.

    Reducing the Burden – Processes described within the AASF Data Ecosystem must reduce the burden on data owners (particularly primary producers and processors) through ensuring mechanisms for re-utilisation of data (collect once, use many) and reducing complexity (fewer digital tools as well as agreement on what information will be requested).

- ***Governance of AASF Data Ecosystem will be Trusted and Transparent; Inclusive and Connected; Agile and Responsive***

    Trusted & Transparent – the governance of the various structures and processes of the AASF Data Ecosystem should be trusted and designed to ensure that they are operating in the best interests of all stakeholders and Australian agriculture as a whole

    Inclusive & Connected – governance mechanisms will work to benefit all stakeholders of the AASF and, where appropriate, seek to include the views and needs of all

    Agile & Responsive – as situations and needs change, the AASF Data Ecosystem needs to be able to adapt. Designing and building for evolution is key to ensure that the AASF Data Ecosystem governance remains relevant and effective over time.

Blueprint

	The future vision for the AASF Data Ecosystem, will be achieved through three stages of development:		
	H1 ESTABLISH *(2025 - 2026)*	**H2** GROW *(2027 - 2028)*	**H3** MAINTAIN *(2029 +)*
VALUE ACHIEVED	Evidence Requestors are starting to deliver AASF-aligned and consistent reporting with reliable and trusted data and methods have started to appear (by first-movers) Some major datasets are beginning to align with AASF Indicators Data and Digital Service providers engaged and investing in initial updates to tools (first movers) Language of agricultural sustainability is aligning across AASF stakeholders Community building confidence and trust in AASF Data Ecosystem structures	Sustainability benchmarks aligned with AASF start to become available New AASF aligned datasets start to appear Majority of farm management tools are aligning with AASF data standards Emerging industry using AASF-aligned indicators and tools Consistent sector-wide sustainability analysis and narratives appear Efficiencies in data collection and analysis start to emerge Start to see capability-uplift around sustainability data collection and use across cohorts	Sustainability is part of the culture within Australia's agriculture sector AASF indicators and data are mainstreamed in farm management tools Sustainability evidence is available as and when needed across the agriculture sector and along individual supply chains All supply chain actors can benchmark themselves with respect to sustainability and can seek advice to take appropriate action if they need/want Capture of sustainability data is BAU and not seen as a chore Exchange and reuse of agricultural sustainability data is safe, secure, efficient and creating value
WHAT WILL BE DELIVERED*	**AASF DATA PORTAL**		
	SETUP	MAINTAINED	MAINTAINED
	REGISTER OF INDICATORS, CATALOGUES OF METHODS & DATASETS		
	SETUP WITH INITIAL CONTENT	ADDITIONAL CONTENT	MAINTAINED & UPDATED
	GUIDANCE MATERIALS		
	COMMENCED	ADDITIONAL CONTENT	MAINTAINED & UPDATED
	GOVERNANCE STRUCTURES		
	INITIAL GOVERNANCE BODIES AND PROCESSES ESTABLISHED	GOVERNANCE BODIES AND PROCESSES BEING REFINED	GOVERNANCE BODIES AND PROCESSES ARE NOW BAU
	TASK LIST		
	COMMENCED	BEING UPDATED	BEING MAINTAINED
	FORUMS		
	ESTABLISHED	*EXPANDING TO INCLUDE TRAINING*	*FLOURISHING*
FUNDS	*Program & Grants*	*Grants & Stakeholders*	*Self-Sustaining*

*NOTE: Cross-Sector Structures are not included here as these fall outside the immediate scope of AASF entity accountability. However, resourcing for collaboration activities related to development of these structures is referenced on the next page.

The future vision for the AASF Data Ecosystem, will be achieved through resourcing the following activities:

	H1	H2	H3
INDICATOR & DATA ADVISORY COUNCIL (IDAC)	Develop initial 3-year strategy	Review progress against strategy, advise AASF entity of changes	Develop next 3-year strategy
	Initiate review of AASF Preliminary Indicator Set		
	Appoint priority EWGs & SDWG members	Appoint new EWGs for next priority criteria and items in Task List	BAU for appointing EWGs and maintaining SDWG
	Implement EWG identification, monitoring, community consultation and approval processes	Shift towards developing maintenance mode EWG & SDWG processes	
	Stand-up SDWG through appointments from cross-sector representatives	Representation and progress assessment of SDWG members	Potential roll-over and/or new appointments to SDWG
	Recommend priority inclusions on Register & Catalogues	BAU for updating and maintenance of Register, Catalogues and Guidance	BAU for updating and maintenance of Register, Catalogues and Guidance
	Develop Task List items to keep track of additional requests not currently prioritised	Open feedback channels for maintenance activities	Maintain feedback channels for maintenance activities
EXPERT WORKING GROUPS (EWGs)	Explore options, undertake first round consultations, finalise and submit recommendations to IDAC for endorsement	Explore options, undertake first round consultations, finalise and submit recommendations to IDAC	BAU to explore options, undertake first round consultations, finalise and submit recommendations to IDAC
	Respond to feedback on recommendations from IDAC and prepare final submissions	Respond to feedback on recommendations from IDAC and prepare final submissions	Respond to feedback on recommendations from IDAC and prepare final submissions
SUSTAINABILITY DATA WORKING GROUP (SDWG)	Engage with design of priority cross-sector structures	Translate priority cross-sector structures into AASF-aligned structures, and vice-versa	Engage with design of Task List identified cross-sector structures
	Inform IDAC strategy on priority cross-sector structures to engage with	Review progress against strategy, advise IDAC of changes	Inform IDAC strategy on additional cross-sector structures to engage with

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To enable AASF Data Ecosystem activities, the AASF Entity will need to deliver the following:

	H1	H2	H3
AASF ENTITY	Register, Catalogues and Guidelines & Task List instantiated	Register, Catalogues and Guidelines & Task List maintained	Register, Catalogues and Guidelines & Task List maintained
	Data Ecosystem Portal established	Data Ecosystem Portal maintained	Data Ecosystem Portal maintained
	Priority forums established	Additional forums established including training program	Forums and annual symposia BUA
	Appoint IDAC	Skills and progress assessment of IDAC	Potential roll-over and/or new appointments to IDAC
	Establish secretariat and other support services for IDAC	Maintain secretariat and other support services for IDAC	Maintain secretariat and other support services for IDAC
	Identify and establish support services for SDWG and EWGs	Maintain and evolve support services for SDWG and EWGs	Maintain and evolve support services for SDWG and EWGs
	Identify funding needs and opportunities for H2 activity resourcing	Identify sustainable funding opportunities for H3 onwards	

Responding to Insights

Constructing meaning in a chaotic system

The proposed structures for the AASF Data Ecosystem respond to the six key insights gathered during the research activities to date:

> ### The current agriculture sustainability data ecosystem is anarchic in nature
> As indicated through the research conducted to date, the existing data ecosystem consists of multiple states of anarchy – ie. stakeholders are unclear on what systems and processes to invest in, what data to collect, which tools to use, and how to exchange data and information up and down and around the supply chain. The state of anarchy is perpetuated through proliferation of additional data, systems and tools for multiple purposes. This leaves all cohorts asking "What Data?" should they be collecting, exchanging and using for AASF-aligned activities.

It is proposed that the implementation of the Register of Indicators will answer the primary question of "What Data?" for all AASF stakeholders, and the two Catalogues will enable the collection and use of this data in consistent and trusted ways throughout the ecosystem and beyond.

> ### Different users will engage with and use the AASF, and hence the AASF Data Ecosystem, in different ways
> It has been apparent since the initial research interviews for this project that the data ecosystem needs to support a wide range of use cases, which will inevitably grow and evolve over time. Further to this, stakeholders articulated a need for the data ecosystem governance to be clearly linked to, but distinguished from, the governance of the AASF itself. Critically, stakeholders identified that a high priority for the data ecosystem is to agree on a standard set of AASF indicators that can be adopted by users in their various contexts and for their different use cases.

The design of the AASF Data Ecosystem structures presented in this report respond directly to the existence of multiple use cases and requirements of stakeholders. The design of the Register has been iterated to ensure that AASF Indicators can be standardised and maintained for multiple contexts. Further to this, the Catalogues are designed to enable consistency within and across multiple stakeholder use cases; the Data Guidance materials will support a variety of implementation options for stakeholders; the processes of the IDAC and EWGs will enable delivery of benefits for a wide range of contexts and use cases; and, the SDWG activities will provide opportunity for AASF Data Ecosystem stakeholders to engage with and connect to broader cross-sector standards and materials.

> ### Different drivers are informing how organisations develop their data practices, frameworks and governance arrangements: since the commencement of the research for this project, it has been recognised that one of the important drivers of the anarchic nature of data practices, frameworks and governance arrangements across the existing AASF Data Ecosystem is the availability (or not) of data to support reporting. Other important drivers of this anarchy include the lack of consistent ongoing dialogues between government and industry about data collection and usage requirements for agricultural sustainability purposes (beyond reporting); and the fact that most existing sustainability frameworks focus on a single commodity with minimal ability to account for data use and re-use on multi-commodity farms.

The AASF Data Ecosystem structures have been designed to account for and support existing data practices, frameworks and governance arrangements – while also filling gaps and ameliorating current issues experienced by stakeholders. In particular, the Principles of the AASF Data Ecosystem Strategy emphasise the importance of ensuring future data ecosystem processes are equitable and ethical. This means that existing practices will need to be accounted for. Ensuring consistency of dialogue between stakeholders will also be enabled through the work of the SDWG and the AASF Data Ecosystem forums.

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Data sharing within the agricultural sustainability sector is undertaken on an ad-hoc basis
It was recognised early in this project that there was a proliferation of data collection methods across the data ecosystem, with many approaches of lower quality and value. It was observed that some stakeholders have been making assumptions about the roles of others within the existing data ecosystem, particularly with respect to "fixing" gaps in data availability and quality; and solving issues stakeholders experienced with mechanisms for data sharing across and along the supply chain. Further to this, it was apparent that data collectors - particularly primary producers and processors – received regular ad hoc requests for their data without a clear line of sight to the benefits associated with responding (ie little to no obvious RoI).

The proposed Data Ecosystem structures and the Strategy are specifically designed to address these concerns. The structures will provide consistency and move the ecosystem from anarchy towards order, while the strategy will provide assurance to stakeholders about the goals and plans for the future. In addition, the Strategy Principles also require future Data Ecosystem processes to reduce the burden currently experienced by all stakeholders, particularly primary producers and processors, when responding to different and uncoordinated requests for their data – a situation caused by the ad hoc nature of existing requests.

In general, stakeholders can see a range of benefits coming from the AASF Data Ecosystem
This project commenced on the hypothesis that a data ecosystem *might* OR *might not* be required for the AASF. That is, it was not a given that this final report would contain recommendations to develop structures for the AASF Data Ecosystem - it was possible that this report could state "nothing required, move on". Through the research enquiry activities, it was identified that, not only did a data ecosystem already exist, but that stakeholder cohorts had a tremendous amount of interest and goodwill to coordinate the implementation of changes which would mutually benefit all involved. Key benefits envisaged included the ability to provide consistency, clarity and ultimately efficiencies around data collection and sharing; provision of mechanisms through which the community could identify and address gaps in national data sets and infrastructure; enablement of greater engagement across the industry to address myths and misconceptions, and collaborate to solve problems; an opportunity for stakeholders to benchmark themselves against their peers; and, ultimately, the data ecosystem may also enable the community to find ways to return value to data producers.

The proposed Data Ecosystem structures respond to, and will enable, all of the benefits initially envisaged by stakeholders. The Strategy provides for regular review of plans, and Forums to engage with community members, which will ensure that structures remain relevant to emergent stakeholder requirements into the future.

The greatest opportunity of, and the greatest risk to, the data ecosystem is trust
A primary focus of these research activities has been to explore and understand what "trust" means to stakeholders. It was identified that getting leadership of the data ecosystem right is essential, and that key characteristics of any leading organisation would be: *trusted, reputable, respected, independent, apolitical* and *having expert understanding of the problem*. Without these leadership elements being apparent in the AASF Data Ecosystem, it would not receive stakeholder support and engagement.

The proposed Governance structures and mechanisms for the AASF Data Ecosystem have been defined and described to ensure trust is embedded in the fabric of the design. Further, the Strategy Principles define all of the essential elements that stakeholders expressed would enable them to trust the structures, use the materials and participate in the ecosystem.

In summary, the structures and mechanisms proposed in this report have been specifically co-designed, iterated and reviewed to ensure that they address, respond to and encapsulate the ambitions, requirements and concerns of AASF Data Ecosystem stakeholders.

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From Anarchy to Order

A broad range of benefits will be realised with the development, implementation and maintenance of the structures proposed in this report. While these have been described in detail previously, they can be summarised as follows:

CURRENT STATE

| FUTURE STATE |

Data Fiefdoms & Anarchic Processes

Inefficiencies & gaps in data supply

Lack of confidence to invest

Competing requests and minimal RoI

Multiple descriptions and stories about aspects of Australian agricultural sustainability practices

Individual stakeholders left to themselves to decide:
- *What data to collect*
- *What data to ask for*
- *How to use the data*
- *Which standards to apply*
- *Who to provide the data to*

Coordinated & Interoperable Data Activities

Comprehensive data availability

Clear strategies and ability to plan for changes

Lines of sight across the data value chain and RoI to all involved

Consistent language and narratives to describe Australian agricultural sustainability practices

Collective agreement(s) on:
- *What data to collect, and how*
- *What data can be asked for*
- *How data can be used*
- *Which standards can be applied*
- *How data owners can control the provision and re-use of their data*

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Recommendations

This report proposes a strategy and blueprint for the establishment of a set structures (technical and governance), processes and activities needed to shift Australia's agricultural sustainability data ecosystem from its current state of anarchy to an ordered state. This will enable all stakeholders within the AASF Community to achieve their many and various use cases.

The delivery of this report does not mean an ordered AASF Data Ecosystem now exists. Far from it. There is still much work to be done. Following is a set of recommendations for the next, and future steps needed to realise the value and benefits of the proposed AASF Data Ecosystem structures.

Next Steps

1. **Test the proposed governance structures and processes –** further develop and then test the processes of the Identifier and Data Advisory Council (IDAC) and Expert Working Groups (EWGs). That is, stand up a test IDAC and an EWG and run hypothetical test cases, observing the interactions and outcomes. Learnings will enable us to develop and modify Terms of Reference and other governance processes to support initial work of the AASF Entity.

2. **Develop and test a framework and process for assessing indicators for their fitness for purpose –** an initial tool that AASF Stakeholders will need is the ability to rapidly assess the Preliminary AASF Indicators list using a common assessment framework. This tool can then be used by the IDAC moving forward to guide assessment of indicators recommended by EWGs

3. **Design and Test the Register of Indicators and Data Ecosystem Catalogues** – while these structures have been identified as necessary, their structure (the content to be included) needs be determined. This activity will work with potential users of these structures to understand their information needs and, using this knowledge, propose designs for each structure

4. **Align proposed structures with outputs of AASF Strategy and Operationalisation project –** this parallel project is ongoing and will recommend governance structures and processes that have direct implications for the governance of the AASF Data Ecosystem. Prior to operationalisation, these structures need to be aligned.

5. **Undertake a rapid review of Preliminary AASF Indicators** – the AFI-led *Model AASF Reports* project will propose an initial set of AASF Indicators. These should be reviewed against a common framework (Recommendation 2) to both test the framework and ensure the proposed indicators meet and common standard.

Future Steps

6. **As part of establishment of the AASF Entity, pursue implementation of the AASF Data Ecosystem Blueprint (Horizon 1 Activities), including:**
   - Establish the IDAC
   - Establish supporting services for AASF Data Ecosystem governance structures (IDAC, EWGs, and SDWG)
   - Establish the AASF Registry (to manage Register of Indicators and AASF Catalogues)
   - Commence development of the AASF Portal
   - Commence development and collation of AASF data guidance materials for publication
   - Establish AASF Data Ecosystem Task List
   - Establish AASF Data Forums

   These activities are the proposed initial first steps for shifting the AASF Data Ecosystem to a state of order.

Overleaf a set of additional activities are proposed.

Future Steps (cont)

7. **Engage with and take an active role in:**
   - AgTrace
   - Geolocation Taskforce
   - AAT Standards Data Working Group

These activities and projects are delivering outputs and outcomes that will directly influence the workings of the AASF Data Ecosystem. The proposed Sustainability Data Working Group (once established) should engage with and participate in them to:

- ensure they deliver aspects that will enhance the AASF Data Ecosystem as well as ensure.
- Elements of their proposed deliver that a common to or relate to structures proposed for the AASF Data Ecosystem are aligned and interoperable. (e.g. aligned or common governance structures where applicable)

The goal here is ensure there is not duplication of effort nor the creation of parallel, competing or contradictory structures.

8. **Take an active leadership role in ensuring that Australia's agriculture sector has established governance structures and processes for:**
   - The development, maintenance and adoption of rules, policies and guidance for data and information
   - Standards for data interoperability
   - Published, unique, verifiable and resolvable identifiers.

These cross-cutting structures are needed to support the exchange of data across the entire agriculture sector. While there has been and is some activity to propose and establish these structures, they need strong leadership to be realised.

9. **Explore options to support (fund) the agriculture sector to implement the proposed outputs resulting from the activities of the AASF Data Ecosystem.**

Achieving order from the current anarchy will require many stakeholders to adopt and implement new tools, standards and protocols. This in turn will require investment, particularly for data and digital service providers, to update their current service offerings. Without direct investment or access to funding opportunities, these updates can take significant time.

To speed adoption and uptake, it is recommended that the opportunity if funding be provided to incentivise data and digital service providers to prioritise supporting AASF Data Ecosystem standards and protocols. This might be though a grants process or similar scheme.

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5.0 Appendices

Appendix A

Use Cases

Use Cases for the AASF Data Ecosystem

The use cases described below were developed as a result of the co-design workshop in March 2024. The details were used to inspire discussions and co-design activities of the Working Groups during their initial sessions in September 2024. They are presented in order of the context in which they were utilised by Working Groups in September and November (ie not numerical order).

Full details of the workshop activities and outputs are available in Lemon D., Lee A., and Lythall A. (2024*), AASF Data Ecosystem Design – March Workshop Report,* CSIRO, Australia - which is accessible from https://aasf.org.au/publications/

1.2 Develop National Scale Sustainability Data Standards	
Objective	Users seek to use nationally relevant standards to reduce risks associated with their sustainability related data and information. This includes, but is not limited to data exchange, data collection, and data use.
Commentary	This use case is at the core of many of the other identified use cases for the AASF Data Ecosystem. The outputs from this use case – standards – will be a key enabler for many, if not all, other supported use cases. The need for standards has also been identified in parallel activities (ie. AATGG Data Standards Working Group). This use case, then, should be the highest priority for implementation and testing in future phases of the project. The direct roles for the AASF Data Ecosystem in supporting this use case are: • Providing a mechanism to enable the collaborative processes of defining, developing, governing, and managing national agricultural sustainability data standards. This includes: • Agreeing on what needs to be standardised (may include: sustainability measures, semantics, identifiers, data formats, access methods, and so on.) • Identifying and/or developing candidate standards • Defining decision-making and governance processes for the standards; and • Managing and evolving the standards portfolio as needs and opportunities arise. • Providing a mechanism(s) for publishing, discovering and accessing national agricultural sustainability data standards. • Providing support for the adoption and use of agricultural sustainability data standards.
Considerations	Multiple steps are involved in the development and adoption of standards: • Community agrees on what needs to be standardised within the ecosystem • Appropriate standards are identified, adapted or developed and then tested • Community adopts/endorse the standards for use • A programme to encourage use of the standards is implemented • The standards are actively maintained/managed
Dependencies/ Constraints	• Requires a willingness and ability for parties to work together • Requires initial investment (time, money, effort) for implementation • Requires ongoing commitment to manage standards

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1.1 Develop National Scale Sustainability Data Sets

Objective	These data sets will be used for a range of national level sustainability related reporting and analysis activities. Users are associated with government and commodity-oriented sustainability frameworks, who wish to address the challenges associated with discovering, accessing, developing and using national scale sustainability data.
Commentary	This use cases reflects that, presently, there is little to no coordination around the development of national scale sustainability related data sets despite some commonality of requirements. The result is an inefficient mix of different approaches to collecting similar data, multiple collections of the same data, and data gaps. The AASF Data Ecosystem can support this use case by: • Providing a mechanism to enable the processes of identifying national agricultural sustainability data needs and subsequent development; this includes providing space(s) for collaboration (physically or online), and rules, policies and processes by which: data requirements can be identified and agreed, data can be developed, and management of these datasets can proceed. • Providing a mechanism(s) for publishing, discovering and accessing national agricultural sustainability datasets developed under the auspices of the AASF Data Ecosystem. • Providing a mechanism to enable the collaborative processes of defining, developing, governing, and managing national agricultural sustainability data standards. These will be necessary to support many aspects of dataset development, publishing, discovery and access. • Providing a mechanism(s) for publishing, discovering and accessing national agricultural sustainability data standards. • Providing support for the adoption and use of agricultural sustainability data sets and data standards.
Dependencies/ Constraints	• Requires a willingness and ability for parties to work together • Requires (ongoing) access to relevant data sets • Potential ongoing costs (time, money, effort) in maintaining data sets and collaboration practices

6.1 Access Subsetted Aggregated Sustainability Data

Objective	Users are undertaking some activity for which they require a subset of aggregated sustainability data. This may be to support policy development, undertake a research project, develop local/regional benchmark information, monitor programme outcomes or similar.
Commentary	This use case combines elements seen in previous use cases, the distinct feature of this use case is the need to be able to subset aggregated data using specific dimensions of interest for users and stakeholders. Access and analysis of this data can be a source of great value for users, stakeholders and the broader community, but also potentially contentious given the specificity of the subset. The direct roles for the AASF Data Ecosystem in supporting this use case are: • Ensure that standards for sustainability data support the subset use case • Providing mechanisms to support permissioned access to organisational sustainability data. • Providing data aggregation and publication capabilities/services • Establishing community guidelines/policies/rules for the appropriate collection and use of organisational sustainability data, defining expectations around privacy, security, (dis)benefits, commercial arrangements and other issues deemed relevant.
Dependencies/ Constraints	• Assumes that input sustainability data is available and is subsettable along required dimensions – this might include location/region, indicator, and commodity, as determined by a user's specific needs • Assumes data can be aggregated in non-identifiable ways, and that individual and organisational identities are protected, especially when there are potential disbenefits

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5.1 Benchmark Sustainability Credentials

Objective	Users seek to conduct benchmarking to understand the current sustainability credentials of their organisation in the context of their industry peers. This may be for reporting purposes or to identify where improvements within their organisation might be made.
Commentary	The ability for organisations to determine how they compare to their peers can be useful for a range of reasons including helping drive innovation and the desire to improve. The direct roles for the AASF Data Ecosystem in supporting this use case are similar to those of previously use cases including: • Providing a mechanism to enable the collaborative processes of defining, developing, governing, and managing national agricultural sustainability data standards. • Developing, managing, publishing and providing support for use of standard identification schemes across keys aspects of agricultural supply chains to which data can be attached • Providing a mechanism to enable the processes of identifying national agricultural sustainability data needs and subsequent development; this includes providing space(s) for collaboration (physically or online), and rules, policies and processes by which: data requirements can be identified and agreed, data can be developed, and management of these datasets can proceed. • Providing mechanisms to support the creation, publication and maintenance of benchmark data sets including associated rules, policies and processes. The scope of these benchmarks may vary by industry, commodity, supply chain, region or another factor. • Establishing community guidelines/policies/rules for the appropriate collection and use of organisational sustainability data, defining expectations around privacy, security, (dis)benefits, commercial arrangements and other issues deemed relevant.
Dependencies/ Constraints	• Availability of industry benchmark data, the ability to generate it, and ability to aggregate this data. • Assumes there is a compelling need for benchmarking and sustainability credentials • Assumes a tool/platform to access and analyse benchmarking data in a meaningful way

2.1 Trace Sustainability Credentials Along Supply Chains

Objective	Users seek to understand and track the sustainability credentials of a product or products that has traversed part, or all, of a supply chain. This might be to support sustainability reporting or to meet export regulatory requirements.
Commentary	There are currently numerous privately and publicly funded activities addressing aspects of this use case. DAFF has funded nearly 30 such projects over recent years (focusing on traceability). Solutions in this space are likely to be commodity specific and potentially specific to individual supply chains. A 'one size fits all' solution is not likely to be useful. Further, the AASF Data Ecosystem is not the appropriate venue to host and govern the development/implementation of industry specific supply chains solutions, although it may add value across industries. The AASF Data Ecosystem can still have an important role in supporting this use case through: • Providing a mechanism to enable the collaborative processes of defining, developing, governing, and managing national agricultural sustainability data standards. In particular, standards necessary to support the traceability of sustainability credentials. • Developing and implementing industry wide identifier schemes across key aspects of agricultural supply chains that support the use of national agricultural sustainability data standards. These are necessary to support traceability. • Developing and implementing mechanisms, rules, policies and processes to support permissioned access to organisational sustainability data and credentials • Providing a venue for stakeholders in supply chains to engage on key issues relating to tracing sustainability credentials (for example, privacy concerns). • Establishing community guidelines/policies/rules for the appropriate collection and use of organisational sustainability data, defining expectations around privacy, security, (dis)benefits, commercial arrangements and other issues deemed relevant.
Dependencies/ Constraints	• Data owners along the supply chain are willing to /able to share their sustainability credentials • There is agreement on the data that is needed to support the use case • There are standards adopted across the industry to support data sharing • There are stable and agreed identifiers for entities along the supply chain

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4.1 Assess Sustainability Credentials

Objective	Users seek to understand the sustainability credentials of a client to assess an application of some form. This might be for finance or similar.
Commentary	This use case is similar to Use Case 3.1 however here the focus is on the sustainability credentials of an individual or single organisation rather than a group of organisations. Once again, solutions in this space are likely to be commodity, supply chain and/or portfolio specific. Given the similarity to Use Case 3.1, recommendations and commentary on potential roles for the AASF Data Ecosystem identified in 3.1 are relevant here: • Providing a mechanism to enable the collaborative processes of defining, developing, governing, and managing national agricultural sustainability data standards. In particular, this use case requires the development and adoption of standard sustainability measures and data interoperability standards. • Developing, managing, publishing and providing support for use of standard identification schemes across keys aspects of agricultural supply chains to which data can be attached. For example, common managed identifiers for agricultural properties. • Developing and implementing mechanisms, rules, policies and processes to support permissioned access to organisational sustainability data and credentials • Providing a venue for stakeholders in agricultural sustainability to engage on key issues relating to the sharing and use of sustainability data (for example, privacy concerns). • Establishing community guidelines/policies/rules for the appropriate collection and use of organisational sustainability data, defining expectations around privacy, security, (dis)benefits, commercial arrangements and other issues deemed relevant. • Providing a space for discussion regarding issues specific to access to an individual organisation's sustainability data, such as social licence to operate or privacy.
Dependencies/ Constraints	• Assumes data is available in a way that meets reporting requirements • Assumes availability of tools/methods for measuring/calculating chosen indicators • Assumes stakeholders consent to sharing of data

7.1 Assess Farm Sustainability

Objective	The user seeks to understand the current sustainability credentials for the property (farm) they are responsible for. This may be for a range of purposes including reporting, internal research and development, or other unspecified reasons.
Commentary	This use case focuses on individual producers/farmers and reflects that much of the burden of sustainability data collection and reporting rests with this group. As such, they need to be supported to be able to collect, analyse and report required data, and realise value in doing so. The direct roles for the AASF Data Ecosystem in supporting this use case are: • Providing a mechanism to enable the collaborative processes of defining, developing, governing, and managing national agricultural sustainability data standards. • Providing mechanisms to support sharing of organisational sustainability data. • Enable users to identify appropriate sustainability indicators for their context, and successfully undertake an assessment. This may be directly via the provision of searchable online repositories of tools or indirectly through connecting users with appropriate resources. • Establishing community guidelines/policies/rules for the appropriate collection and use of organisational sustainability data, defining expectations around privacy, security, (dis)benefits, commercial arrangements and other issues deemed relevant.
Dependencies/ Constraints	• Assumes a level of digital literacy that not all users will have • Assumes that primary user will see value/benefit/need in assessing sustainability of their property • Assumes availability of tools/methods for measuring/calculating chosen indicators • Assumes availability of data that can fulfill a user's needs and context

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7.2 Improve Farm Sustainability

Objective	The user seeks to improve aspects of the sustainability of the property (farm) they are responsible for. They might be a farm owner, a sustainability officer or resource manager, or another professional based at this specific organisation.
Commentary	This use case is related to Use Case 7.1 and has cross-over with Use Case 5.1. It focuses on individual producers/farmers, and their need to be supported to be able to achieve required/desired sustainability outcomes. Roles identified for the AASF Data Ecosystem in 7.1 (especially technical roles) remain relevant and should be considered here. Further, the potential for benchmarking to support this use case means use case 5.1 is also relevant here. Additionally, additional direct roles for the AASF Data Ecosystem in this use case are to support users in finding advice and tools for: • improving operational sustainability • translating sustainability knowledge and analysis into implementable action
Dependencies/ Constraints	• Assumes a level of digital literacy that not all users will have • Assumes that primary user will see value/benefit/need in assessing sustainability of their property • Assumes availability of tools/methods for measuring/calculating chosen indicators • Assumes availability of data that can fulfill a user's needs and context • Assumes users can translate data into actions to support their context

3.1 Create Reports

Objective	Users seek to report upon sustainability credentials of entities within the agriculture supply chain. This might focus on one entity or organisation, or a portfolio of entities (such as in the case of corporations with multiple holdings).
Commentary	This use case is similar to Use Case 2.1, although the focus is on generating sustainability reports specific to an organisation or corporate entity. Thus, required sustainability data might be related to a specific supply chain or a portfolio of clients. As with Use Case 2.1, it is unlikely a "one size fits all" solution will be useful to enable this use case. The AASF Data Ecosystem can have a role in supporting this use case through: • Provide a collaborative space or mechanisms for stakeholders to develop, implement, and manage sustainability data standards (including data interoperability and data quality) and their key qualities (i.e. what is being reported) • Developing, managing, publishing and providing support for use of standard identification schemes across keys aspects of agricultural supply chains to which data can be attached. For example, common managed identifiers for agricultural properties. • Providing a forum for governance and administration of data standards. This might include determining rules, expectations and policies around standards and sustainability reporting, data requirements, data licencing, data custodian ship, and key policy elements (e.g. privacy) • Incentivising the development of mechanisms to support registration and discovery of, and permissioned access to, organisational sustainability data. This includes policies, incentives (if resources are available and possible), and/or collective undertakings and social agreements on this
Dependencies/ Constraints	• Assumes a level of digital literacy that not all will have • Assumes data is available in a way that meets reporting requirements • Assumes that primary user will see value/benefit/need in assessing sustainability of their property • Assumes availability of tools/methods for measuring/calculating chosen indicators • Assumes stakeholders consent to sharing of data

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Appendix B

Personas – Current & Future States

PRIMARY PRODUCERS & PROCESSORS

	Heather	**Amandeep**	**Allan**
ROLE	**Runs a sheep station in Tasmania**	**Has a blueberry farm and packhouse on the NSW mid-north coast**	**Is a wool grower in southern NSW**
CURRENT EXPERIENCES	Heather spends a lot of time manually providing her sustainability credentials to requestors as there is no way for them to be automatically discovered	Amandeep is frustrated by the resourcing required to provide similar, but not the same, data to different retailers in different systems in different ways	Allan is confused by the inconsistent guidance provided by sustainability advisors about how to collect and share data about his practices, and is distrustful of what others will do with his data
	⌄	⌄	⌄
IN THE FUTURE...	**Heather's sustainability credentials can be traced through the supply chain because ...**	**Amandeep can meet sustainability reporting requirements set by his retail customers because ...**	**Allan feels confident to meet sustainability requirements to be able to sell his wool because ...**
ROLE OF THE DATA ECOSYSTEM	**Her property has an identifier managed within the Australian agriculture sector and her AASF-aligned credentials are attached to this.**	**The retailer systems he is required to report into are using AASF Data Ecosystem guidelines for data and analysis and are interoperable with his farm management system**	**His sustainability advisor has been able to connect him with the AASF Data Ecosystem aligned data and digital services which meet his needs.**
PRIMARY VALUE FROM DATA ECOSYSTEM	**This means her sustainability credentials can be discovered, and ...**	**This means, he can confidently collect his data in one system and ...**	**This means, he can confidently collect data and put it in the digital systems to ...**
ADDITIONAL BENEFITS FROM DATA ECOSYSTEM	• *Those seeking to trace her products can do so efficiently and reliably*	• *Report to multiple different retailer systems using their APIs linked to his farm management system* • *Benchmark his farm sustainability practices and attract a premium for his product*	• *Provide evidence of on-farm sustainability to those who request it, including his broker, ag services contact and finance provider* • *Choose whether to provide others across the wool industry with his sustainability data so they can do commodity-level analysis* • *Evaluate his farm against benchmarks for his region and farm type*

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PRIMARY PRODUCERS & PROCESSORS

Marcus

ROLE

Sustainability Manager for a corporate farming operation

CURRENT EXPERIENCES

Marcus needs to provide reports to shareholders and export markets, but the process is resource intensive as he needs to identify the indicators he is going to use and collect relevant data. The task is seen as a cost by the organisation with little visible return on investment

IN THE FUTURE...

He can meet company sustainability reporting obligations in a timely, ethical and responsible way because …

ROLE OF THE DATA ECOSYSTEM

… the tools he uses to collect and analyse data for reporting purposes have been designed using AASF Data Ecosystem guidelines for data and analysis.

PRIMARY VALUE FROM DATA ECOSYSTEM

This means, he develops consistent reports which …

ADDITIONAL BENEFITS FROM DATA ECOSYSTEM

- *Informs shareholders about the sustainability practices and impacts being achieved by the corporation in the short, mid and longer term*
- *Communicate with export markets about sustainability claims the corporation is making*
- *Benchmark performance of their farms against their own sites but also against others - to determine operational improvements*

Alejandro

Processor (1st Level)

Alejandro is overwhelmed by the amount of different types and formats of data he receives from his suppliers and the resourcing required to aggregate and then share with others along the supply chain

Alejandro is able to readily seek permission for sustainability data from his suppliers and then pass this information along the supply chain because …

… his suppliers are using AASF DE aligned tools and standards as are those up the supply chain

This means he can reduce the cost of sustainability data collection and provision and …

- *Efficiently pass information along the supply chain, and know that it will be trusted*
- *Be an efficient and effective collaborator in the supply chain*
- *Reduce the reporting burden on his suppliers*

Tayla

Grows wheat in WA

Tayla is exhausted by using multiple different digital systems which are not fit for her purposes, and which do not interoperate. She also feels disempowered by lack of control over the use of her data by others in the supply chain

Tayla is able to provide required certificates regarding sustainability to their handler because …

… they use a AASF aligned digital system that collects required sustainability data for certification purposes

This means they can collect data in one system and …

- *Provide certificates to grain handlers to meet export requirements*
- *Provide sustainability evidence to auditors when required*
- *Choose whether to provide GRDC with their sustainability data so they can do commodity-level analysis*
- *Provide their insurance broker with their sustainability evidence so they can access 'green' products*

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PRIMARY PRODUCERS & PROCESSORS

Mary

Runs a mixed-commodity farm in Western Victoria

CURRENT EXPERIENCES

Mary needs to have multiple sustainability certifications for the supply chains she is involved in and is fielding a multitude of different requests for her sustainability data. This is time consuming, and Mary doesn't have a line of sight to long-term benefits from the data collection and reporting activities she undertakes.

IN THE FUTURE...

She has time to plan for, implement, and report on sustainability-related activities on her family's farm, because ...

ROLE OF THE DATA ECOSYSTEM

... the digital systems she uses to plan and track her farm activities are aligned with AASF Data Ecosystem guidelines for data and analysis.

PRIMARY VALUE FROM DATA ECOSYSTEM

This means, she reports into the systems once and can choose to ...

ADDITIONAL BENEFITS FROM DATA ECOSYSTEM

• *Provide her banks and insurers information to satisfy their product agreements*

• *Communicate with export markets about the farm's sustainability practices*

• *Engage with buyers who want information about individual commodities from her farm*

• *Benchmark her farm's sustainability practices and gain insights from her advisors about potential changes which can deliver enhanced economic, environmental and social outcomes in the future*

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DATA & DIGITAL SERVICE PROVIDERS

	Jane	**Ben**	**Arina**
ROLE	**Director at a company supplying farm management software**	**Value added re-seller of data and data products**	**Technical Product Manager at an industry-owned company that manages farm-level data**
CURRENT EXPERIENCES	Jane is unable to easily distinguish the value of her sustainability data collection product offerings for Australian ag producers and processors	Ben is unable to develop the best possible analysis products for their clients, because of limited data supply, reliability and/or quality.	Arina finds it difficult to verify claims because identifiers are not consistent. This impacts the value proposition of her company's system as a traceability and identity assurance tool.

IN THE FUTURE...	Jane is able to communicate about the unique value offerings of her company's products, because …	Ben is able to develop fit for purpose, innovate data products meeting a range of client needs because …	Arina can make informed product strategy and technical decisions that deliver greater benefit to her stakeholders because …
ROLE OF THE DATA ECOSYSTEM	… the digital tools they provide include functions aligned with AASF Data Ecosystem guidelines for data and analysis, along with other add-ons related to traceability.	… the AASF Data Ecosystem provides him permissioned access to a broader range of data sets and a greater understanding of data needs across the sector	… they can easily find globally accepted standards to use for supporting product traceability.
PRIMARY VALUE FROM DATA ECOSYSTEM	This means, she can offer farm management software which …	This means he is able to …	This means, her company can improve the reliability of system data and …
ADDITIONAL BENEFITS FROM DATA ECOSYSTEM	• *enables users the opportunity to capture their farm data for multiple purposes in formats which are interoperable* • *provides users with options to approve on a case-by-case basis any data access to external parties supports benchmarking of sustainability practices and gain insights about potential changes which can deliver enhanced economic, environmental and social outcomes in the future.* • *Also, AASF Data Ecosystem mechanisms provide her company opportunity to plan for long-term systems development and manage future changes.*	• *more confidently invest in the development of new data products and assure their ongoing supply* • *target product offerings to a broader client network* • *reduce costs associated with quality assurance of the preliminary data* • *provide reliable data integration services, using reliable identifiers*	• *Be confident sustainability claims can be verified*

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DATA & DIGITAL SERVICE PROVIDERS

Omid
ROLE

Systems-Level Data Exchange Company

CURRENT EXPERIENCES

Omid finds there is a high cost / difficulty in providing a true systems-level offering as industry data or products are not interoperable or compatible, therefore they have to build bespoke mappings for all digital service providers within the sector.

IN THE FUTURE...

Omid is able to reduce costs associated with maintaining data mappings between systems, and can shift towards delivery of value-added services, because ...

ROLE OF THE DATA ECOSYSTEM

... AASF Data Ecosystem data standards mean that data across the ag sector is interoperable, accessible and usable.

PRIMARY VALUE FROM DATA ECOSYSTEM

This means, Omid's company can focus on innovating their value-adding services which ...

ADDITIONAL BENEFITS FROM DATA ECOSYSTEM

- *Provides advanced analytics on trends across various agricultural sustainability practices for different commodities and regions*
- *Increases the scope of the data they're able to exchange*
- *Opens-up new market opportunities for the company*
- *Enables efficient data integration, using reliable identifiers*

Roger

Data product owner from a government data agency

Roger is unable to create high quality national datasets due to changing requirements from policy makers and limited engagement from primary producers and processors in supplying data through national surveys. This restricts the utility and increases resourcing required to develop national datasets

Roger can augment existing datasets or build new ones for national and regional scales because ...

... he has regular feedback from the DE about requirements for national data which he can provide to his department as evidence for resourcing requests.

This means, his government department can ...

- *reduce reliance on in-house survey tools, by gaining permissioned access to producer and processor data available in AASF-aligned data and digital systems*
- *produce fit-for-purpose national and regional datasets which meet AASF DE community requirements*
- *produce reliable and necessary national-scale reports on agricultural sustainability trends*

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EVIDENCE REQUESTORS

	Bob	**Fiona**	**Daniel**
ROLE	An ag finance specialist at an Australian bank	Sustainability report developer at an FMCG	Supplier of fertiliser for on-farm use
CURRENT EXPERIENCES	Bob struggles to define his bank's sustainable product offerings and assess applications from primary producers. He finds it difficult to meet his KPIs with regards to sustainability products and hence help his organisation meet their sustainable investment targets	Fiona finds it difficult to report on certain aspects of sustainability across her organisation as the data is either unavailable or requires intensive resourcing to access and analyse	Daniel is not able to confidently trace his product through the supply chain as his PDF product documentation is manually re-typed by primary producers into their on-farm reporting systems, potentially losing or misrepresenting critical information.
IN THE FUTURE...	Bob is able to provide competitive sustainability-related funding to agricultural companies across Australia, because ...	Fiona is able to confidently and comprehensively report on sustainability across the organisation, because ...	Daniel can fulfil his own sustainability reporting requirements because ...
ROLE OF THE DATA ECOSYSTEM	... he is able to confidently request information from clients regarding their sustainability practices, because their tools are interoperable, and therefore he knows the clients will have the required data available not only at application but throughout the lifetime of the product.	... she can easily seek permission to access data required and be assured that the data will be appropriately structured because it is aligned with AASF Data Ecosystem standards.	... he and the primary producers have alignment on the data to be collected and use interoperable systems to capture and share data between them.
PRIMARY VALUE FROM DATA ECOSYSTEM	This means, he can help ensure his organisation ...	This means, her organisation can ...	This means he can ...
ADDITIONAL BENEFITS FROM DATA ECOSYSTEM	• *Offers competitive funding which meets their sustainable investment targets, which in turn reduces their risk exposure and ensures they can continue to be attractive to international investment markets* • *Is able to continually monitor their investment and ensure expectations of sustainability practices are being met*	• *Track their progress towards achieving their sustainability targets* • *Meet its sustainability (ESG) reporting requirements* • *Reduce the costs associated with data access and analysis* • *Develop in-house datasets for longitudinal analysis and comparison reporting*	• *Continue responsible and sustainable operation of his business.* • *Easily fulfil any reporting requirements.* • *Provide the product information once, in one place, and trust it will retain integrity throughout the supply chain.* • *Obtain feedback on the utilisation and appropriateness of his product for future improvements.*

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EVIDENCE REQUESTORS

	Pravin	**Kahu**	**Rebecca**
ROLE	Representative of a non-government organisation (NGO)	Consumer of Australian agricultural goods	Research Scientist
CURRENT EXPERIENCES	Pravin wants to use benchmarking data in their consumer-facing app to raise awareness about how sustainable different Australian agricultural commodities are but can't easily find or use reliable data.	Kahu wants to make informed choices about the types of goods she buys in regard to sustainability of the product but isn't sure if she can trust what is printed on the label on the products.	Rebecca finds discovering and accessing data to support her analysis is time consuming, expensive and sometimes unsuccessful leading to poor, unreliable or unusable results
IN THE FUTURE...	Pravin can find and collate the data he needs to produce summary level insights and commentary because ...	Kahu can feel comfortable with her consumer behaviour because ...	Rebecca can discover and gain permissioned access to data for analysis because ...
ROLE OF THE DATA ECOSYSTEM	... the data is discoverable, available and usable. Data guidelines indicate usage restrictions, and methodology is comparable.	... the data is available to back up any sustainability claims made by products, and she can easily benchmark across agricultural industries if she wants to.	... she has access to a forum and tools associated with the AASF data ecosystem to support her research activities.
PRIMARY VALUE FROM DATA ECOSYSTEM	The collateral Pravin produces can ... • Inform consumers of whole of supply chain sustainability performance. • Be trusted as it is using sources of integrity.	This means she can ... • Make informed purchasing decisions • Review associated data with a product • Trust claims made by a supplier or product	This means she can undertake analysis that ... • Is not constrained by data limitations and access constraints • Repurposes and reuses data which has previously been requested of industry and government agencies
ADDITIONAL BENEFITS FROM DATA ECOSYSTEM			

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EVIDENCE REQUESTORS

	Helen	**Saeed**	**Maria**
ROLE	Sustainability Manager at a Retailer	Develops insurance products for the agriculture sector	Owner of a Commodity Framework
CURRENT EXPERIENCES	Helen lacks confidence in sustainability claims of products she is buying, which is a risk for her organisation to meet its sustainability targets with respect to its sales	Saaed is unclear as to how sustainable practices can be accounted for in assessing on-farm insurable risk with no standard approach defined in Australia	Maria is using unreliable survey or repurposed publicly available data to produce commodity sustainability reports which still have data gaps
IN THE FUTURE...	Helen can effectively and efficiently communicate down her supply chain to access the evidence she requires about sustainability claims because ...	Saeed is able to develop insurance products which account for on-farm operational or organisational sustainability practices, because ...	Maria can provide industry specific benchmark data sets used to guide improvements in sustainability outcomes because ...
ROLE OF THE DATA ECOSYSTEM	... her organisation's sustainability framework is aligned with the AASF along with their data systems.	... he knows that information about these practices can be requested, supplied and appropriately analysed as the data and analysis tools are aligned with AASF Data Ecosystem standards.	... she is able to seek permissioned access to comprehensive on-farm sustainability data (aligned with the AASF) from across her industry.
PRIMARY VALUE FROM DATA ECOSYSTEM	This means, her organisation can ...	This allows his organisation to ...	This means she can ...
ADDITIONAL BENEFITS FROM DATA ECOSYSTEM	• *Meet and report on its sustainability targets and provide trusted evidence of these claims* • *Reduce the reporting burden down the supply chain* • *Confidently produce in-house data sets and access reliable analysis tools*	• *Differentiate themselves in the marketplace with product offerings which take account of sustainability practices in agriculture* • *Be confident in their reporting towards achieving sustainability targets and reduce costs to access international reinsurance markets* • *Understand how to request and analyse data from clients regarding their sustainability practices*	• *monitor progress of the industry as a whole to meet sustainability targets* • *make recommendations to AASF Data Forums for national data sets* • *understand sustainabiity trends and needs within her industry*

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EVIDENCE REQUESTORS

	Garry	**Troy**	**Paris**
ROLE	**Market Access and Trade Government Policy Advisor**	**Agronomist / Trusted Advisor**	**Procurement Manager at an International Hotel Chain**
CURRENT EXPERIENCES	Garry needs policy decisions and program investments to be informed by robust intelligence to address priority issues for industry and the community, however he cannot always access the data he needs to undertake his assessment. This can reduce community trust in decisions	Troy struggles to provide advice to clients with respect to sustainability as there is currently a plethora of conflicting information from various sources. He wants to be more confident they are providing trustworthy, current and relevant information to individual clients.	Paris needs to align procurement practices with sustainability goals of her organisation but is unable to access consistent trusted evidence of sustainability claims for individual products
IN THE FUTURE...			
ROLE OF THE DATA ECOSYSTEM	**Garry can make more informed policy recommendations that lead to better outcomes because ...** ... he can easily identify and quantify investment areas, such as market failures or power asymmetry, through data. Uses the technical requirements of the DE to help foster adoption via AgTech players or other mechanisms.	**Troy can access and reference trusted information to advise clients on sustainability practice and reporting because ...** ... their online tool (provided by their employer) can query the AASF registry to return customised, relevant information for their particular client and their property.	**Paris can access trusted evidence of sustainability practices for all Australian suppliers she engages with because ...** ... these suppliers speak a common language and have a consistent narrative about the sustainability of their produce.
PRIMARY VALUE FROM DATA ECOSYSTEM	**This means his advice and recommendations can ...**	**This enables him to ...**	**This means ...**
ADDITIONAL BENEFITS FROM DATA ECOSYSTEM	• *Reinforce Government's role in the system as a strong trust anchor* • *Achieve a cost benefit through the re-use of existing data from production processes or other regulatory requirements* • *Identify priority indicators and metrics across the industry* • *Nominate data gaps and required investment* • *Support adoption of the technical and data requirements* • *Enable appropriate taxpayer funding expenditure*	• *Give specific and tailored advice to his clients based on their property and operation type* • *Reference a ""single source of truth"" for sustainability information and tools* • *Trust the advice and guidance he gives his clients is endorsed, accurate and fit for purpose* • *Have visibility on upcoming / new regulatory changes or requirements*	• *Paris prefers to use Australian suppliers as the information she needs is readily available, consistent and trustable.*

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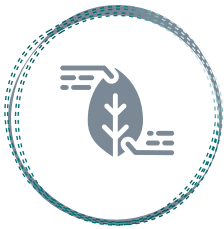
EVIDENCE REQUESTORS

	Paul	**Connie**	**Fatimah**
ROLE	Agricultural investor	Compliance manager for an importer in Europe	Australian government policy analyst
CURRENT EXPERIENCES	Paul needs up to date, trusted and accurate information regarding sustainability to inform his investment decisions in products or markets, however the accuracy of this and timeliness doesn't always meet his needs	As the accountable party in the supply chain, Connie has difficulty in verifying sustainability claims for a product and needs access to product data that is comparable and interoperable with their own for assessment and approval.	Often gets requests from the Minister to assess the impact of a policy change but can't determine if he's found all of the data he needs
IN THE FUTURE...	Paul can make confident strategic decisions and identify new opportunities because ...	Connie can easily use data provided about an Australian agricultural product to undertake a sustainability compliance audit as ...	Fatimah can identify when data does not exist, can let the right people know, and can seek funding from the Minister to fill a data gap because ...
ROLE OF THE DATA ECOSYSTEM	... he can find relevant and consistent data to inform his market analysis and opportunity identification, and data guidelines clearly outline the use.	... the data provided is accessible, interoperable, and the standards and methodologies utilised are equivalent and endorsed.	... she has access to registers of datasets, indicators and metrics that she can search and a list of subject matter experts she can contact to discuss missing data.
PRIMARY VALUE FROM DATA ECOSYSTEM	This allows him to ...	This means she can ...	This means she can ...
ADDITIONAL BENEFITS FROM DATA ECOSYSTEM	• *Generate a wish list of intended markets and products, and uses AASF to ID sustainability requirements for each* • *Interrogate investment potential by understanding sustainability requirements per commodity or market* • *Use the right data for his analysis*	• *Make an informed and robust decision regarding the compliance of the product being assessed* • *Reduce risk for the importing company through verification of product claims* • *Be assured the data provided is trustworthy, accurate and comparable* • *Complete her audit quickly*	• *Develop a business case to get funding to collect the missing data* • *Use the registers and advice from experts as evidence to prioritise and justify funding requests* • *Use data available from Data Ecosystem stakeholders to provide evidence for policy changes*

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EVIDENCE REQUESTORS

	Nikola	**Prue**	**Jasmin**
ROLE	Australian agricultural sustainability champion	Verifies Sustainability Processes and Systems	Journalist
CURRENT EXPERIENCES	Nikola is a champion of the sustainability of Australian agriculture. She uses the AASF to describe agricultural sustainability practices, but is not able to readily access evidence to help her demonstrate progress against it.	Prue needs to expend significant resources to go on farm and physically inspect practices, infrastructure, equipment and documentation. This is intrusive and returns limited value to producers and processors.	Jasmin has been tipped off about a greenwashing claim and has decided to investigate. She wants to be able to access information to verify the claims being made but finds this very difficult.
IN THE FUTURE…	Nikola can champion the AASF in the forums and events she attends because …	Prue can reliably determine where sustainability outcomes are being achieved against agreed standards …	Jasmin can access AASF Data Ecosystem structures to find data and …
ROLE OF THE DATA ECOSYSTEM	… she can show people how she's used AASF in her business and can help others' find and use AASF data guidance information.	… because she can remotely access credible data from the farm and all organisations along the supply chain.	… she can find contextual information and access experts.
PRIMARY VALUE FROM DATA ECOSYSTEM	**This means she can …**	**This means that for sustainability assessment purposes, she can …**	**This means she can …**
ADDITIONAL BENEFITS FROM DATA ECOSYSTEM	• *Use the guidelines and information available to promote awareness of and the benefits of the AASF* • *Join in on community forums to build knowledge and his networks*	• *Easily access data from one or many points across the supply chain and easily compare and analyse it* • *Undertake consistent, trustworthy, interoperable and cost-effective verification activities* • *Enable relevant benchmarking and provide value back to producers and processors*	• *Access data and speak to people who can verify or refute the claims being made* • *Join in on public commentary based on the evidence she finds*

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Appendix C

List of additional current activities

Additional current activities

The AASF Data Ecosystem project has been undertaken alongside a multitude of other projects exploring sustainability, agricultural practices, data harmonisation and systems interoperability. Below and overleaf are a list of the many activities currently underway within Australia that have implications for the AASF Data Ecosystem.

Name	Types of value it offers to stakeholders	Status	Audience / users	Relevance to AASF data ecosystem,
Australian Agriculture Traceability Alliance & Governance Group (AATGG)	Australian Agricultural Traceability Governance Group (AATGG) is part of the governance framework for the Australian Agricultural Traceability Alliance. The AATGG provides national governance, leadership, coordination, and linkages between various agricultural traceability sectors. The AATGG guides the development and implementation of the National Agricultural Traceability Strategy 2023 to 2033.	Established in March 2023.	Regulators, industry, supply chains	Will not specifically create datasets. Will guide how data should be created and managed, to enable data sharing and interoperability.
Data Standards Working Group (DSWG)	The Australian Agricultural Traceability Data Standards Working Group (DSWG) is responsible for developing a data standards consultative paper to advise AgTech solutions and systems that promote data sharing and interoperability across the supply chain. The DSWG also provides guidance and advice to the AATGG and other associated working groups as required on data standards priorities to support the National Agricultural Traceability Strategy 2023 to 2033 and its associated implementation plan. Food Agility Cooperative Research Centre were funded to establish the DSWG, and provides secretariat for this group.	DSWG is due to finalise the consultation paper by 31 October 2024.	AATGG; supply chain participants, regulators, service providers and AgTech developers	Will not specifically create datasets. Will guide how data should be created and managed, to enable data sharing and interoperability.
Data interoperability framework for agricltural traceability and product data: consultation paper	The paper proposes a Data Interoperability Framework for agricultural traceability and product data for use by Australian agriculture and government. The framework aims to: • enable data interoperability • enable a shared understanding of key data • promote and incentivise data-sharing while preserving consent and privacy • enable the secure exchange of data • enable the verification of data • keep Australian traceability systems in line with global advancements • align to how Australia's key trading partners are managing traceability.	The draft paper was released for public consultation in May 2024. The paper is due to be finalised by 31 October 2024.	Multiple audiences including supply chain participants, regulators, service providers and AgTech developers. The primary target audience are system and solution architects including AgTechs that produce technical specifications and requirements solutions for the collection, storage, exchange, or use of data for traceability or product claims.	Will not specifically create datasets. Will guide how data should be created and managed, to enable data sharing and interoperability.

Name	Types of value it offers to stakeholders	Status	Audience / users	Relevance to AASF data ecosystem,
National Traceability Strategy	The overarching purpose of the strategy is to align and maintain momentum with relevant stakeholders around a common vision for an enhanced national agricultural traceability ecosystem.	The Strategy was released in 2023. An implementation plan is yet to be released.	In the first instance, the audience is Australian agriculture. It is also being promoted with global audiences, to demonstrate Australia's approach to traceability.	Will not specifically create datasets. Will guide how data should be created and managed by Australian Government agencies.
Data Enabled Traceability Proof of Concepts - AgTrace	The project is completing a series of tests (proofs of concept and pilots) to explore 'the art of the possible' with regards to sharing data as a verifiable credential, using the Australian Agricultural Traceability Protocol (AATP). Food Agility were also funded as part of this grant, to establish the Australian Agricultural Traceability Data Standards Working Group (DSWG) to oversee development of a data standards paper, the Data Interoperability Framework consultation paper.	The first proof of concept (PoC) (red meat) was completed in December 2023. A second PoC (horticulture) and an European Union Deforestation Regulation (EUDR) Pilot that builds upon the learnings of the red meat PoC, is due to be completed before the end of 2024. A third PoC will focus on grains.	In the first instance, the audience is Australian agriculture.	Project is testing a standardised approach for sharing verified data. Project is testing sharing traceability data along the supply chain. Specific to red meat, horitculture and grains.
Farm-level emissions reporting standards (Improving GHG accounting at national to farm levels)	Funding will be used to: • enhance the National Greenhouse Accounts methods and data collection processes • develop, publish and maintain voluntary emissions estimation and reporting 'standards' for the agriculture, fisheries and forestry industries.	Funded in Budget 2024-25, over 10 years. Work commencing at DCCEEW and DAFF to scope work and establish technical reference groups to support the work.	Regulators, industry, supply chains, international markets, finance sector, service providers and AgTech developers	Depending on how the work is scoped, there is potential for the standards that are developed to be used to develop calculators and tools for measuring and reporting purposes.
Geolocation Data Sharing Cross-jurisdictional Taskforce	Aims to investigate opportunities to implement an opt-in 'tell us once' approach to geolocation data sharing within agricultural supply chains.	Established in August 2024. Meets approximately monthly, currently in place until early 2025.	Regulators, industry, supply chains	Taskforce aims to improve alignment of the ways data is collected and managed to help with interoperability across all Australian jurisdictions.

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Name	Types of value it offers to stakeholders	Status	Audience / users	Relevance to AASF data ecosystem,
Traceability Grants Program - Round 3	A funding round under the National Traceability Program. The Traceability Grants Program has the following objectives: • Support industry projects that will enhance our agricultural supply chain traceability systems. This includes developing and trialling technologies that digitise information flow. • Provide an advantage for our exporters in overseas markets that will assist them to maintain their competitive edge. • Increase opportunities to export Australian commodities. Round 3 projects focus on 3 of the Priority Areas for Action identified in the National Traceability Strategy 2023 to 2033: • Priority areas for action 4: Enhance and support trust and adoption of agricultural traceability through demonstration of value-add and return on investment. • Priority areas for action 6: Improve two-way, producer-consumer information flows to identify value-add creation and distribution opportunities and drive business development. • Priority areas for action 9: Establish a flexible and responsive agricultural traceability research and development agenda.	Round 3 funded 11 projects in 2024. Projects have commenced and will be completed by 30 June 2025.	Industry, research organisations, regulators, supply chains, international markets	Funded projects are identifying and collecting data for providing traceability along supply chains. The types of data are specific to each project.
Traceability Grants Program - Round 2	A funding round under the National Traceability Program. The Traceability Grants Program has the following objectives: • Support industry projects that will enhance our agricultural supply chain traceability systems. This includes developing and trialling technologies that digitise information flow. • Provide an advantage for our exporters in overseas markets that will assist them to maintain their competitive edge. • Increase opportunities to export Australian commodities.	Round 2 funded 14 projects in 2021. All projects were completed by 30 June 2023.	Industry, research organisations, regulators, supply chains, international markets	Funded projects are identifying and collecting data for providing traceability along supply chains. The types of data are specific to each project.

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Traceability Grants Program - Round 1	A funding round under the National Traceability Program. The Traceability Grants Program has the following objectives: • Support industry projects that will enhance our agricultural supply chain traceability systems. This includes developing and trialling technologies that digitise information flow. • Provide an advantage for our exporters in overseas markets that will assist them to maintain their competitive edge. • Increase opportunities to export Australian commodities.	Round 1 funded 16 projects in 2020. All projects are completed.	Industry, research organisations, regulators, supply chains, international markets	Funded projects are identifying and collecting data for providing traceability along supply chains. The types of data are specific to each project.
Extrata	Securely transports data, encrypted end-to-end, providing farmers with confidence that their sensitive agricultural data is supplied to the intended recipient only and remains confidential. Extrata provides a secure platform to exchange sensitive agricultural, financial and research data.	Was in pilot stage in 2022, seeking early adopters; part of the DPIRD eConnect+ project. As of last page update in March 2024, Extrata is currently being trialled across a number of collaborative projects involving WA primary producers.	Farmers, producers and service providers involved in the broadacre, intensive grains, livestock, horticulture and aquaculture industries in WA and across Australia. Research institutions.	Based on public information, Extrata appears to be creating a database of agricultural data, primarily based in WA though with potential national application.
Building Trust in Australian Agricultural Traceability and Credentials in Southeast Asia Grant	A funding round under the National Traceability Program. Several projects are exploring how to establish end-to-end traceability systems for specific commodities to one or more Southeast asian markets (Indonesia, Malaysia, Philippines, Singapore, Cambodia, Brunei, Laos, Thailand, Myanmar, Timor Leste and Vietnam).	11 projects were funded in June 2024 through the grant round. The projects have commenced activities and will all be completed by 30 June 2026.	Industry, research organisations, regulators, supply chains, international markets	Funded projects are identifying and collecting data for providing traceability along supply chains. The types of data are specific to each project.

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Cool Soil Initiative	The Cool Soil Initiative project started in 2020 and aimed to develop a scientifically credible framework for the food industry to support cropping farmers achieve both sustainable production and reduce GHG emissions. Using data analysis and digital solutions coupled with research, the focus was to identify innovative agronomic strategies to increase soil health and related function and support their trial and adoption. The project has: • Developed baseline paddock level GHG emissions data across a number of years of variable seasonal conditions and soil health on 200 farms and measured and track changes over time. • Refined how GHG emission calculations are made on-farm, to ensure that GHG data is highly credible, aligned to the Australia's National GHG Inventory and globally compatible. • Brought together key players in the grains supply chain to support farmers to investigate innovative cropping practices to improve their soil health and in-turn reduce on-farm GHG emissions.	Project completed	food industry; cropping farmers	Collected and baselined paddock-level GHG emissions data. If still available, might be a useful dataset to include as part of the ecosystem.
Manual of Importing Country Requirements (MICOR)	Micor is a resource for exporters of Australian agricultural products and provides guidance on importing country requirements for meat, dairy, plants, fish, live animals, eggs, non-prescribed goods and organics.	Working - information is updated when DAFF is aware of a change to an importing country's requirements. Some parts of the system require a log in to access the information.	Australian exporters	As a national dataset it identifies importing country rules and requirements, by commodities. This data may be useful to draw on. Data can be searched by keyword and/or refined by country, group, end use and scientific name.

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Climate Active	Climate Active is an Australian Government program that supports national climate policy by driving voluntary climate action by Australian businesses. Climate Active certification is used to substantiate carbon neutral claims. Climate Active claims are subject to independent third party verification to ensure the integrity of the carbon neutral claim. The Climate Active Carbon Neutral Standard is underpinned by carbon accounting and offsets integrity principles, and built upon international best-practice standards and GHG protocols including: • Australian Standard (AS) ISO 14064 series • International Standard ISO 14040 series • ISO 14065:2013 – Greenhouse gases • The Greenhouse Gas (GHG) Protocol standards	Program established in 2019.	Australian businesses; consumers; international markets	Is an example of a certification that may be shared along the supply chain.
Data and Digital Government Strategy	Provides a blueprint for the use and management of data and digital technologies through to 2030.	Strategy and implementation plan were released in 2023 and for the period 2023 through to 2030.	Australian Government	This strategy provides guidance to Australian government agencies on use of data and will influence how data is managed and structured for storage, interoperability and sharing.
Building Trust in Australian Agricultural Traceability and Credentials in Southeast Asia Grant	A funding round under the National Traceability Program. Several projects are exploring how to establish end-to-end traceability systems for specific commodities to one or more Southeast asian markets (Indonesia, Malaysia, Philippines, Singapore, Cambodia, Brunei, Laos, Thailand, Myanmar, Timor Leste and Vietnam).	11 projects were funded in June 2024 through the grant round. The projects have commenced activities and will all be completed by 30 June 2026.	Industry, research organisations, regulators, supply chains, international markets	Funded projects are identifying and collecting data for providing traceability along supply chains. The types of data are specific to each project.

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Livestock and Animal Traceability Development, Implementation and Improvement Grant	A funding round under the National Traceability Program. The grant round provides the opportunity for successful applicants to contribute to developing, implementing, and improving traceability systems for Australian agricultural industries, specifically in the livestock, animals and animal products sector.	Applications closed in July 2024; successful projects are yet to be determined.	Industry (livestock, animals and animal products), research organisations, regulators, supply chains, international markets	Funded projects are identifying and collecting data for providing traceability along supply chains. The types of data are specific to the livestock, animals and animal products sector.
Sustainability Uplift Grant Round	A funding round under the National Traceability Program. Objectives of Sustainability Reporting grants are to: • Identify and test approaches to address known data gaps across the agriculture sector to support reporting against sustainability frameworks and emerging international requirements and standards. • Identify the core cross-commodity data points and indicators required to verify the agriculture sector's sustainability credentials and quantify the potential economic benefits. • Facilitate information sharing and ongoing engagement across supply chains to promote transparency in response to changing consumer and market demand.	11 projects were funded in 2023 through the grant round. Projects are due to be completed by 30 June 2025.	Industry, research organisations, regulators, supply chains, international markets	Funded projects are identifying and collecting data for providing traceability along supply chains. The types of data are specific to each project.
Regulatory Technology Research and Insights Grant Round	A funding round under the National Traceability Program. The objectives of the RegTech Research and Insights grants were to: • Identify existing and potential new RegTech traceability applications and developments that can provide solutions for streamlining compliance across agricultural supply chains; and • Help the adoption of appropriate, cost-effective, and compatible digital traceability systems, to increase regulatory efficiency and reduce the administrative and compliance burdens along the agricultural supply chains.	15 projects were funded in 2023 through the grant round. Projects are due to be completed by 30 June 2025.	Industry, research organisations, regulators, supply chains, international markets	Funded projects are identifying and collecting data for providing traceability along supply chains. The types of data are specific to each project.

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Indigenous Agricultural Product Framework	Funding for a project to develop Australia's first Indigenous Agricultural Product Framework. The objectives of this grant to the ILSC include the following: • Enable First Nations peoples to define 'Indigenous agricultural product' for the purposes of agricultural trade, recognition, and benefit. • Clarify the benefits, gaps, industry maturity and export opportunity for Indigenous agricultural products. • Provide key actions and governance requirements to translate the concept into recognisable Indigenous agricultural credentials.	Project is underway	First Nations farmers, producers and processors and exporters	Project will be defining 'indigenous agricultural product'. Project will be developing a standardised framework to be used for indigenous agricultulral credentials in future.
AADX	Eventually a capability to discover and access data on a range of agricultural subjects. Provides mechanism to enable to data to flow from 'where it is' to 'where its needed'. In particular, secure, private, permissioned access to farm level data.	In development phase. Currently delivering 3 case studies	Primarily a tool for those requiring data	Provides mechanism to access on farm sustainability data support report development, credential verification and development of benchmarks
Cotton Industry Data Platform Project	CRDC will collect and maintain data associated with participants along the cotton supply chain. This includes information on inputs (e.g. fertilizers, chemicals, etc.), agronomy, farm data, ginning, classing, merchant, transportation, spinning, brands, workforce data and data relating to sustainability reporting. At this stage workforce and sustainability reporting are not in scope for the BRD phase but future BRDs would be required for this additional work. Some indicative information about this potential work will be available for responders to the RFT process.	RFT for development out now	All stakeholders in cotton supplychains	Database containing relevant sustainability data.
National Livestock Identification System (NLIS)	Ostenisbly to support biosecurity requirements regarding tracing of animal movements. NLIS links identifiers of individual anmials with property identifiers and hence enables tracing.	Mature system. Currently undergoing refresh (technology upgarde)	Australian livetsock producers, transporters and processors	Key element of the agricultural tracing infrastructure
Australian Wool Traceability Hub	Ostenisbly to support biosecurity requirements regarding tracing of wool. Also to support market access.	Due for release in mid 2024	Wool growers and those along wool supply chains to the first processor	Key element of the agricultural tracing infrastructure

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Australian Agricultural Traceability Assuring Sustainability Claims Working Group (ASCWG)	Australian Agricultural Traceability Assuring Sustainability Claims Working Group (ASCWG) provides an advisory role to the AATGG. It provides expertise on the requirements for sustainability datasets to ensure they are accessible, searchable, interoperable and are of high quality to be leveraged by the agricultural sector. This provides verification of sustainability-based claims and supports export and compliance processes. It is also responsible for developing a discussion paper, due to be released for public consultation in late 2024. National Farmers' Federation (NFF) were funded to establish the ASCWG and provides secretariat for the group.	Working - meetings are scheduled when collaboration/input is needed from working group members.	Primarily AATGG	Will not specifically create datasets. Will guide how data should be created and managed, to enable data sharing and interoperability.
National Livestock Identification System (NLIS) Database Uplift Project	NLIS Database Uplift is a whole-of-system project that will provide: • a contemporary, fit-for-purpose national livestock traceability platform that is better placed to be able to meet current and future biosecurity and market access requirements. • a modernised data capture, storage, and distribution platform for tracking livestock, including improved usability, functionality (including capacity), and reporting/analytics capabilities, and • an adaptive platform that can accommodate additional data inputs from other systems to assist in demonstrating emerging credentials such as sustainability and animal welfare.	Project is underway and due to be completed by 30 June 2026.	Livestock farmers, producers, regulators	Project will be identifying and collecting data for providing traceability along supply chains. Specific to livestock.
Export Readiness Pilot for First Nations Agriculture	Funding for a pilot to the uplift of export readiness for First Nations' businesses by using digital and paper-based traceability systems to meet export requirements and consumer demands. It will include 3 proof of concept designs to support the NLE become viable producers and exporters of honey and wattle seed products.	Project is underway	First Nations farmers, producers and processors and exporters	Project will be identifying and collecting data for providing traceability along supply chains. Specific to honey and wattle seed products.
PigPass	Ostensibly to support biosecurity requirements regarding tracing of pigs.	Live system	Those seeking to move pigs off or onto their property	Key element of the agricultural tracing infrastructure
Policies on FAIR, SAFE, CARE & 5 SAFES etc	Desribe 'best practice' when it comes to subjects such as data sharing, data safety/handling, working with data from indigenous peoples.	Mature	Those working with data	

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Contact us
1300 363 400
+61 3 9545 2176
csiro.au/contact

For further information
Environment Research Unit:

Dr Laura Kostanski
+61 425 711 094
Laura.Kostanski@csiro.au

Dr David Lemon
+61 417 880 758
David.Lemon@csiro.au

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