AgTrace Australia

Australian Grains Industry Supply Chain Harmonisation Review

Summary Report
June 2026

Prepared by

foodagility

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Acknowledgements

In 2025, the Grains Research and Development Corporation (GRDC) commissioned Food Agility Consultancy (a subsidiary of Food Agility CRC Ltd) to provide a review of the Australian grains industry supply chain with recommendations for improvements in how information is extended for use in sustainability and traceability credentials. The review is supported by the development of case studies that reflect diverse supply chain configurations and illustrate key challenges and opportunities with a comparative assessment facilitated through the lens of achieving a common 'future state' of harmonisation. This future state is compliance with the Australian Agriculture Traceability Protocol (AATP). The AATP emerged from the Department of Agriculture, Fisheries and Forestry (DAFF) funded 'AgTrace' initiative, led by Food Agility CRC.

This review would not have been possible without the valuable contributions, active participation or support of producers, processors, exporters, agricultural service providers, technology developers and industry peak bodies. The authors would like to thank those who generously gave of their time to host site visits, contribute data and information, participate in discussions and provide valuable feedback during the design and conduct of this work.

About the Authors and Host Organisation

This project is managed by the Food Agility Cooperative Research Centre (Food Agility) through Food Agility Consultancy. With a $400m portfolio comprising of over 60 initiatives carrying an estimated economic impact of $6bn, Food Agility specialises in designing and delivering projects and major initiatives using data and digital technologies to increase profits and improve sustainability for Australia's agrifood sector.

Project lead, Professor David Lamb, is the Chief Scientist of Food Agility. He has over three decades of project leadership and co-design in precision agriculture and digital and data innovation in the agrifood sector. The delivery team comprises of members of the recently completed AgTrace initiative as this has been used to inform the evaluation context of this project. Simon Winter (Simon Winter Consulting) has over 35 years' experience in agricultural industries, with a strong focus on traceability. Harley Thomas and Andrew Grant (Trust Provenance) have been building traceability and sustainability software solutions in Australian agriculture since 2017. Kate McCabe, brings two decades of expertise in finance, economic analysis, and accounting across the wine, agricultural, and food sectors.

The use of 'AgTrace' branding throughout this report recognises this initiative is bigger than just one host organisation.

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Glossary of Acronyms

AATP	**Australian Agriculture Traceability Protocol**
BCA	**Benefit Cost Analysis**
BCR	**Benefit Cost Ratio**
DCC	**Digital Conformity Credentials**
DID	**Decentralised Identifier**
DPP	**Digital Product Passport**
ESG	**Environmental, Social and Governance**
EPCIS	**Electronic Product Code Information Services**
GS1	**Standards Organisation**
NPV	**Net Present Value**
UNTP	**United Nation Transparency Protocol**
VC	**Verifiable Credential**
WTO	**World Trade Organisation**

Executive Summary

The Australian grains industry is facing increasing requirements for traceability, sustainability reporting and transparency, driven by export market expectations, regulation and financial sector disclosures.

Although substantial data is collected across grain supply chains, it is fragmented, inconsistently structured and often exchanged in paper-based or bespoke digital formats. This limits its re-use, increases compliance costs and constrains the industry's ability to respond efficiently to emerging requirements such as Scope 3 emissions reporting.

This project was commissioned by the Grains Research and Development Corporation (GRDC) to examine how information exchange in grain supply chains could be improved through harmonisation. The team reviewed five case-study supply chains, pre-selected or endorsed by the GRDC and de-identified for this report, that reflect a range of supply-chain structures, digital maturity and market exposure.

The review mapped current information flows, identified existing roadblocks to more efficient data exchange, assessed opportunities for improved sustainability and traceability credentialing, and evaluated the costs and benefits of adopting a harmonised digital approach.

A comparison of case studies was achieved by invoking a common 'future state' based upon the Australian Agriculture Traceability Protocol (AATP), Australia's implementation of the United Nations Transparency Protocol (UNTP).

The AATP represents harmonisation (not homogenisation) through a protocol-based framework designed to standardise how traceability and sustainability data is recorded, exchanged and verified across supply chains.

It promotes interoperability standards that allow any technology platform or data ecosystem to participate in sustainable value chains ensuring that supply chains can be connected and verified without imposing technical dependencies on each other. The approach is scalable and is aimed at leveraging investments and systems already in place to support supply chain transparency.

Why pose a 'future state' different to today?

World Trade Organisation (WTO) data from the last decade shows the number of global non-tariff trade measures (NTMs) increased by an average six per cent per year, proving the need for evidence of sustainability, legality, and provenance.

Environmental concerns are another major driver for supply chains with agriculture and land-use change contributing an estimated 25–30 per cent of global CO_2 emissions. Social responsibility, labour standards, and governance expectations also shape consumer and investor behaviour.

Australia's traceability systems are fragmented, inconsistent both within and across commodities, and often reliant on centralised databases that are difficult to scale.

Commercial, digital traceability systems do exist, but these are generally closed systems running on proprietary platforms. As such, current arrangements are not adaptable or responsive and rely on centralised 'systems', often include data of variable quality, do not empower data owners (i.e. farmers) and do not easily evolve.

One perspective is that these limitations can be considered as posing risks to market access, regulatory compliance, and the ability to demonstrate ESG performance. Another perspective, given increasing consumer awareness and expectations, is that the current processes miss a significant opportunity to support farmers in a way that eliminates or minimises the duplication of data inputs or reporting as well as limits a farmer's ability to derive value from their own data.

Australian Agriculture Traceability Protocol as a ‘future state’

The AATP represents the simplest form of data sharing, providing a consistent, interoperable method for attaching verified data to agricultural products. It builds on the UNTP and adapts it for agricultural contexts, ensuring compatibility with global standards while addressing sector-specific needs such as land identity, animal movement, crop provenance, and ESG.

It also echoes the National Farmers’ Federation Farm Data Code because it encourages farmers to adopt digital technology by ensuring they are comfortable with how their data is used, managed, and shared. Key design principles include decentralisation, interoperability, verification, scalability and technology agnosticism. The AATP is a significantly different paradigm to existing traceability models, enabling any claim about any product to be digitally attached if the product has a unique digital identifier. That identifier can be anything from an NLIS ear tag on a steer, a reference number on a chaser bin during grape harvest, a consignment number accompanying a truck load of grain, through to a QR code on box of fresh produce.

The technical components of the AATP are Decentralised Identifiers (DID), Verifiable Credentials (VCs), Trust Anchors and interoperability frameworks such as GS1, EPCIS, and the UNTP.

DECENTRALISED IDENTIFIER

This is a type of digital identifier that allows an entity, such as a farm business, property, organisation, device, or product to have a secure, verifiable, and self-controlled digital identity without relying on a central authority.

VERIFIED CREDENTIAL

A VC is a piece of information issued by a trusted party, digitally signed so it can’t be altered, is held by the entity it relates to (e.g., a farmer, packhouse, or exporter), is presented to others when needed and has been cryptographically verified without calling a central database. A VC stands on its own.

TRUST ANCHOR

A trust anchor is the starting point in a chain of trust; a highly reliable, independently verifiable source of truth that other digital credentials can build upon. Once you have an anchor, you can attach other VCs to it with confidence.

Case Study Selection

Case studies were selected through a mix of GRDC-directed priorities and industry engagement, using criteria of definability, sustainability relevance, and uniqueness. Each had the aim of representing diverse supply chain models and illustrating key traceability and harmonisation challenges. For each case study, the supply chain chosen needed to be easily definable, have a sustainability reporting requirement and be relatively unique in the context of the review. Each Case Study has been de-identified whilst preserving key features for evaluation.

Case Study	Digital Maturity	Sustainability information exchange	Features
#1	●○○○○	●○○○○	Manual operating environment; SharePoint and Microsoft tools rather than dedicated grain platform. Minimal sustainability data exchange; quality and provenance are the active near-term demand signals. **Read more p9-10**
#2	●●●○○	●●○○○	Well-established operational and regulatory documentation systems (Plant Exports Management System, phytosanitary, certifications). Emissions tracking identified as a development priority but not yet embedded. **Read more p11-12**
#3	●●●○○	●●●●○	Mixed portal, digital farm management system-API and spreadsheet inputs; clean direct grower-to-buyer pathway. Substantial sustainability data (paddock-level GHG, soil health, climate-smart practices) but issued as PDFs and aggregated summaries. **Read more p13-14**
#4	●●●●○	●●●●○	Grain management software, branded network accreditation, independent GHG verification and commercial land assessment product already in use. Strong sustainability credentials in place with app based collation. **Read more p15-16**
#5	●●●●●	●●●○○	Most digitally sophisticated supply chain. Online farmer transaction portal, integrated business management and trading systems and Azure data infrastructure. Sustainability layer exists (grower questionnaire, annual GHG audit including maritime shipping) but sustainability data is not linked across systems. **Read more p17-18**

Benefit vs Cost Analysis

The benefit–cost analysis for each case study was conducted using a Commonwealth-aligned framework, comparing the current ('as-is') supply chain with a modelled future 'harmonised state'; in this case based upon the AATP.

Costs, including system establishment, integration, training and ongoing governance were estimated alongside benefits comprising efficiency gains, reduced compliance burden, and potential market premiums. Impacts were quantified, projected over a 10-year period and discounted at 7 per cent, with sensitivity testing applied to alternative premium scenarios. Data inputs were drawn from case study operations, stakeholder consultations, industry workshops and relevant pilot findings, with assumptions applied where necessary. Results were expressed using Net Present Value (NPV) and Benefit–Cost Ratio (BCR) metrics.

A key element of the case study evaluation was:

- Scenario modelling of market benefits, especially price premiums
- Typically tested across a range (e.g. 0% to ~5% price uplift)

This allowed the analysis to answer:

- "What if there is no premium?"
- "What level of premium makes this viable?"

Benefits were estimated across four main categories

EFFICIENCY GAINS

- Reduced manual processes
- Less duplication of data and reporting
- Streamlined audits and compliance

STRATEGIC/SYSTEM BENEFITS

- Improved trust and transparency
- Better ESG reporting capability
- Data reuse across supply chains

MARKET BENEFITS

- Potential price premiums
- Improved or protected market access

REGULATORY AND COMPLIANCE SAVINGS

- Lower regulatory burden
- Better readiness for emerging requirements (e.g. traceability, ESG)

CASE STUDY #1

LOW DIGITAL MATURITY

MANUAL PROCESSES

BACKGROUND

Case Study #1 is a family-owned milling business that produces a high-value flour for branded food products and bespoke food manufacturing.
It sources high-quality wheat from a specific, well-known region via its own farms and a small grower network. The company controls much of its supply chain, milling grain into flour and by-products such as for stockfeed, and selling mainly into domestic markets but has previously fed into specialty export markets. Its operations are traceability-focused but remain relatively manual, relying on contract data and basic identifiers rather than integrated digital systems, creating risks around varietal verification and efficiency.

MARKET SIGNALS

The business is operating in a market increasingly defined by the need for verifiable traceability, provenance, and product integrity across food supply chains. Customers and end-users are seeking reliable assurance that grain characteristics, particularly varietal identity, are validated prior to processing, reflecting heightened quality and compliance expectations. At the same time, there is growing demand for sustainability and origin credentials, requiring improved data capture and integration. These signals are occurring alongside tightening cost and efficiency pressures, where digitisation is becoming a baseline requirement for participation rather than a source of price premium, particularly in the context of more complex and restrictive export market entry.

Key features attesting to change

- Heavy reliance on manual systems and paperwork
- Significant inefficiencies in data handling, reporting and compliance
- Strong benefits from digitisation and process automation
- Positive business case even without market premiums (efficiency-driven)
- Illustrates high-return entry point for harmonisation

The path towards transformation

This business can respond to market signals by progressively digitising its supply chain to create reliable, end-to-end traceability and reduce operational risk.
This includes strengthening data capture at intake (e.g. linking consignments to verified attributes such as variety), improving traceability by digitally connecting inbound grain to outbound product, and standardising identifiers across shipments. Digitisation of contracts, shipment records and grower data would reduce manual handling and improve efficiency, while enabling auditable provenance records sought by customers. Establishing a structured data foundation also positions the business to layer in additional credentials such as sustainability and origin reporting without redesigning systems, aligning operational gains with emerging market requirements.

Benefit Cost

BENEFIT COST
Favourable

UP-FRONT COSTS
Modest
& Front-Loaded

VALUE DRIVER
Reduced Labour
& Error Costs

The benefit–cost balance for this business structure is favourable, even at a relatively small scale (e.g. <10 growers and <5,000 tonnes of grain processed annually).
Benefits are driven by reduced labour and error costs through digitising currently manual processes, particularly avoiding costly varietal mismatches that are only detected after milling.
These efficiency gains are sufficient to deliver a positive NPV even with zero price uplift, indicating that the change is economically justified on operational grounds alone.
Costs are modest and largely front-loaded, including digital platform adoption, implementation, and process change across growers and the mill. Ongoing costs relate mainly to system use and data management.
Overall, the BCA shows that relatively small investments can unlock proportionally significant efficiency gains, with additional upside from improved market access and future credentialing capabilities.

CASE STUDY #2

MIXED DIGITAL MATURITY

MIXED DIGITAL CAPABILITY

BACKGROUND

Case Study #2 is a privately owned Australian grain trading and export business with several decades of experience, connecting hundreds of growers to global markets.
It sources grain to customer specifications, manages storage and logistics across multiple regional sites, and coordinates export through to vessel loading. Around 60–70 per cent of its volume is exported to Asia, the Middle East and Africa, with the balance supplied to major domestic food manufacturers. Its operations are underpinned by a complex regulatory compliance system, with emerging opportunities to digitise and link these processes to meet growing transparency and sustainability expectations.

MARKET SIGNALS

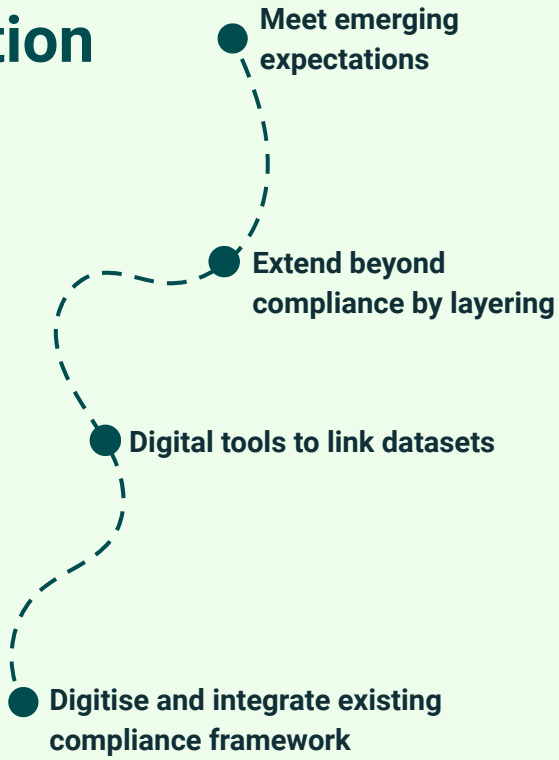
The business operates in a market shaped by increasing complexity in export compliance, where multiple certification and regulatory requirements must be met efficiently to maintain market access. At the same time, there is a clear shift toward digitally verifiable and interconnected documentation, moving beyond static compliance processes. While current demand is largely compliance-driven, international markets are beginning to expect greater transparency, including traceability, provenance, and sustainability credentials. These drivers, combined with competitive global grain markets, signal the need for the business to streamline data flows, reduce duplication, and position itself with integrated digital systems that support both regulatory requirements and emerging customer expectations.

Key features attesting to change

- Partially digitised systems with some manual and fragmented processes
- Opportunities for efficiency gains in compliance and reporting
- Benefits arise from reduced duplication and streamlined workflows
- Economic case improves significantly with modest market premiums
- Represents a typical transition case between manual and fully digitised systems

The path towards transformation

This business can respond to these market signals by digitising and integrating its existing compliance framework into a unified, verifiable data system.
Rather than replacing established export processes (e.g. Plant Exports Management System reporting, phytosanitary documentation), digital tools would link these datasets to create a single, auditable record across the supply chain. This reduces duplication and administrative burden while improving accuracy and efficiency in regulatory compliance. Digitisation also enables this business to extend beyond compliance by layering traceability, provenance, and sustainability data onto existing workflows, positioning the business to meet emerging international buyer expectations without disrupting current operations.



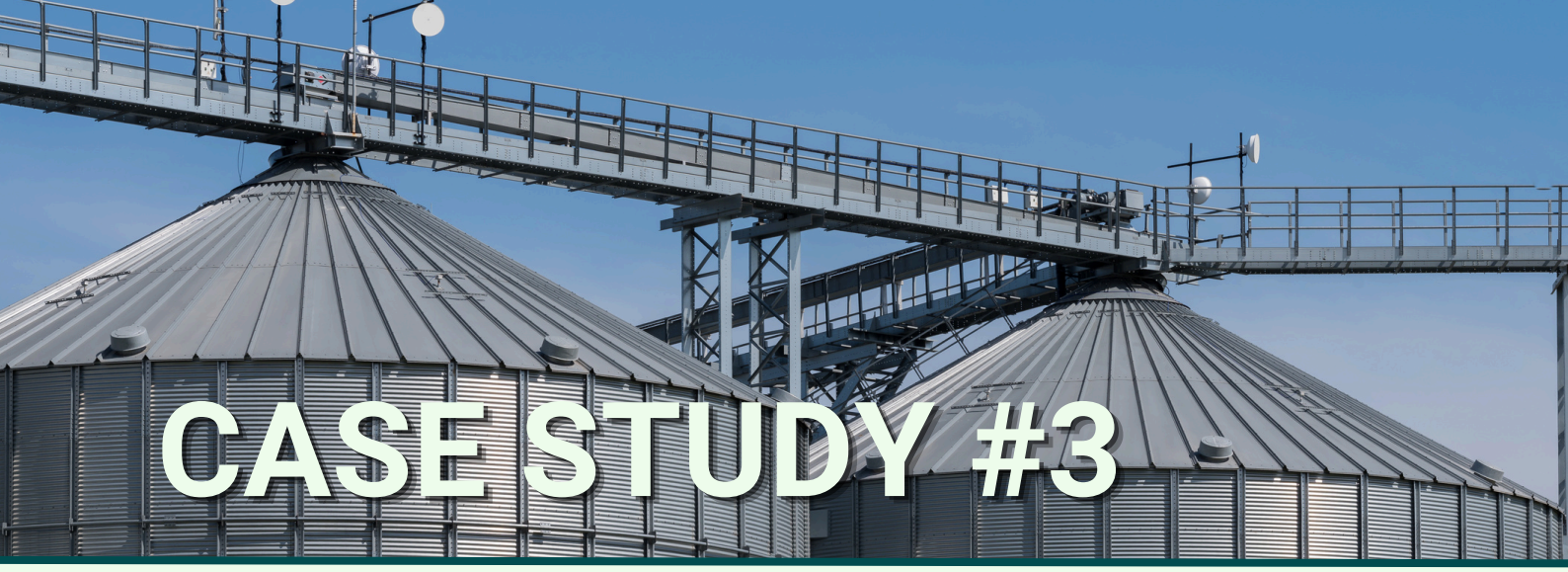
Benefit Cost

BENEFIT COST
Positive

UP-FRONT COSTS
Moderate

ECONOMIC CASE
Strong

The benefit–cost profile for this business is positive and more balanced than lower-maturity supply chains, reflecting its medium level of digital capability.
Benefits arise from reducing duplication and manual handling across a complex compliance system, improving efficiency in processes that manage large export volumes (60–70 per cent of total throughput) across a network of hundreds of growers. Digitisation enables reuse of compliance data (e.g. certificates, Plant Exports Management Systems submissions), lowering transaction costs per consignment and improving accuracy. Costs are moderate, covering system integration, data standardisation, and incremental changes across existing workflows rather than full system replacement.
The economic case strengthens with even modest market premiums or improved access, but remains positive where efficiency gains alone offset implementation costs.



CASE STUDY #3

DIGITAL INITIATIVE

DEFINED END-USERS

BACKGROUND

Unlike defined business-value chain entities featured in the other case studies, this industry-led, not-for-profit program was established to help farmers improve soil health and reduce on-farm emissions, while enabling corporates to meet Scope 3 reporting requirements.

It connects growers, researchers and food companies through a coordinated supply-shed model, aggregating paddock-level data into consignment-level sustainability metrics. This initiative supports adoption of improved practices via its 'Innovation Paddock' approach and provides credible, independently verified emissions and provenance data. Its model focuses on scalable, aggregated sustainability reporting aligned with evolving market and supply chain demands.

MARKET SIGNALS

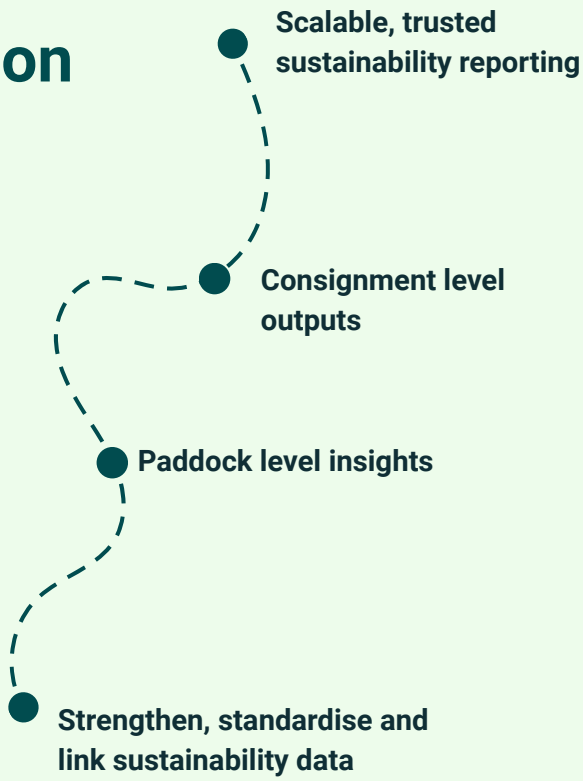
This producer-focused initiative is responding to strong market demand for credible, scalable measurement of agricultural emissions and sustainability performance, particularly to support corporate Scope 3 reporting obligations. Food and agribusiness companies increasingly require verified data on emissions, soil health and climate-smart practices across their supply chains. There is also a clear signal for aggregation models that enable reporting at commodity scale rather than individual farm level, reflecting how markets transact. In some cases, direct buyer demand is actively driving grower participation, creating adoption pressure and reinforcing sustainability credentials as a prerequisite for market access.

Key features attesting to change

- Operates across a coordinated group of producers and supply chains
- Focus on aggregating sustainability credentials (e.g. emissions) at scale
- Enables traceable linkage between production and end-user requirements
- Benefits driven by credible, aggregated claims and market alignment
- Strong dependence on market demand and premium capture

The path towards transformation

This Initiative can leverage digital tools by strengthening the capture, standardisation and linkage of farm-level sustainability data into verifiable supply chain credentials.
This includes using digital systems to collect paddock-level inputs such as fertiliser use, yield and soil indicators, and as it scales up, applying consistent emissions calculations.
These data are then aggregated at a supply-shed level and converted into consignment level outputs, such as production certificates and GHG intensity metrics provided to buyers.
By digitising and linking these datasets into auditable records (e.g. digital farm records, grain passports and conformity credentials), the initiative is poised to efficiently deliver scalable, trusted sustainability reporting aligned with market demand.



Benefit Cost

BENEFIT COST
Variable

UP-FRONT COSTS
Reflective

VALUE DRIVER
Market Uptake

The benefit–cost profile for this type of initiative indicates that value is strongly driven by market uptake rather than efficiency alone.
At current scale (approximately 12 growers and ~25,000 tonnes), the BCR is below breakeven without market returns (BCR = 0.8 at 0 per cent price benefit). However, the economics improve materially with even modest premiums, increasing to a BCR of around 5.0 with a 1 per cent price benefit.
This reflects a cost base associated with data collection, aggregation and verification, with benefits realised through credible, aggregated sustainability credentials that enable market access and value capture.

CASE STUDY #4

HIGH DIGITAL MATURITY

ADVANCED SUSTAINABILITY PRACTICES

BACKGROUND

This Case Study represents a highly mature, digitally enabled grain supply chain that integrates production, data and market access through an established sustainability framework.
It connects growers with end-users such as major food & beverage producers, delivering detailed reporting across provenance, compliance, emissions and soil carbon. The system operates across multiple levels from paddock, consignment (~300t), and enterprise, balancing detailed measurement with aggregated reporting. Digital infrastructure, including API-driven dashboards, underpins data capture and sharing. The key challenge is integrating diverse datasets into linked, verifiable credentials that can scale with evolving market and regulatory expectations.

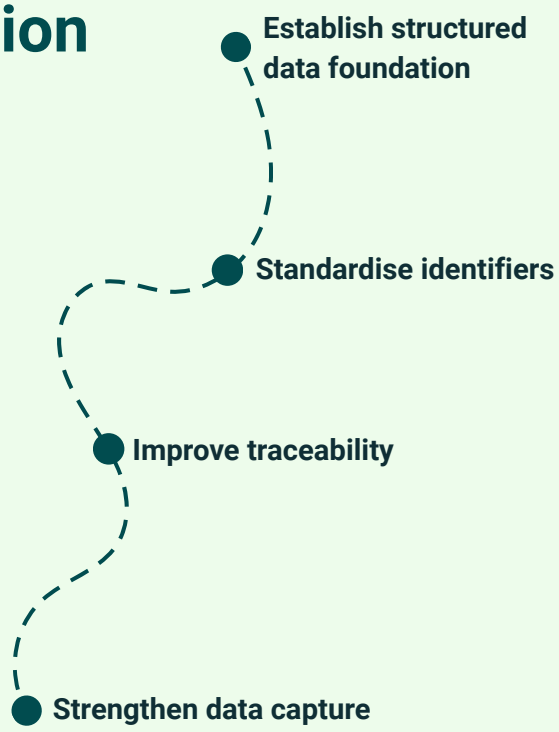
MARKET SIGNALS

The organisation operates in a mature, demand-driven environment where end users have requirements for detailed compliance, provenance and production data, and expectations are now expanding to include multi-layered sustainability credentials. Market signals include the need to manage and report data across multiple granularities from paddock, consignment and enterprise, while integrating diverse datasets such as emissions, soil carbon, audit outcomes and ESG metrics into coherent, auditable claims. There is also a clear shift toward data that is structured and verifiable, even if not always formally verified, reflecting cost sensitivities. Overall, value is increasingly driven by the ability to deliver integrated, trusted sustainability credentials that support market access and differentiation.

Key features attesting to change

- Strong existing digital systems and integrated data workflows
- Established sustainability and reporting capability
- Already capturing and managing credentials effectively
- Limited efficiency gains from further harmonisation (systems largely optimised)
- Value primarily driven by market opportunities (premiums, access) and future compliance flexibility

The path towards transformation



This organisation leverages digital tools to capture, integrate and present multi-level sustainability and compliance data across its supply chain.

This includes API-enabled dashboards that replace traditional reporting and enable real-time data sharing with growers and end users. Digital systems support the capture of paddock-level data (e.g. emissions, soil carbon) and aggregation into consignment and enterprise level outputs, aligned to customer requirements.

The key leverage opportunity is linking previously separate datasets into coherent, auditable credentials allowing the organisation to deliver structured, verifiable claims that meet evolving market demands without fundamentally changing its existing systems.

In short, the challenge here is not data availability, but data orchestration. This means transforming rich, multi-source datasets into linked, interoperable, and consignment-ready credentials that can flow through the supply chain while preserving commercial sensitivity.

Benefit Cost

BENEFIT COST
Limited

VALUE DRIVER
Market Access & Sustainability Credentials

The benefit–cost profile for this type of organisation reflects its already advanced digital maturity, where most efficiency gains have been captured and incremental benefits are limited.

As a result, the base case is close to breakeven, with a BCR of approximately 0.9 at 0 per cent price benefit.

However, the economic case strengthens significantly when market returns are included, with the BCR increasing to around 7.0 at a 1 per cent price benefit.

This indicates that value is primarily driven by market access, premiums and the ability to supply verified sustainability credentials, rather than further operational efficiency gains.

CASE STUDY #5

HIGH DIGITAL MATURITY

FRAGMENTED SYSTEM

BACKGROUND

This Case study represents a large, highly integrated grain supply chain operated as a grower owned co-operative, connecting thousands of grains producers to global export markets through an extensive network of receival sites, rail logistics and port terminals.

Its sustainability focused export pathway is built on bulk handling and a Mass Balance model, blending grain to meet contract specifications while tracking sustainability-qualified volumes. Demand is driven primarily by financial sector and regulatory requirements, with GHG emissions aggregated at supply shed level and audited annually. The key challenge is integrating complex, multi-system data into coherent, end-to-end sustainability and traceability credentials.

MARKET SIGNALS

This organisation operates in a market where sustainability and transparency demands are increasingly driven by the financial sector and regulation rather than direct end-user pull. The shift from volumetric targets to actual, audited GHG reporting is a key signal, requiring aggregation of emissions data across large 'supply shed' groupings. At the same time, customers expect scalable models such as Mass Balance to manage sustainability at bulk commodity level, rather than Identity Preserved systems. Additional drivers include emerging expectations to extend emissions accounting beyond the farm gate (e.g. shipping), and the need to integrate complex data across large supply chains to maintain compliance, access and competitiveness.

Key features attesting to change

- Highly digitised environment with multiple systems not fully harmonised
- Existing complexity creates data silos and duplication
- Benefits driven by system integration and interoperability
- Value realised through compliance efficiency and flexibility to meet diverse market requirements
- Economic case depends on scale and ability to leverage harmonised data across markets

The path towards transformation

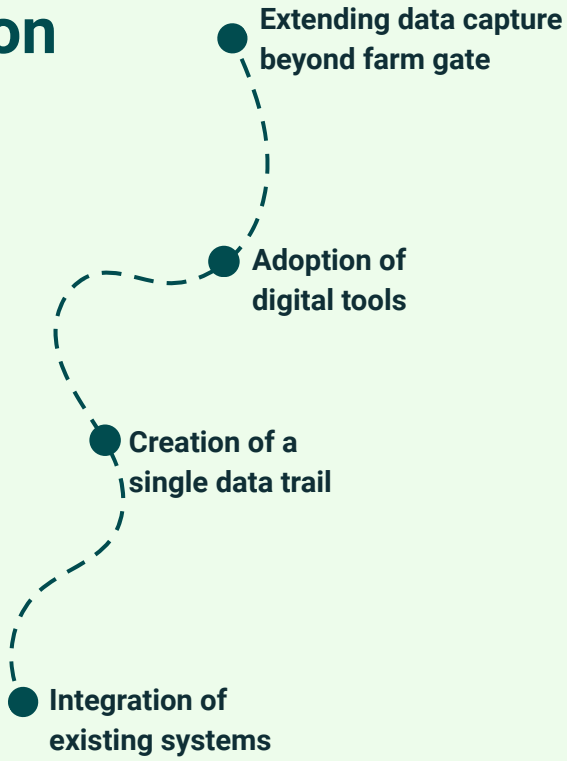
This type of organisation can leverage digital tools by integrating already highly digitised operational systems into a unified, end-to-end data architecture.

This includes linking platforms such as grower transaction and core business operating systems and trading systems to create a single, coherent data trail from grower nomination through to export consignment.

Digital tools can also support consistent Mass Balance accounting, enabling sustainability claims to be tracked volumetrically across blended grain shipments in line with market requirements.

Further value comes from digitising and standardising aggregated GHG reporting across supply sheds and extending data capture beyond the farm gate (e.g. emissions associated with transportation).

The key leverage lies in transforming fragmented data into interoperable, auditable credentials that support large-scale compliance, reporting and market access.



Benefit Cost

BENEFIT COST
Low

UP-FRONT COSTS
Already Realised

VALUE DRIVER
Integrated Data

The benefit–cost profile for this organisation reflects its very high digital maturity and scale, where most operational efficiency gains have already been realised.

As a result, the base case economic return is low, with a BCR of approximately 0.3 at 0 per cent price benefit, indicating efficiency gains alone do not justify further investment.

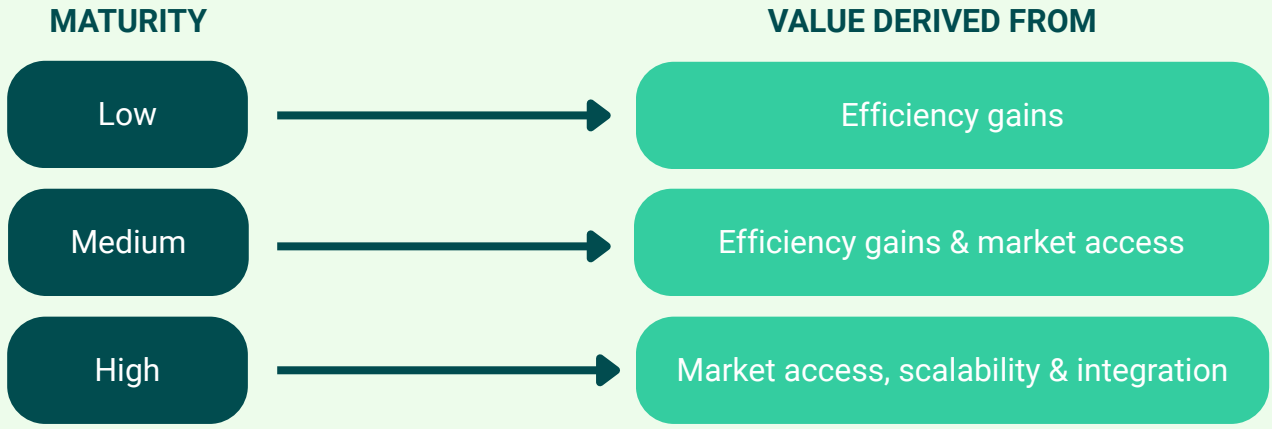
However, the economics improve significantly when market benefits are included, with the BCR increasing to around 5.6 at a 1 per cent price benefit.

This highlights that value is primarily driven by the ability to leverage integrated data at scale for market access, compliance flexibility and participation in sustainability-linked markets, rather than incremental operational savings.

Conclusions

Cross-case insights

Value from digital harmonisation shifts with the system maturity. Overall, there is a positive economic case across all the supply chain scenarios. Even small price signals can yield BCRs upwards of 5.0



Digital maturity and system challenges

Most supply chains already have significant data capture capability. The key issue is fragmentation, not absence of data. Data is often held across multiple systems with poor linkage and interoperability. This means, generally, there is no single, end-to-end data provenance trail from farm to product

Data and credentialisation insights

There is a growing need to convert data into Digital Product Passports (DPPs) and Digital Conformity Credentials (DCCs). The value lies in linking datasets (traceability, sustainability, compliance) into unified credentials. Different supply chains require multiple levels of data granularity, for instance paddock, consignment and enterprise.

Recommendations

Strategic takeaways

The grains industry is shifting from paper-based, fragmented compliance systems to digitally integrated, credential-based supply chains. Competitive advantage will come from the ability to orchestrate data across systems and deliver trusted, scalable credentials into markets.

Future systems should integrate, not replace, existing operational platforms. Focus on interoperability and data linkage. Support different chain-of-custody models, such as Identity Preserved or Mass Balanced. Finally, verification vs verifiability is key. Markets often want data capable of verification rather than fully audited data.

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