

Australian Farm Institute Research Report

BRINGING THE AASF TO LIFE

Groundwork for Implementing the Australian Agricultural Sustainability Framework

July 2023

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EXECUTIVE SUMMARY

Project background

Funded by a grant from the Australian Department of Agriculture, Forestry and Fisheries, the National Farmers' Federation (NFF) has led development of the Australian Agricultural Sustainability Framework (AASF) since inception in 2020 via a set of parallel discovery projects.

This includes the work by the Australian Farm Institute (AFI) to design and deliver a principles-based framework (the 'Framework'), which has been informed by industry consultation, an expert reference group, and an extensive review of domestic and global sustainability frameworks.

The work program has also convened a Community of Practice (the 'Forum') which has helped advance the goals of the project and the broader agricultural industry, along with supporting reference material.

This report details the AFI's component of Phase 3 of the AASF development project. It discusses considerations for the practical establishment of the AASF, covering governance principles and strategy, sustainable operationalisation, continuous improvement, and data needs, as well as a content review of the Framework to date (resulting in AASF Version 4.1) and a model report.

Overview

The Australian Agricultural Sustainability Framework (AASF) is much more than the semiotic structure itself. Not just a construct, it is also a concept, a process, a convening of ideas, a call to action. It is a clarification of what the Australian agricultural industry sees as ideal states for the natural, human and social capital needed to continue sustainably producing food and fibre for generations to come.

AASF is the golden thread which ties together the sustainability goals, aspirations and actions of the entire sector.

Many Australian farm sectors have developed commodity-specific sustainability initiatives; however, a lack of system-wide consistency in language, structure and format means that understanding of sustainability often varies across industries, locations and stakeholders. The AASF seeks to amplify the efficacy of these initiatives by articulating universal principles and proffering a cohesive structure to communicate the sustainability status and goals of Australian agriculture to markets and to the community.

"The community sees rural industries as one – not a collection of separate industries with unique challenges. If one sub-sector does not move to meet community expectations or fails to respond to a challenge in a meaningful way, that impacts the community's view of all rural industries." (Sefton, 2021)

A Framework *alone* cannot create long-term, restorative value for the Australian agricultural industry. Rather, it is a scaffold on which goals and objectives for sustainability can be built by stakeholders, providing the process by which agricultural producers and the wider community can identify the shared values which underpin industry-wide social licence and continuity.

In order to bring that process to life, this report identifies considerations for the practical establishment of the AASF, addressing governance principles and strategy, sustainable operationalisation and continuous improvement systems in Section 1, and the ubiquitous data requirements issue in Section 2.

Section 3 presents an update for the Framework in response to AASF Community of Practice (CoP) feedback and a landscape scan. In addition, a 'model report' illustrates potential use of the Framework as a communications tool and outlines a process for developing Indicators to support the overarching AASF Principles and Criteria in future work streams.

GOVERNANCE CONSIDERATIONS FOR OPERATING MODELS

In the context of this report, 'governance' should not be regarded as the administrative constructs which enable operation; rather 'governance' refers to a *system of principles and strategy which will inform the most appropriate structures*. While integration of governance into sustainability is interpreted differently across geographical areas and commodity requirements, **vision, mission and leadership** are the most significant drivers of successful sustainability framework governance.

Investigation of the strategic role of the AASF as an intermediary in the sustainability communications and governance ecosystem emphasised the value proposition of the Framework and Forum as *connectors* and *aggregators*. That is, rather than replacing Industry Sustainability Frameworks and Private Sustainability Governance initiatives, the AASF can *amplify and accelerate* the work already underway to **ensure the economic, environmental and social sustainability of Australian agriculture**. It should not be seen as a separate system bolted on to an already crowded group of systems, but the *golden thread* running through these which ties together the sustainability goals, aspirations and actions of the entire farming sector.

While the AASF is unique, success factors for sustainability framework and forum structures can be gleaned from other reporting mechanisms being developed and implemented around the world. A review of analogous entities identified common threads for successful implementation. These included establishing a governance structure, actively and meaningfully engaging stakeholders from different sectors, promoting collaboration and integration, performance measurement and assurance, contextualisation and translation and processes to ensure continuous improvement. While these elements may seem somewhat obvious, they cannot be taken for granted when building robust, credible sustainability reporting and management systems.

An exploration of the intersection of private benefits and public goods to be derived from the AASF notes that both the Framework and Forum aim to provide *public good via private action* on environmental stewardship, care for the people, animals and community of Australian agriculture, and the economic resilience of the industry as a whole. This strongly suggests that a combined approach to joint public and/or industry co-operative resourcing is the most appropriate funding model to support the intended activities of the AASF in the long term.

The AASF can amplify and accelerate the work already underway to ensure the economic, environmental and social sustainability of Australian agriculture.

Further work on detailed resourcing models will be required to fully operationalise the AASF. For example, the inevitable question when considering the proposed implementation, continuous improvement and sustainable operationalisation of the AASF is: who is the most appropriate 'owner' or coordinator? While this question is still open, guide rails on potential pitfalls the AASF must evade will help to inform this future decision.

DATA STRATEGY

The AASF clearly needs data, yet it need not be the owner, or even the collector of data. Creation of a **formal agricultural sustainability data-sharing ecosystem with AASF as the intermediary or moderator** (utilising the Forum) is an imperative for success, not just for the AASF project per se but for sustainability efforts across the Australian agricultural industry.

Noting the extensive sustainability reporting efforts underway across industry bodies, Rural Research and Development Corporations (RDCs), private initiatives, research organisations, the Federal Department of Agriculture, Fisheries and Forestry and other government bodies, a formal agricultural sustainability data-sharing ecosystem need not be created from scratch. Rather, an

important role for the AASF could be in *coordinating existing cross-jurisdictional efforts* to synthesise (and facilitate access to) the multiple existing public and private data initiatives.

While the AASF requires sources of data to report on progress against goals under the principles and criteria, a two-way flow of data can in turn benefit the Australian agricultural industry by providing harmonised information. By aggregating and analysing data, AASF stakeholders can assess performance (*measurement*), track progress (*accountability*), and make informed decisions that contribute to a more sustainable agricultural sector (*evidence* and *continuous improvement*).

Creation of a formal agricultural sustainability data-sharing ecosystem with AASF as the intermediary is an imperative for success.

Commentary about agricultural sustainability often goes straight to *what practices* are undertaken, not *why they are used* and *how they align with universal values*. Sustainability principles derive from the values shared by all stakeholders. Shared values underpin societal structures, enabling us to work together to achieve outcomes for the common good. Discussions about how to deliver sustainable outcomes can become so focused on the *practices* being deployed that the underpinning values of sustainability are assumed or overlooked.

The AASF has been built using the globally-recognised ‘Principles, Criteria, Indicators’ structure to ensure that discussions on agricultural sustainability differences between Australia and trading partners do not become mired in disagreements on region-specific practices, but instead focus on shared values to enable understanding of these differences. Values alignment – such as that delivered by the 17 overarching Principles of the AASF – is the first step on the pathway to provide evidence of outcomes for those values.

A RESPONSIVE FRAMEWORK

The Framework builds on significant work undertaken by the Australian agricultural industry. It reflects the rapidly maturing sustainability schemes already operating domestically and globally and maps existing industry-level indicators and goals into a catalogue of overarching sustainability principles and criteria for the entirety of Australian agriculture.

In reviewing the Framework (Version 4.0), the AASF Community of Practice (CoP) was surveyed to ensure material issues for Australian agricultural industry stakeholders were considered and/or addressed. Additionally, the AFI research team scanned the sustainability reporting landscape and consulted with topic specialists to test the currency of language and intent.

The landscape of mandatory financial disclosures and climate impact reporting for corporate entities is a fast-moving and complex space. Global investment and activity in climate- and nature-related financial disclosure mechanisms highlights the need for the AASF, which can provide a platform for Australian agriculture to proactively communicate its stewardship credentials on the international stage. The challenge continues to be balancing the international materiality of sustainability components with their application in an Australian agriculture context.

While maintaining awareness of global and domestic sustainability developments must be part of the AASF continuous improvement process, substantial changes to the Framework principles and criteria were not required *at this stage*. However, some anomalies and/or inconsistencies were identified in V4.0 which have been revised for V4.1, presented herein.

A prototype ‘model report’ was created for *Principle 6: Water resources are used responsibly and equitably*, utilising available information from Industry Sustainability Frameworks (ISFs) and official statistics datasets. The prototype demonstrates:

- the potential use of the Framework in communicating a consistent national view of Australian agricultural sustainability
- the centrality of industry frameworks (ISFs)
- a process for developing Indicators to support the overarching Principles and Criteria
- a method by which data availability and gaps can be ascertained
- the importance of an ongoing Forum to inform these methods and processes.

We recommend that the same prototype mapping process be completed for the remaining 16 AASF Principles for testing with stakeholders in the next stages of work.

CONCLUSIONS / RECOMMENDATIONS

Development of the AASF has been a collaborative, iterative project which to date has delivered a well-articulated framework with broad industry and government support, and convened a Community of Practice which has helped advance the goals of the project and the broader agricultural industry.

While it will likely fulfill many functions, deliver multiple outputs and reach numerous outcomes, the ultimate purpose of the AASF is to ensure the economic, environmental and social sustainability of Australian agriculture.

The Australian Farm Institute recommends that:

- The AASF should function under a distributed governance structure.
- A combined approach to public and/or industry co-operative resourcing be considered as the most appropriate funding model to support the intended activities of the AASF.
- Creation of a formal agricultural sustainability data-sharing ecosystem with AASF as the intermediary or moderator is treated as an urgent priority.
- Building strategic relationships with global sustainability initiatives will provide a tangible leadership opportunity for Australian agriculture and ensure the industry's stewardship credentials are proactively communicated on the international stage.
- The data-sharing ecosystem and the Community of Practice be utilised in identifying appropriate indicator sets to inform AASF Principles and Criteria.
- The AASF project team continue to closely monitor activity in the global sustainability landscape.

Sustainability is not merely a tagline for Australia's farmers – it is a mindset which is fundamental to the continuation of economic systems which depend on natural and social capital. However, sustainability cannot be created just by words on a page: **to create meaningful impact, the AASF must be 'brought to life' as a functioning entity.**

Australian agriculture cannot afford to wait until a perfect system to "reduce complexity and progress goals" is in place. We must act as soon as possible to launch, operationalise and resource the AASF Framework and Forum, so that it will evolve and mature in response to the fast-developing landscape of standard-setting, reporting and disclosure.

The AASF is purpose-designed for proactively communicating Australian agriculture stewardship credentials on the international stage.

0. INTRODUCTION

Sustainability is at the heart of Australian farming. Producing food and fibre sustainably means practicing responsible stewardship of the environment, taking care of people and animals, and ensuring economic resilience for the community and industry.

Evidence that a product is sustainable is now an almost universal requirement of market access and consumer expectation. Sustainability schemes – e.g., industry frameworks, best management practice programs, private accreditation and certification regimes etc. – provide a mechanism for collecting and communicating evidence that a product or an industry is being developed sustainably (against a defined set of metrics relevant to that scheme). These schemes serve an important function for discrete agricultural subsectors and/or businesses in the market and the community.

In this landscape, the Australian Agricultural Sustainability Framework (AASF) works with commodity frameworks and other jurisdictions (e.g., environmental initiatives, natural capital accounting) to provide a consistent national view of Australian agricultural sustainability; acting as a translation layer between farm practices, markets and the community.

As one of the first country-specific frameworks to address sustainability from a whole-of-agriculture perspective, the AASF:

- helps global stakeholders to understand the particular traits of the Australian agricultural system, and
- provides clarity to Australian farmers on principles and criteria to guide sustainability strategy and practice.

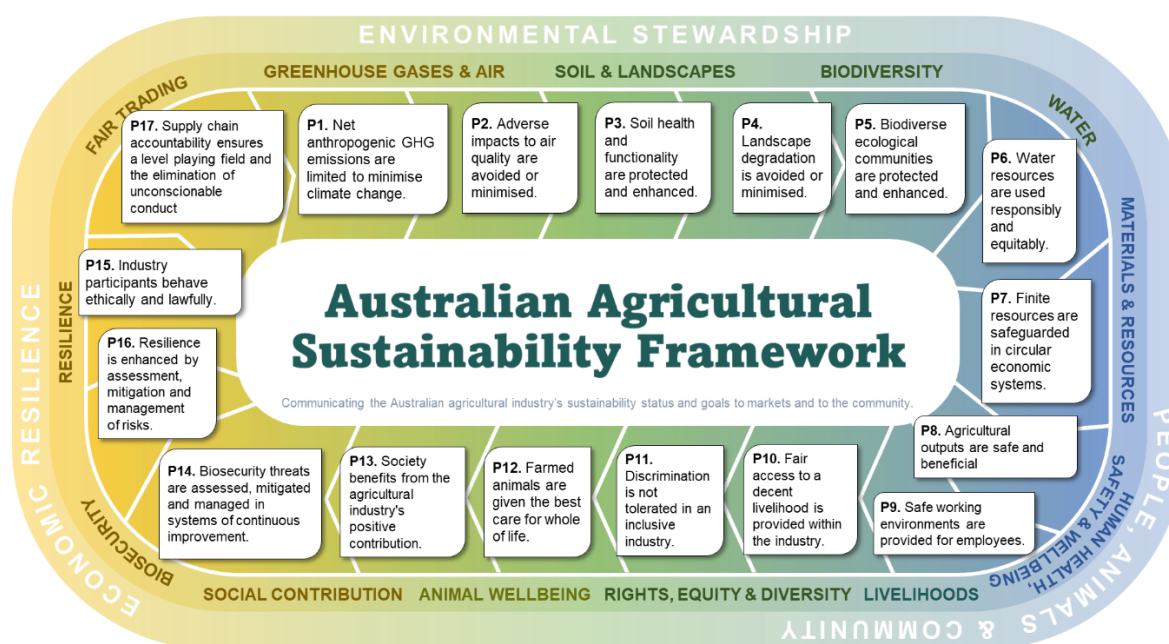


Figure 1: The Australian Agricultural Sustainability Framework, as of June 2023. Source: Authors

The National Farmers' Federation (NFF) has led development of the AASF via a set of parallel discovery projects, funded by a grant from the Australian Government. This includes the work by the Australian Farm Institute (AFI) to design and deliver the framework (Figure 1 – larger version in Section 3), which has been informed by industry consultation, an expert reference group, and an extensive review of domestic and global sustainability frameworks. Supporting and guiding development of the Framework, an AASF Community of Practice was established in 2022 which has provided a collaborative forum for industry, research and government stakeholders.

1. GOVERNANCE CONSIDERATIONS FOR OPERATING MODELS

‘Governance’ in this report refers to a system of principles and strategy which will inform the most appropriate structures for implementation of the AASF.

Identification of the AASF’s strategic role as an intermediary in the sustainability ecosystem emphasises the value proposition of the Framework and Forum as connectors and aggregators. The AASF should not be seen as a separate system bolted on to an already crowded group of systems, but the golden thread running through these which ties together the sustainability goals, aspirations and actions of the entire sector.

The intersection of private benefits and public goods to be derived from the AASF suggests a combined approach of joint public and industry co-operative resourcing as the most appropriate funding model to support intended activities.

To date, development of the AASF has been a collaborative, iterative project addressing a broad program of foundational work. This program has delivered a well-articulated *framework* with broad industry and government support (McRobert, Gregg, et al., 2022), and convened a *forum* in the ‘Community of Practice’ (CoP) which has helped advance the goals of the project and the broader agricultural industry. While it will likely fulfill many functions, deliver multiple outputs and reach numerous outcomes, the ultimate purpose of the AASF is to **ensure the economic, environmental and social sustainability of Australian agriculture.**

CoP stakeholders have identified additional benefits or purpose statements for the AASF as:

- *Ensuring that global sustainability goals are identified and prioritised so that Australian agriculture industries can align with global best practice.*
- *Establishing Australia as a model of environmental stewardship, fair interactions, and well-being for all stakeholders in agriculture.*
- *The potential of an overarching, multi-commodity system to reduce the reporting obligations of individual agricultural producers.*
- *Bringing cross-industry initiatives together to undertake collaborative projects at scale.*
- *Building national capacity in Australian agriculture to address challenges in sustainable development.*

To implement the AASF successfully, it is necessary to establish principles of governance, identify relevant strategies, and describe the policy environment in which the Framework will operate. Once these contexts are clear, potential operating models can be evaluated.

In considering principles, strategy and the socioeconomic policy environment, we emphasise that the Framework *alone* is not a solution to the problem of reporting on sustainability and creating long-term, restorative value for the Australian agricultural industry; rather, it is a scaffold on which goals and objectives for sustainability can be built to support positive actions across the value chain. AASF is much more than the semiotic structure of the Framework; it is also a process, a convening of ideas, a call to action.

It is a clarification of what the Australian agricultural industry sees as ideal states for the natural, human and social capital needed to continue sustainably producing food and fibre for generations to come.

The Framework alone cannot create long-term value for Australian agriculture; it is a scaffold on which goals for sustainability can be built.

However, sustainability cannot be created just by words on a page: **to create meaningful impact on sustainability goals, the AASF must be ‘brought to life’ as a functioning entity.**

1.1 Governing principles

Shared understanding of the challenge

Governance principles and strategy ensure that sustainability initiatives are guided by accountability and transparency. By establishing clear governance structures, decision-making processes, and reporting mechanisms, initiatives such as the AASF demonstrate their commitment to responsible and ethical practices. This transparency fosters trust among stakeholders by showcasing how the initiative aligns with broader societal and environmental goals beyond the industry context.

Good governance design enables evolutionary adaptation to the changing circumstances of the organisation and constituent needs; however, for an iterative framework to be effective, flexibility must happen within structure. An agreed set of principles within which the AASF will be governed and structured – based on a *shared understanding of the goal* amongst stakeholders – should guide development.

Previous research on the role for the AASF in the standards, certification, accreditation landscape identified that complexity in this ecosystem can limit stakeholder understanding of risks and opportunities of participation in sustainability reporting (McRobert, Gregg, et al., 2022). Moreover, inconsistent communication of potential outputs, outcomes, activities, and intentions of the AASF could risk confusing stakeholder expectations about the framework’s goals and potential. To ensure the AASF operating principles are clear, the core issue, end goal and unique value proposition of the framework and forum must not only be clearly stated but also frequently reiterated.

“Practices can change, business models are disrupted, and technology evolves, but principles do not change. They are the soul of strategy design and delivery.”

– [Harvard Business Review](#)
[blog: Brightline](#)

The AASF must find a sweet spot between stability and flexibility. This is also true of the challenges the Framework and Forum collectively address, along with the activities and outputs it seeks to achieve. The outcomes and goal must be broad enough to remain the ‘north star’ which guides the evolving strategy and structure; for example: **improvements in farm practice** which create **robust social licence**, underpinning **favourable trade status** and positioning Australia as a **world leader in agricultural sustainability**, with the aim of **ensuring the economic, environmental and social sustainability of Australian agriculture**.

As long as these high-level ambitions stay constant, a responsive Framework and Forum can adapt operating systems and activities contextually to meet the agreed goals.

To this end, the impact map presented here (Table 1 and Figure 2) provides a way of communicating the impact of the AASF by describing the challenge, changes, activities, outputs, outcomes and goal.

Adoption of a *succinct purpose statement* - e.g., “reducing complexity to progress goals which underpin the economic, environmental and social sustainability of Australian agriculture” - and related *unique value proposition* (UVP) - e.g., “positioning Australia as a world leader in agricultural sustainability” - is a necessary first step before considering the principles of operation and governance.

IMPACT MAP:

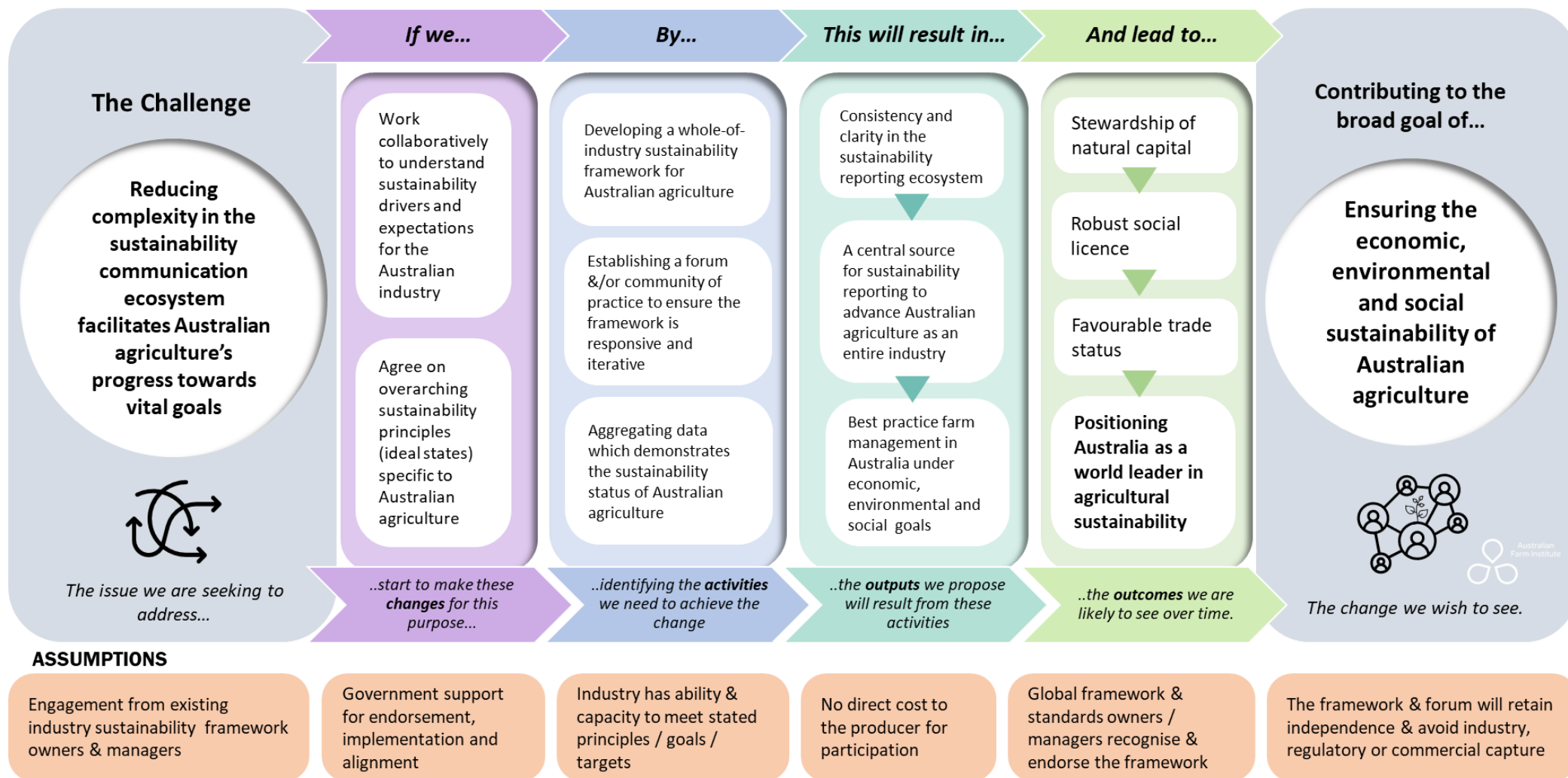


Figure 2: Impact map of the challenge and broad goal AASF seeks to address. Source: Authors

Table 1: AASF impact. Source: Authors

The <u>challenge</u> the AASF seeks to address:	<i>Reducing complexity in the sustainability communication ecosystem will facilitate Australian agriculture's progress towards vital goals</i>
The <u>changes</u> required:	<p>Work collaboratively to understand sustainability drivers and expectations for the Australian industry</p> <p>Agree on overarching sustainability principles (ideal states) specific to Australian agriculture</p>
The <u>activities</u> to support the change:	<p>Developing a whole-of-industry sustainability framework for Australian agriculture</p> <p>Establishing a forum &/or community of practice to ensure the framework is responsive and iterative</p> <p>Aggregating data which demonstrates the sustainability status of Australian agriculture</p>
The <u>outputs</u> which will result:	<p>Consistency and clarity in the sustainability reporting ecosystem (<i>leading to...</i>)</p> <p>A central source for sustainability reporting to advance Australian agriculture as an entire industry (<i>leading to...</i>)</p> <p><i>Best practice farm management</i> in Australia under economic, environmental and social goals</p>
The <u>outcomes</u> which will follow:	<p>Stewardship of natural capital (<i>leading to...</i>)</p> <p>Robust social licence (<i>leading to...</i>)</p> <p>Favourable trade status (<i>leading to...</i>)</p> <p>Positioning of Australia as a world leader in agricultural sustainability</p>
And the <u>broad goal</u> to which the AASF will contribute:	<i>Ensuring the economic, environmental and social sustainability of Australian agriculture</i>

Shared principles for good governance

Robust governance systems and a viable, self-supporting operating framework will be essential to the success of the AASF's intention to improve sustainability communication. However, 'governance', like many terms used in the sustainability ecosystem, has different connotations for different stakeholders.

In this context, governance should not be regarded as the administrative constructs which enable operation; rather it is a *system of principles and strategy* which will inform the most appropriate structures. While integration of governance into sustainability is interpreted differently across geographical areas or commodity requirements, **vision, mission and leadership** are the most significant drivers of successful sustainability framework governance (E-Vahdati et al., 2018).

Given that the AASF must be responsive to developing market, economic, environmental and social drivers, the governing and operational systems chosen to implement the strategic goals must also seek that fine balance between being kinetic and durable. Static systems which fail to respond and adjust to the macro environment are not only inherently less desirable but also have been shown to be more costly over time than flexible, adaptive governance systems (Birchall, 2014).

Policy implementation, such as that the AASF seeks to enable, is often met with resistance from impacted stakeholders, and can face systemic inertia to change. Business model logics can form barriers to change and inhibit the diffusion of alternatives. In these circumstances, a *system dynamics perspective* can help identify those feedback loops that form barriers to transitions. These feedback structures promote the understanding of an organisation’s role in a changing environment and help stakeholders to anticipate problematic future scenarios (Kliem & Scheidegger, 2020), ensuring that evolution of supporting systems benefits the stakeholders and end goal.

The AASF is a classic case for “ambitious intent, cautious implementation”. ‘Governance’ will not be established all at once – examples of sustainability scheme difficulties in the United States provide lessons on schemes which promise too much too soon, to too many people (R. Heath, personal communications, October 2022-June 2023). Rather, the process must be staged, starting with a kernel of structure and activities which can be scaled up as capacity increases (see *Section 1.4 Defining resourcing requirements*).

To ensure the actions and intentions of the participants in a complex innovative system are aligned, it is necessary that stakeholders agree on a shared set of good governance principles, such as those outlined in Table 2 and Figure 3. This list, collated from desktop review (Boutilier & Thomson, 2011; Hayne, 2020; McRobert, Goucher, et al., 2022) and project consultation, is comprised of primary and secondary principles which resonate with proponents of good governance across industries, borders and disciplines. It is incumbent on the invested stakeholders to ensure the Framework and Forum remain aligned with these principles as the AASF evolves.

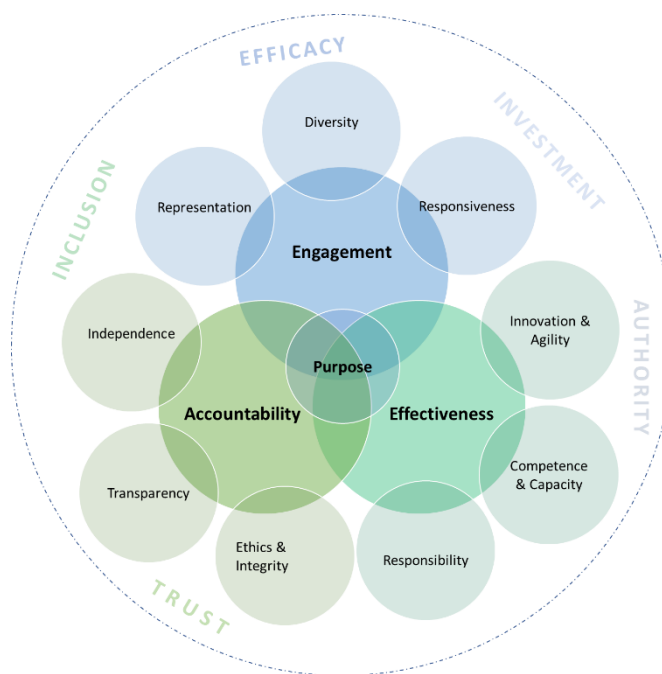


Figure 3: Principles of good governance. Source: Authors

Table 2: Proposed AASF governance principles. Source: Authors

Primary principle	Secondary principles	Outcomes
Purpose	Sustainability Long-term orientation	Clarity, focused action, efficacy
Engagement	Representation Responsiveness Diversity of thought	Social cohesion, inclusion, investment , collaborative effort
Efficiency and effectiveness	Competence and capacity Innovation and agility Responsibility	Sound management, openness to change, authority
Accountability	Openness and transparency Ethical conduct, legal compliance, integrity Independence	Trust , social licence, respect

1.2 Governance strategy

“The community sees rural industries as one – not a collection of separate industries with unique challenges. If one sub-sector does not move to meet community expectations or fails to respond to a challenge in a meaningful way, that impacts the community’s view of all rural industries.” (Sefton, 2021)

Designing for flexibility

Sustainability is not a fixed construct. Definitions and drivers of sustainability change over time as our understanding of the natural world, our economic systems and our societies change (McRobert, Gregg, et al., 2022). The strategy adopted for AASF implementation must incorporate the ability to evolve at rapid pace.

Differing perspectives on sustainability context, goals and reporting requirements between stakeholders (governments, markets, communities and producers) have fed into the creation of multiple sustainability strategies in Australia and internationally. These include regulatory plans, quality assurance programs, environmental management systems, property management planning processes, value chain systems (certification and assurance) and incentive schemes (McRobert, Gregg, et al., 2022; Williams, 2012). If the challenge the AASF seeks to address is “reducing complexity in the sustainability communication ecosystem” for the good of the agricultural industry as whole, then appropriate strategy must be articulated via a systematic approach which incorporates planning, risk management and performance against outcomes and goals.

Effective governance design¹ enables evolutionary adaptation to the changing circumstances of organisation and constituent needs, within understood and agreed boundaries. This report aims to identify the *design parameters* within which operational and governing strategy should be built in subsequent stages of AASF development.

A flexible, collaborative approach, open to scrutiny by all invested or affected parties, such as *responsive governance*, generates broadly accepted, shared responsibility (Mount, 2012). Indeed, *transformative governance* is needed to enable the radical change necessary for achieving sustainability goals in agriculture, particularly when addressing the challenge from a complex whole-of-industry perspective. To address the indirect drivers² underlying sustainability issues, Visseren-Hamakers et al. (2021) argue that governance becomes ‘transformative’ by being:

1. **Integrative** – to ensure local solutions also have sustainable impacts elsewhere (across scales, places, issues, sectors, different agricultural commodities and production zones)
2. **Inclusive** – to empower those whose interests are currently not being met
3. **Adaptive** – enabling learning, experimentation, and reflexivity
4. **Pluralist** – recognising different knowledge systems (cross-commodity, cross-discipline, First Nations perspectives, cross-industry, non-partisan etc.)

These governance characteristics are particularly important for:

- recognising the crucial role of industry sustainability frameworks (ISFs) in meeting the AASF overarching goals, by communicating the sustainability ambitions and actions of Australian agricultural commodities at a more granular level, and
- embedding agility, responsiveness and adaptive capacity into AASF organisational systems.

An inherently flexible approach also allows for and supports organisational growth. Santos et al., (2021) argue that each stage or phase of an innovation ecosystem’s life cycle – inception, launching,

¹ A reminder that ‘governance’ here refers to *systems of principles and strategy*, not the operating rules of an entity.

² i.e., demographic, sociocultural, economic, technological drivers, or relating to institutions, governance, conflicts, epidemics and disruption.

growth and maturity – will require different coordination strategies (Figure 4). Initially, networks of innovative systems are relatively simple. At these early stages, coordination can be managed through traditional governance strategies, developing into orchestrated models incorporating some complexity. However, as the system or organisation evolves and the complexity of connected networks increases, more sophisticated strategies are needed to ensure effective implementation and governance. Figure 4 depicts the evolution of an innovation system or entity over four broad (non-linear) phases:

- **Phase one (P1):** In the inception stage, coordination of activity is centralised through a single governance structure to mobilise actors, align actions and establish common strategy.
- **Phase two (P2):** In the launching stage a simple network is formed, and orchestration of actors within the network becomes necessary.
- **Phase three (P3):** During the growth stage, the network of actors becomes more complex and the number of members increases, making multi-orchestration necessary.
- **Phase four (P4):** In the maturity stage, high levels of trust and alignment between the actors make choreography of aligned goals and interests possible as the coordination mechanism.

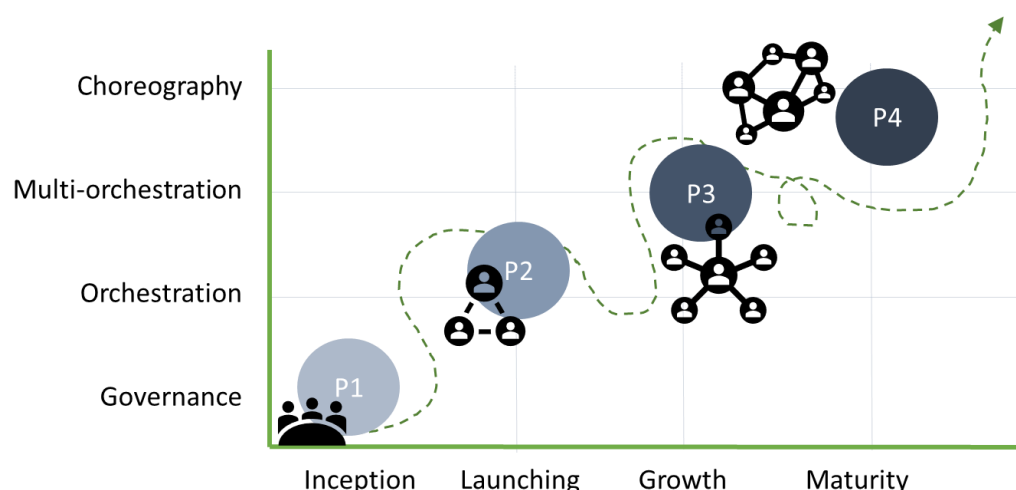


Figure 4: From governance to choreography. Source: adapted from Santos et al., (2021)

There is no direct path from inception to maturity; indeed, many entities will go backwards at points along the development journey. Strategic models such as this – and those proposed by Cantner et al. (2020) and Rabelo & Bernus, (2015) – emphasise that organic development through stages of inception, growth, maturity, decline and re-emergence is to be expected in establishing new innovative systems.

Questions on the extent and type of governance required also depend on the scope of eventual operations of AASF. As the sustainability reporting landscape evolves, supporting frameworks must also mature. For example, while certification programs and labelling are not being canvassed as functions of AASF at this stage of development, it would be prudent to consider governance structures which can evolve (i.e. *adaptive systems*) to incorporate this type of potential activity in the future.

Governance for the AASF must be *integrative*, to ensure local solutions have wider impacts; *inclusive*, to empower all stakeholders; *adaptive*, enabling learning and reflexivity; and *pluralist*, recognising different knowledge systems across the agrifood and sustainability communication ecosystems.

The golden thread (role of intermediaries)

The AASF should not *replace* Industry Sustainability Frameworks (ISFs) and Private Sustainability Governance (PSG) initiatives, but instead *amplify and accelerate* the work already underway to

ensure the economic, environmental and social sustainability of Australian agriculture. It should not be seen as a separate system bolted on to an already crowded group of systems, but the *golden thread* running through these which ties together the sustainability goals, aspirations and actions of the entire sector.

A study of governance and social capital (Abbey et al., 2016) highlights the importance of not only including but *elevating* the role of industry bodies in agricultural value-based organisations, noting that industry bodies are vital conduits for:

- facilitating wider stakeholder participation,
- enhancing social capital and shared values, and
- fostering consensus within agricultural value chains and socio-economic development.

Abbott, (2012) proposes that alongside engaging with industry and the public sector, an independent sustainability organisation should also develop linkages with PSG (private) entities and actors, to promote effective and legitimate private schemes, manage fragmentation, enable experimentation and enhance citizen participation. For example, the ISEAL Alliance seeks legitimacy in its aim to “support ambitious sustainability systems” via inclusion of an advisory Stakeholder Council, which makes recommendations and provides strategic advice to the ISEAL Board (Loconto & Fouilleux, 2014).

The broad strategic role of the AASF in the sustainability communication ecosystem was comprehensively addressed by Gregg (2021) and McRobert, Gregg, et al., (2022). This research highlighted that governance for the AASF must ensure the Framework and the processes which serve its implementation (e.g. Forum and enabling entity) are defensible, avoiding any perception of ‘green-washing’ or ‘gold-plating’. Recognising the crucial role of *facilitation* in multi-stakeholder sustainability assessment, Gregg (2021) addressed the role of the AASF as an arbitrator in a ‘Regulator-Intermediary-Target’ (RIT) model³, in which the AASF *facilitates* positive outcomes within the sustainability communication landscape by acting as an *intermediary* between actors.

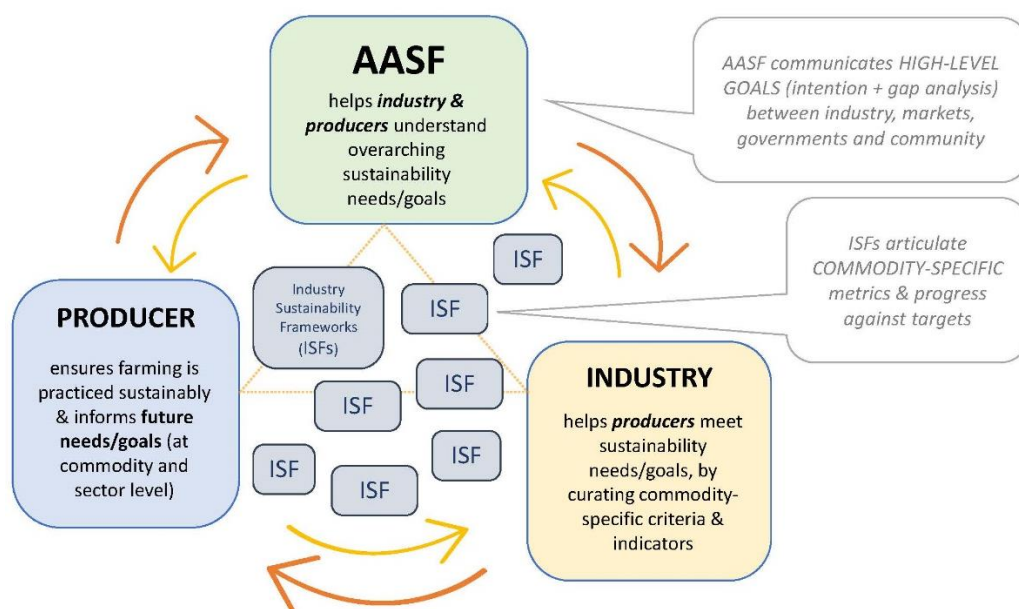


Figure 5: The AASF can facilitate progression of industry and producer sustainability goals. Source: Authors

³ See [Development of the Australian Agricultural Sustainability Framework 2021-22](#) for more detail.

For PSG initiatives, industry bodies, government and indirectly related stakeholders to be effectively included in a system that *maintains independence, authority and accountability*, the role of the AASF as an *intermediary* to facilitate overarching sustainability goals, within which the ISFs act as curators of commodity-specific criteria and indicators, must be clear (Figure 5).

Developing the role of intermediary further, a conceptual framework exploring voluntary stewardship programs for land managers developed by Lawson, (2019) unpacks the facilitation relationship amongst three groups of actors as a *flow of benefits* – i.e., between **land managers** who participate in the programs, **organisations** that manage the programs, and **stakeholders** who have an interest in private land stewardship. In the case of the AASF, these groups are represented as **farmers/producers**, the **AASF** and **agricultural ISFs**, and **other stakeholders** (government, community, market actors etc.). Extending the concept depicted in Figure 5, the diagram in Figure 6 proposes the flow of benefits between these three groups which will be enabled by implementation of the AASF, and Figure 7 highlights the AASF's role in the sustainability ecosystem as facilitator or intermediary.

Governance for the AASF must ensure the Framework and the processes which serve its implementation are defensible, avoiding any perception of 'green-washing' or 'gold-plating'.

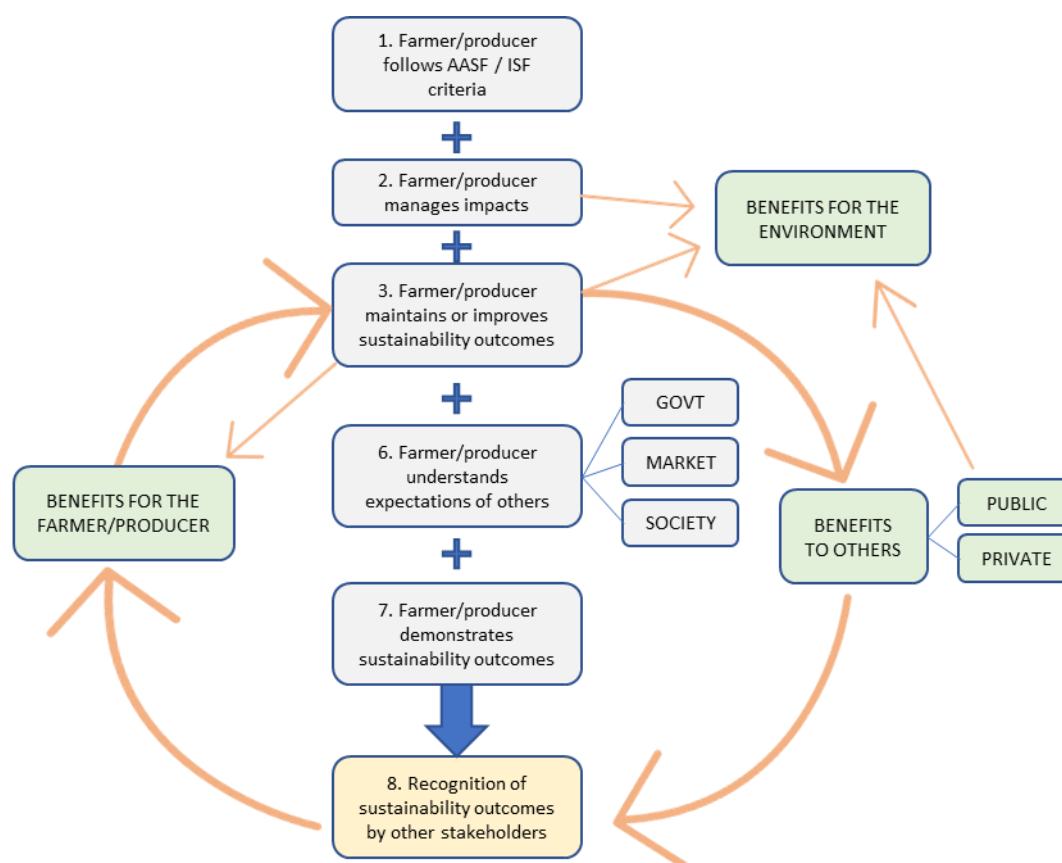


Figure 6: Conceptual framework of benefit flows. Source: adapted from Lawson (2019)

	Roles	Examples
Drivers	Create incentives/sanctions associated with sustainability	The 'ESG' movement is a market-led (shareholders, consumers) movement that sanctions enterprises that appear to generate environmental risks and rewards enterprises that mitigate or reduces environmental risks (both internal and externality risks).
Facilitators	Assist enterprises to achieve sustainability goals	Industry programs provide a facilitation mechanism by assisting producers to identify the key activities they need to undertake to achieve sustainability outcomes identified as important at an industry level. The 'Holistic Management' movement outlines a range of land management actions that are linked to environmentally, socially, and financially sustainable management.
Metrics	Provide for the consistent and widely-understood measurement of sustainability at a business, industry, or regional level	The FAO Sustainability Assessment of Food and Agriculture systems (SAFA) provides for possibly the most widely-accepted sustainability metric currently in use. SAI Global and GRI (amongst others) have widely accepted frameworks whilst there are also a range of competing methodologies for assessing sustainability (e.g. SAFE and FSI) ^a
Assurance	Assessment of the sustainability achievements of enterprises against relevant metrics (and reliable communication of these)	Standards, Certification, and Accreditation programs, including Voluntary Sustainability Standards, are the most well-known and relevant programs under this category. There are many examples of these, but two of the most well-known sustainability program types are associated with organic certification and European food retailing sustainability standards (the Global GAP program).

a: SAFE=Sustainability Assessment of Farming and the Environment; FSI=Farmer Sustainability Index

Figure 7: The AASF's role in the sustainability ecosystem is to act as facilitator or intermediary. Source: Gregg (2021)

Distributed governance

Given that the sustainability communication landscape involves distributed influence and information pathways, the AASF ideally should function under a *distributed governance model*⁴ (Figure 8). That is, a model which can incorporate the complexity associated with having intermediaries facilitating the communication of sustainability objectives between consumers or investors to producers and vice versa, and *amplify* (not sideline) the roles of stakeholders.

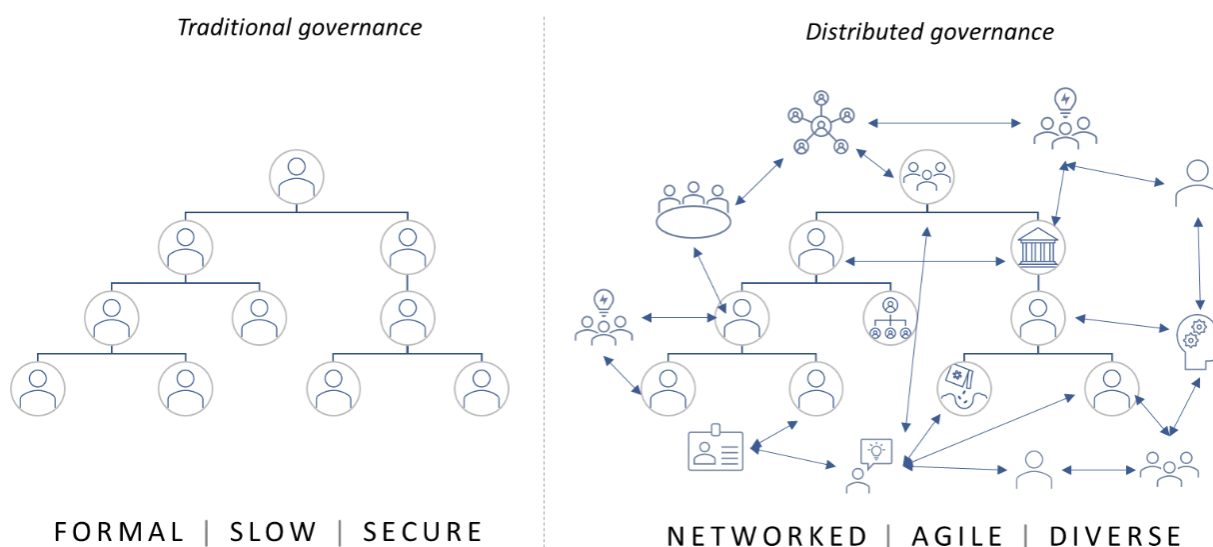


Figure 8: Traditional vs. distributed governance. Source: Authors

⁴ Distributed governance is the specification of principles, processes and methods which enable scalable coordination to form consensus and ratify decisions. Participants in a distributed governance model are treated equally and hierarchy is de-emphasised or abolished. Distributed governance systems are elastic and scalable, so efficiency is not reduced but steady or improved as the number of participants increases.

While many sustainability initiatives have emerged within Australia and globally, the system is far from perfect - and questions posed by Williams et al., (2018) on governance for agricultural sustainability are directly relevant to the AASF:

- What are the *relative responsibilities* of governments, society and markets?
- How can governance system implementation foster institutional and social change?
- What are the politics of investing in 'sustainable agriculture' data? What types of data and knowledge are required? *Who should own the data and how should it be shared?*
- How can *traditional ecological knowledge systems* and citizen science be recognised?

Governments, civil society, and the market have distinct yet interconnected roles and responsibilities in establishing effective governance for agricultural sustainability reporting.

Governments, civil society, and the market have interconnected responsibilities in establishing effective governance for sustainability reporting.

Governments set policies and regulations that promote agricultural sustainability and ensure transparent reporting, establish legal frameworks and standards for sustainable practices, maintain compliance systems, and enforce penalties for non-compliance. Governments overseas also provide financial support, incentives, and subsidies to encourage farmers and agricultural businesses to adopt sustainable practices and report their progress accurately⁵. As Official Statistics Agencies, governments also play a vital role in collecting and analysing data on and related to agricultural sustainability, which informs policymaking and decision-making processes⁶.

Civil society - including non-governmental organisations (NGOs), community groups, and advocacy organisations - acts as both a watchdog and catalyst for change in agricultural sustainability reporting. These groups engage in monitoring and verification of sustainability practices, raising awareness about the importance of transparent reporting, and holding governments and market actors accountable. Civil society organisations often bridge the gap between farmers, consumers, and policymakers, facilitating dialogue and promoting sustainable agricultural practices through education, training, and capacity-building initiatives. They can also contribute to the development of standards, guidelines, and best practices in sustainability reporting, ensuring a comprehensive and holistic approach. The involvement of civil society actors in sustainability reporting enhances the social licence of an initiative; noting, however, that some actors have fixed agendas and inclusion is a not a panacea for social licence issues.

The market (agricultural businesses, investors, and consumers) plays a pivotal role in driving agricultural sustainability reporting expectations. Market forces, such as consumer demand for sustainable products and responsible sourcing, encourage agricultural businesses to adopt sustainable practices and disclose their sustainability performance. Market actors also invest in technologies, research, and innovation for sustainable agriculture, driving advancements in reporting methodologies and tools. In turn, transparent sustainability reporting enables informed

⁵ While direct subsidies for farming are not employed in Australia or New Zealand, governments in both countries encourage participation in relevant programs via market stimulation and tax incentives. Development of the AASF is an example where the Australian Government has provided the financial support to develop an improved means of communicating agricultural sustainability reporting for the industry.

⁶ The relatively recent rise of sustainability an ESG reporting requirements has amplified pressure on the Australian agricultural statistical system to meet a range of emerging information needs relating to environmental performance while maintaining the need for accurate, timely and detailed data for industry stakeholders (McRobert et al., 2019).

decision-making by consumers and investors, enabling them to support and reward sustainable agricultural practices through their purchasing choices or investment decisions.

Effective governance for agricultural sustainability reporting clearly requires a collaborative effort between governments, civil society, and the market. Governments provide the regulatory framework, civil society is the promoter of accountability, and the market drives adoption of sustainable practices through consumer preferences and financial incentives. By working together, these stakeholders can create an enabling environment that fosters transparency, accountability, and continuous improvement in agricultural sustainability reporting. It is not the sole responsibility of one element alone to direct the others, hence the requirement for *distributed governance*. A distributed governance model can incorporate the complexity associated with the intermediary role the AASF will play.

Governance for agricultural sustainability reporting requires a collaborative effort between governments, civil society, and the market.

1.3 Public good, private benefit

“Agricultural industry advocacy faces a fundamental economic constraint, arising because the principal output of advocacy is (in economic terms) a pure ‘public good’; that is, the benefits are available to all, whether or not they contribute to obtaining those benefits, and the benefits realised by one person do not diminish the availability of the benefits to another person. There is little opportunity to charge for the use or consumption of ‘public good’, so [such] organisations find it difficult to reap a direct return on their investment in the benefits they deliver.” (McRobert, Goucher et al., 2022)

In developing a governance scaffold for the implementation and ongoing resourcing of the AASF, understanding whether the outcomes of the initiative are of a private or public good nature is a key consideration. While policy exceptions do occur, public good is usually funded by the public purse, and private good is generally left to markets to develop.

Determining whether something is a public good or a private good involves ascertaining whether it is *excludable* and/or *non-rivalrous*:

- Non-excludable refers to goods or services that *cannot exclude* a certain person or group of persons from using such goods or services (e.g. free public roads)
- Non-rival means that consumption of a good or use of a service by one person *does not reduce the amount available for others* (e.g. internet)

To illustrate this point, some common examples of excludable/non-excludable and rival/non-rival elements in the Australian economy are depicted in Figure 9.

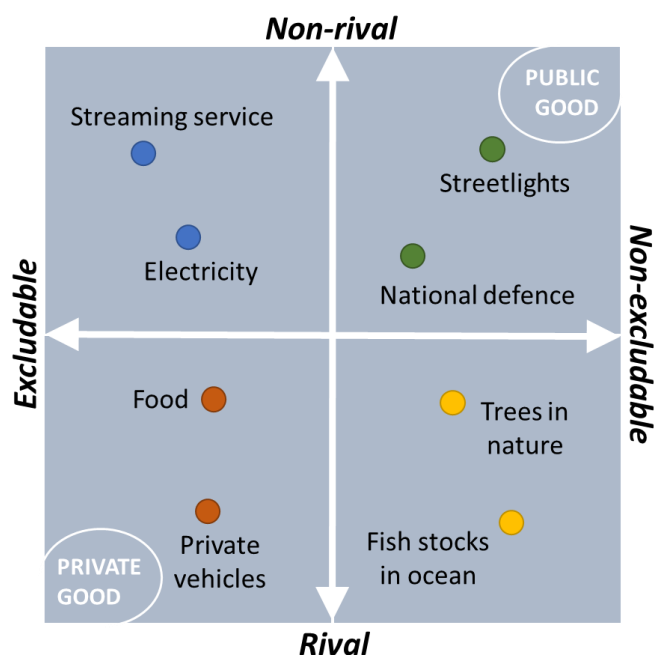


Figure 9: Examples of the spectrum of public and private goods. Source: Authors

The current (i.e. project) form of the AASF comprises two primary elements: the *Framework* (codified principles and criteria⁷) and the *Forum* (the structured Community of Practice, or CoP, plus other stakeholders and expert advisors). Subsequent development of the AASF will result in *creation of an entity* and *identification of supporting structures* to manage these and other elements.

Framework

As a program of work, the AASF aims to benefit the entirety of the Australian agricultural industry, covering all commodities, locations, sizes and business types. These benefits may include improved social licence, improved environmental benefits and natural capital and more favourable trade conditions.

The benefits of building, promoting, iterating, and using the framework cannot be withheld from certain sections of the agricultural industry – *it is not excludable*. When the framework is used by a stakeholder, this does not limit or impact a different stakeholder also using it. For example, government officials can use the framework in trade discussions at the same time as an industry organisation or peak body is using it to demonstrate stewardship to domestic consumers.

Both entities using the framework at the same times does not detract from its ability to achieve its outcome, meaning it is also *non-rival*. The objective of the framework is not to derive a profit, but to lift and develop the Australian agricultural sector overall. Thus, in its current form **the Framework is a public good**.

Forum

The CoP which drives the Forum aspect of the AASF is a mechanism for stakeholders to:

- *Collaborate* – Share ideas, learnings and insights,
- *Connect* – Hear from others and problem solve,
- *Coordinate* – Continually evolve and integrate sustainability approaches, and
- *Contribute* – Advance Australian agriculture’s collective sustainability narrative.

⁷ The AASF Principles describe desired outcomes / ideal states of sustainability, and criteria articulate the conditions which need to be met for these principles to be achieved. See Section 3.1.1. for further definitions.

Currently participation in the CoP Forum is open to all interested parties, meaning *it is non-excludable*. Someone joining the community does not take away a position or diminish any of the benefits others derive from the community, meaning *it is non-rival*. In its current form, **the Forum is also a public good**.

A hybrid approach

Although the two current elements of the AASF can be considered public goods, they cannot be considered *pure public goods* as they contain *elements of excludability*. Yet likewise they are not *pure private goods* as the ultimate overarching goal of the AASF (to communicate sustainability of Australian agriculture) is *not excludable* and is *non-rival*.

When a public good is provided by private companies, free-riders increase and supply costs can become too high for private providers.

If the AASF (Framework and Forum) was to be established as a private benefit entity, one of the biggest issues to consider would be the free-rider problem, whereby the benefits are available equally to fee-paying participants in a program and non-participants. That is, if it were a requirement for industry bodies or farmers to pay a fee for participating in the AASF, it would be impossible to restrict those who elect not to pay from benefitting from AASF outcomes (such as improved social licence or more favourable trade conditions for Australian agriculture as a whole). When private entities supply public goods, participants soon realise that the non-excludable and non-rival benefit can be obtained without their financial contribution. Such a model relies on philanthropy for continuation.

When a public good is provided by private companies, free-riders increase as the incentive to pay is diminished, and supply costs can become too high for the private provider to maintain.

The creation of *markets* for sustainable development and other public interest investments is causing a shift in the responsibilities of public agencies, from *funders* of social and economic development and ecological sustainability to *brokers of financing* for these public goods and services. The broker role is an important one; however, Tan (2022) cautions that:

“... as financial markets constitute an ever-increasing share of resources available for essential services, social provision and environmental sustainability, they will also increasingly serve as quasi-regulatory tools for access to and use of such global public goods, structuring the terms and conditions on which resources are allocated and utilised.”

An overreliance on private investment into public initiatives can result in the manipulation of public good outcomes, by either direct or indirect influence.

While the AASF is neither a *pure* public nor a *pure* private good, it provides outcomes for both (Figure 10). In seeking to support Australian agriculture to be environmentally, socially, and economically sustainable, the AASF will enable:

- *private benefit* by ensuring agricultural practices are sustainable, underpinning the continued productive capacity of farm businesses, and
- *benefit to society* by encouraging improvements to Australia’s ecosystems services and future-proofing national food/fibre security.

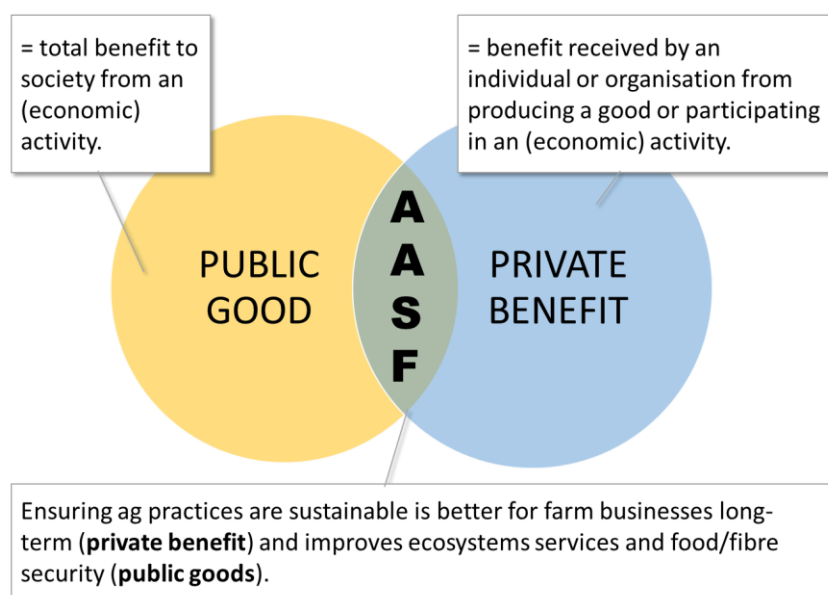


Figure 10: The AASF can provide both public good and private benefit. Source: Authors

It is clear in the language of the AASF Principles and Criteria (Figure 1 and Appendix A: AASF V4.1 Principles, Criteria, themes and categories as a list) that the Framework and Forum aim *primarily* to **provide a public good** by facilitating better understanding of and action on environmental stewardship, care for the people, animals and community of Australian agriculture, and the economic resilience of the industry as a whole.

As such, a combined approach to public and/or industry co-operative resourcing is the most appropriate funding model to support the intended activities of the AASF.

The inevitable question when considering the proposed structure, implementation, operationalisation, maintenance and continuous improvement of the AASF is: who is the most appropriate 'owner'? While this question is still open, guide rails on potential pitfalls the AASF must evade will help to inform this decision.

An overreliance on private investment into public initiatives can result in manipulation of public good outcomes.

Specifically, the AASF should **avoid**:

- *unreasonable influence* by industry or specific organisations (i.e. enabling market asymmetry),⁸
- becoming a *regulatory arm* of government,
- being a '*paper tiger*' without an authoritative voice,
- relegation to '*orphan*' status, without supporters, advocates and/or guardians (particularly in its inception phase), or
- an *overreliance* on private resourcing.

1.4 Defining resourcing requirements

The potential governance and operational structure for the AASF outlined by McRobert & Gregg et al., (2022) suggested an organisational structure based around an independent, skills-based Board. The proposed structure incorporates qualities of integrity, industry input, integration and feedback and continuous improvement. The core elements of this proposed structure and their relationships,

⁸ or even the perception of unreasonable influence, as any such perception will undermine trust in the AASF activities and reduce effectiveness.

along with additional elements suggested by subsequent research (see Sections 1.4.1-3), are outlined below and described in Figure 11:

- An AASF Board would manage the overall objectives of the AASF, vote on submissions by (and set the membership of) sub-groups, set strategic goals, ensure good governance, have oversight of resourcing and seek positive outcomes for core stakeholders.
- The AASF Translation and Communication Group could directly manage industry-level groups and develop valid translations of global sustainability frameworks to the domestic context (which may include seeking membership of appropriate organisations on the basis of a set of standards that become approved as representing the Australian agri-food sustainability context). This groups also manages the Community of Practice (CoP), an AASF-led mechanism for stakeholders to collaborate on sustainability approaches across the broader landscape.
- The AASF Markets and Information / Innovation Group could manage the operation of sustainability communication and assurance mechanisms. The group could also manage internet-based cohesion mechanisms, e.g. mechanisms to facilitate the emergence of sustainability-assured contracting systems and linkages to independent research/assurance organisations.
- The Technical Working Groups (or Activity Groups) are envisaged to operate at an industry level, possibly *within topic categories or utilising existing industry groups*, to assist the Translation and Communication Group in contextualising sustainability frameworks for Australian agricultural industries. The Working Groups would also facilitate operation of the Markets and Information / Innovation Group in interacting with sustainability researchers and assurance organisations.
- A Partner Forum, comprised of members and/or partners of the AASF organisation as determined by an AASF constitution (industry, govt., business etc.), would act as an invested advisory (similar to the Cooperative Research Centre model).

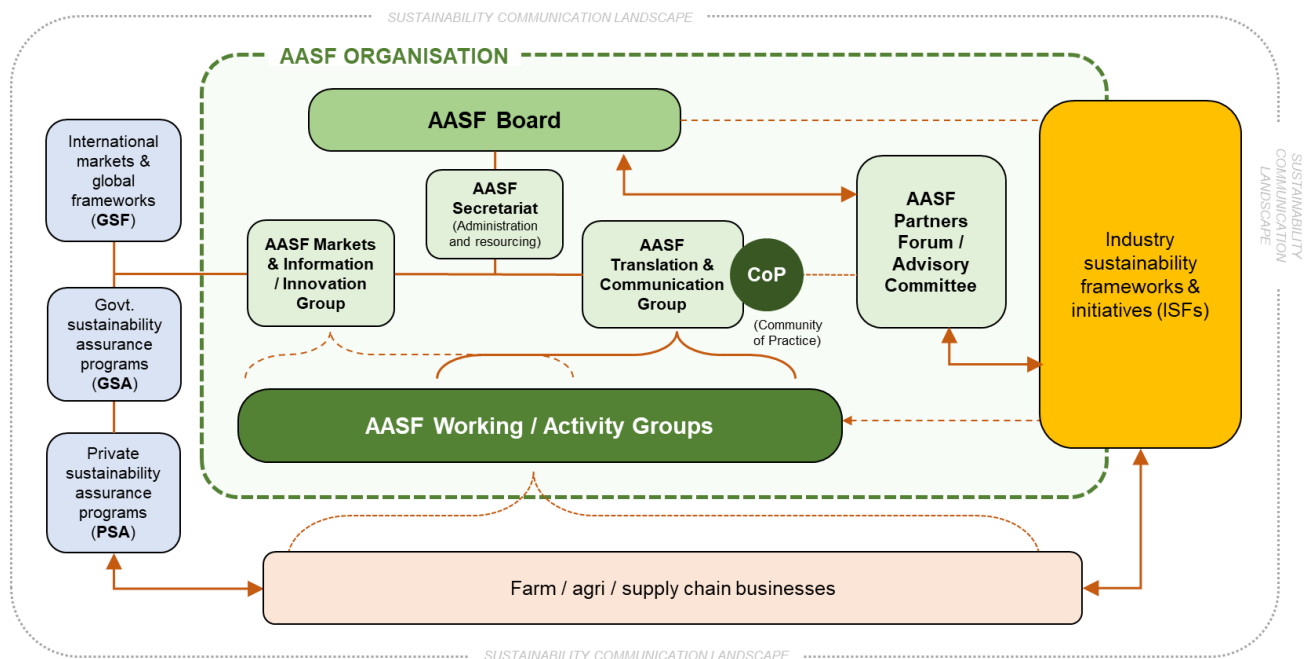


Figure 11: Proposed (draft) operational structure for the AASF. Source: Adapted from McRobert & Gregg et al., (2022)

This core structure was based on a thorough investigation of the strategic role AASF could play in sustainability communication, and of the core attributes for success (as discussed in Section 1).

1.4.1 Case studies of sustainability initiative governance structures

While the AASF is unique, success factors for sustainability framework and forum structures can be gleaned from other reporting mechanisms being developed and implemented around the world. While many initiatives were investigated in the literature review, the four presented here as most pertinent are [Field to Market](#), the [National Index on Agri-Food Performance](#), [Origin Green](#) and the [Global Farm Metric](#).

Field to Market

Field to Market is a United States-based program which offers tools and programs to deliver sustainable outcomes for agriculture, including the development of metrics and reporting platforms to its diverse stakeholder group of 155 members. It aims to provide sustainability solutions throughout agricultural value chains, and its membership reflects this goal with farmers, agribusiness companies, brands, retailers, civil society, academia and public sector partners represented in the member base. With such a diverse membership - and sometimes competing priorities between different stakeholder groups - the structure of the organisation is important to ensure ongoing buy-in from all parts of the value chain.

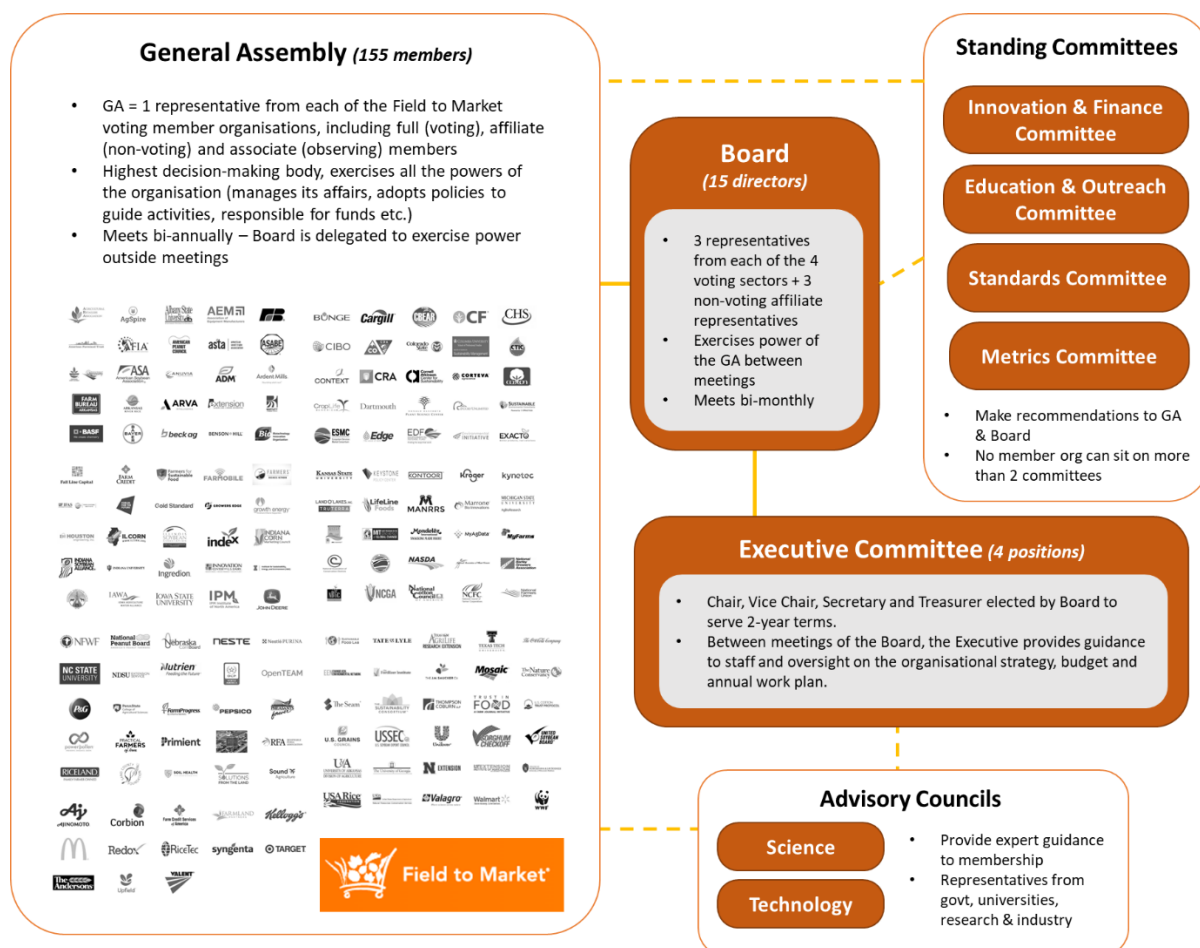


Figure 12: Operating structure of Field to Market. Source: Authors

A *general assembly model* allows all voting (full) members a voice in the direction of the organisation (Figure 12). The General Assembly, which meets bi-annually, manages the organisation, adopts policies to guide activities, and is responsible for the receipt, proper custody and expenditure of its funds and the care of its property. It is comprised of one representative from each of the Field to

Market voting member organisations, including full (voting), affiliate (non-voting) and associate (observing) members. The Board has 15 members, with three representatives from each of the four voting sectors: agribusiness; brands and retailers; civil society; and grower organisations, plus three non-voting members from the affiliate sector, with the aim of balancing representation and influence in decision-making. Between meetings of the General Assembly, the Board exercises the power of the General Assembly, and elects the Executive Committee.

As Field to Market has expanded its voting member base, different stakeholder groups have from time to time had greater or lesser control over direction and strategy. This model, unless carefully managed to maintain equity amongst stakeholder groups, can present a danger in terms of perceived stakeholder capture of the direction of the organisation.

The National Index on Agri-Food Performance / Centre for Agri-Food Benchmarking

The National Index on Agri-Food Performance (the Index) uses science-based metrics to present Canada's agri-food sustainability credentials. In doing so, it aims to create value for the sector. The Index addresses environment, economic, societal wellbeing, and food integrity indicators, using outcomes-based data where appropriate, and practice-based data as a substitute for outcomes where required.

The Index was started in 2020 by a consortium of agri-food sector partners, including producer and industry organisations and companies, environmental organisations, academia, government, financial institutions and innovation and technology organisations. It currently has more than 25 partners and 111 supporter organisations⁹. Development of the Index began after the consortium identified a growing need to demonstrate stewardship to a global audience to differentiate Canadian produce and create value opportunities, maintain access to markets and disclose materiality of emerging risks. Several phases of the project have been undertaken since 2020¹⁰, with a pilot 'Index 1.0' launched in May 2023.

In 2021, the project partners recommended that a *Centre for Agri-Food Benchmarking* (the Centre) be created to advance the development and ongoing operation of the Index. Research undertaken by project partners concluded that the Centre should become part of an existing non-government organisation (NGO) as an operating unit to enhance the credibility and independence of the Index. After a review and consultation process, the Canadian Agri-Food Policy Institute (CAPI) – an independent not-for-profit agricultural policy think-tank – was recommended as the 'home' of the Index.

The Centre is expected to operate as a virtual organisation, and being housed within CAPI provides advantages (through connections and credibility) and efficiencies. CAPI maintains direct oversight of the Centre's Executive Director from a governance perspective. While housed within CAPI, the Institute is not responsible for funding the Centre's activities; it is self-financing and sets its own partner fees, levels, and terms for matching funding from Government. In-kind partner contributions are relied on to complete work programs.

Since the Index was first conceived in 2020, costs for undertaking each phase of work have been shared between the consortium of project partners. For example, Phase 2C of the project was substantially funded by Protein Industries Canada with contributions from industry and public sector, while Agriculture and Agri-Food Canada provided significant funding for Phase 3, which incorporated additional funding from industry. The next phase of work aims to establish a long-term funding plan for the independent establishment of the Centre.

⁹ A full list of partners and supporters involved in the National Index on Agri-Food Performance is published on the website: <https://www.agrifoodindex.ca/partners>

¹⁰ <https://www.agrifoodindex.ca/publications-and-events#publications>

A series of recent reports detail the evolution of the Index and Centre (National Index on Agri-Food Performance, 2023). Figure 13 outlines the governance structure for the Centre, with three committees overseeing strategy, data and metrics, stakeholder engagement and activities. Three additional ad hoc groups are included to consider partnerships, measurement issues and global engagement.

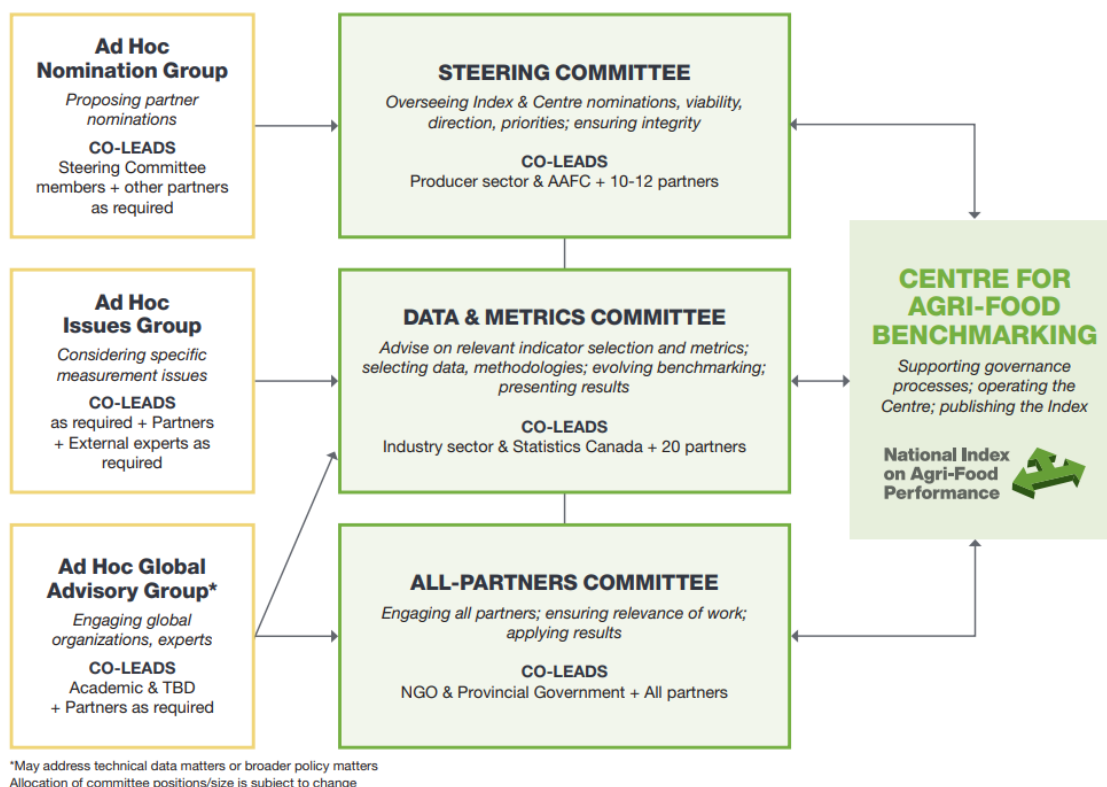


Figure 13: Recommended structure for operation of the Centre for Agri-Food Benchmarking. Source: (National Index on Agri-Food Performance, 2023)

The reports also include salient issues for AASF consideration, and outline a comparison of Canada's Index to Australia's Framework. Key points include:

- The Index's role in policy development will be greatly enhanced IF it can identify where improvement is required by measuring performance against international competitors, past performance, other sectors, or agreed-to targets or objectives.
- The Index's co-development process, with governments and stakeholders working together, has itself been a positive contribution (breaking down silos, improving collaboration).
- The Index has a potential role in describing "what is" BUT cannot describe "what should be"; it could serve as a starting point for policy development and the baseline against which to measure progress.
- Australia's framework was supported and developed by a large coalition of farm groups and industry and is seen as "the light on the hill" to help identify where they want to be. By comparison, the National Index is supported by a broader coalition of food system partners.
- Both country's initiatives are attempting to describe how Australian or Canadian agriculture and food is unique and is achieving sustainability in its own way; something that should be respected by international partners.
- Both initiatives intend to allow for regional and commodity diversity since both countries have extremely varied landscapes and regions. This diversity will be reflected at the metrics and indicator levels.

- *Australia's focus is on helping industry step up with continuous improvement while the National Index is designed to benchmark the agri-food sector as a whole, with the potential to identify areas of improvement. (National Index on Agri-Food Performance, 2023)*

Origin Green

Origin Green is a decade-old food and drink sustainability program for Ireland which collaborates with farms and Irish food and drink companies to set and achieve measurable sustainability targets for the environment and local communities. Origin Green functions as a program within Bord Bia, the Irish state agency which promotes and markets Irish food.

Sustainability assessments for the program are undertaken by Bord Bia. At farm level, Origin Green has 55,000 collaborators representing the majority of Irish agriculture, including beef and lamb farmers (92% of beef produced), dairy farmers (95% of milk produced), horticulture (70% of horticulture) and egg (95% of eggs). Bord Bia sustainability assurance schemes are also being developed for poultry and pigs.

More than 100 independent auditors carry out 650 weekly on-farm engagements across Ireland. In addition to produce quality, the sustainability criteria measured and monitored are greenhouse gas emissions, biodiversity, water use, energy efficiency, soil management and socio-economic factors.

Origin Green also offers practical guidance and advice to inform farmers on how to become more sustainable, primarily through its Farmer Feedback Report. Bord Bia is currently working on a Farm Sustainability Program (FSP) which aims to facilitate a national, unified approach to sustainability improvement on Irish farms. As a government-led initiative, Origin Green acts as an intermediary linking public good (sustainability outcomes) with private benefit (market rewards).

Global Farm Metric

The Global Farm Metric (GFM) is a system that enables farmers to understand the social, economic and environmental sustainability of their systems. By provision of a common baseline of sustainability data, the GFM aims to “empower farmers to communicate farm-level outcomes, support informed decision-making, better risk management and the avoidance of unintended consequences”.

GFM focuses on evaluating outcomes of practices, rather than prescribing what practice is considered appropriate to create the outcome, so as to be neutral in terms of farming approaches and systems and recognise the unique contexts of farms.

The initiative was established by the Sustainable Food Trust (SFT), a United Kingdom-based charitable organisation which works to accelerate the transition to more sustainable food and farming systems. Operations of the GFM are directly supported by the SFT.

To be relevant to agricultural value chains, the GFM has built a broad coalition of more than 80 partners (farmers, consultants, researchers, educators, environmental groups, certifiers, food companies, financial services and government agencies). The coalition contributes to development of the framework via a Steering Committee, which then informs the activities of the GFM team. The breadth of the coalition and its integration into the structure of the organisation provides the framework with credibility and relevance (Figure 14).

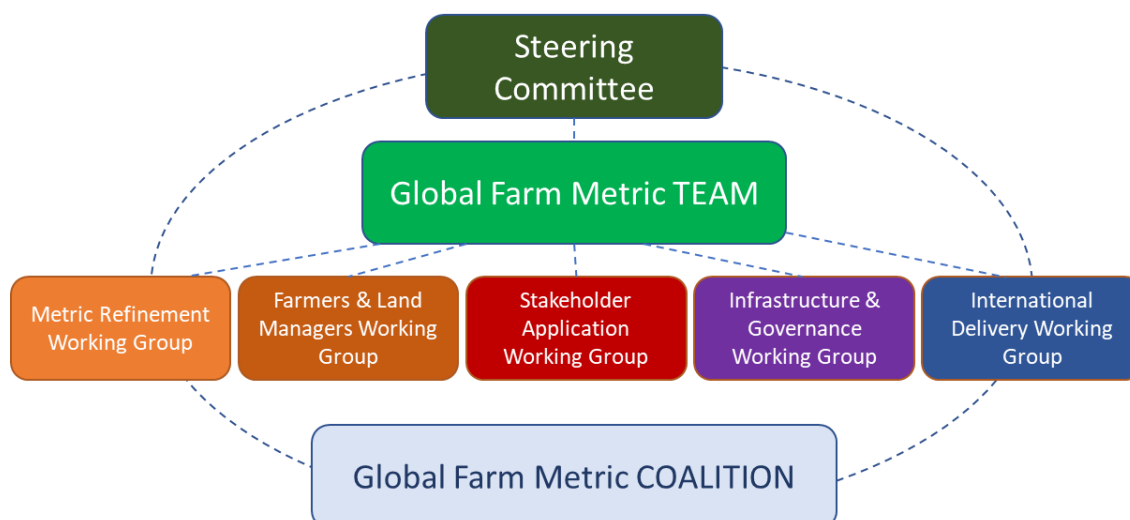


Figure 14: Operating structure of the Global Farm Metric. Source: www.globalfarmmetric.org

1.4.2 Common threads

The common threads across these case studies (along with salient points in the wider literature review) demonstrate key considerations for establishment of an entity to implement and manage the AASF:

Governance structure:

All initiatives emphasise the importance of establishing a governance structure to oversee the sustainability reporting and management processes. This includes the presence of boards or committees responsible for setting objectives, making strategic decisions, and ensuring accountability for good governance.

Stakeholder engagement:

Each recognises the significance of actively and meaningfully engaging stakeholders from different sectors, including farmers, agribusiness companies, brands, retailers, civil society, academia, and public sector partners. Stakeholder engagement helps ensure diverse perspectives, buy-in, and balanced representation in decision-making processes.

Collaboration and Integration:

The initiatives promote collaboration and integration between different entities and groups. They often involve partnerships between industry, government agencies, research institutions, and sustainability-focused organisations. These collaborations aim to develop common frameworks, share knowledge, and create cohesive systems for sustainability reporting.

Performance measurement and assurance:

Measuring sustainability performance effectively means using standardised metrics and assurance mechanisms, which in turn require reliable (and sustainable) data collection, verification, monitoring, evaluation, and reporting systems to assess key indicators.

Contextualisation and translation:

Many initiatives focus on adapting global sustainability frameworks to the specific domestic context of the agricultural industry. They aim to develop valid translations of these frameworks, ensuring relevance and applicability to local conditions. This process usually involves structured engagement with industry-level groups, working groups, advisors and experts.

Continuous improvement:

Continuous improvement in sustainability practices requires feedback mechanisms, independent audits and regular engagements with stakeholders to identify areas for change, inform decision-making, and drive better sustainability outcomes.

While these commonalities may seem obvious to those who work within these spheres, each of these element **must be explicitly addressed** in implementing the AASF. They cannot be taken for granted when seeking to build robust and credible sustainability reporting and management systems for Australian agriculture.

1.4.3 Considerations for operationalisation

Through extensive consultation and review, the AASF project partners¹¹ have developed views on the intended and/or potential *services*, *capabilities* and *development areas* required to progress the AASF's goals beyond the project phase and into operationalisation (NFF & KPMG, 2023; McRobert & Gregg et al., 2022).

These points, summarised in Tables 3 and 4, have been canvassed in previous reports by project partners (including but not limited to AFI) and developed by stakeholders in CoP forums and other related meetings. They are covered more fully in related work, and presented here for reference to those project partner reports.

In summary, resourcing requirements for an entity or system to manage the Framework and the Forum must incorporate the ever-present need to manage data and reporting capabilities, emerging requirements for education, communications activities, continued engagement with domestic and global stakeholders, and pragmatic back-office functionality.

Timelines for implementation of these services and exploration of further development areas have been mapped by KPMG and NFF (in a parallel AASF project work stream) at two-, five- and 10-year delivery horizons.

¹¹ Project partners referenced here include representatives of DAFF, NFF, AFI, KPMG, CSIRO and Schuster Consulting Group.

Table 3: AASF intended services and capabilities

Framework:	The Australian Agricultural Sustainability Framework (AASF) will bring cohesion to definitions of sustainability principles and criteria in Australia and internationally.
Organisation:	To implement the Framework, an AASF Secretariat or Coordinating Organisation ('the Organisation') must be established. The size and structure of this are to be determined, noting different requirements at inception and maturity (see 1.2).
Forum:	A designated forum will be established for stakeholders interested in the AASF. The Forum will serve a two-way communication function: as a platform for distributing updates from the Organisation and the Framework, and as a consultative group or sounding board for the AASF.
Data:	Data will be utilised to support the evidence base for Australian agriculture's sustainability credentials. This involves establishing a baseline for the nation and potentially setting targets in future. The data will also cater to global users who require information on sustainability.
Reporting and insights:	The Organisation will eventually have the capacity to develop and distribute reports and insights on the status of Australian agricultural sustainability. These reports will be valuable for market access discussions, benchmarking, and other purposes.
Communications:	The Organisation will handle formal communications and marketing functions, which include website management, social media presence, handling inquiries and complaints, participating in events, and more.
Education:	The Organisation will provide education on sustainability for the agricultural sector. This may involve sharing insights on global trends with relevant downstream entities and participants. Additionally, there might be efforts to build capacity and capability within the sector.
Back office:	The Organisation will require ongoing support functions such as human resources, finance, legal, and other critical back-office tasks.

Table 4: AASF development areas

Industry engagement:	Expanding stakeholder buy-in for sustainable agriculture, natural capital management and climate change action, and retaining/building the knowledge base created in the project Community of Practice.
Verification	Considering how the AASF might progress towards the eventual capability to verify other frameworks and offer relevant tools for industry.
Materiality assessment:	Undertaking a whole-of-sector materiality assessment will ensure alignment between the Framework and stakeholder/industry expectations.
Organisational design:	Designing the Organisation's structure to reflect the principles, strategies, key considerations and stakeholder feedback established in project discovery and through ongoing consultation.
Data work packages:	Identifying <i>detailed</i> data availability and key gaps related to the potential use of the AASF, to aid in the co-design of a sustainability data ecosystem.
Organisation performance:	Establishing a base case and performance Key Performance Indicators (KPIs) for the Framework, Forum and the Organisation; determining the processes, systems and resources required by the Organisation to fulfill its functions.
Pilots:	Conducting robust, effective, structured use-cases and/or pilots to test the implementation of the Framework.
Legal/risk:	Establishing the functional and immediate governance needs of the Organisation requires addressing legal and risk considerations.

2. DATA STRATEGY

The AASF clearly needs data, yet it need not be the owner, or even the collector of data. Creation of a formal agricultural sustainability data-sharing ecosystem with AASF as the intermediary is an imperative for success. A two-way flow of data can benefit both the AASF and the Australian agricultural industry as a whole by providing harmonised information for decision-making.

The AASF is constructed on a Principles / Criteria scaffold to ensure that discussions on agricultural sustainability differences between Australia and its trading partners do not become mired in disagreements on region-specific practices, but instead focus on shared values. Values alignment – such as that delivered by the 17 overarching Principles of the AASF – is the first step to providing evidence of outcomes which support those values.

“Without a solid foundation of evidence of outcomes, the misinformed basis for sustainability discussions based on accepted practices will continue. An evidence base of outcomes will allow a more nuanced and flexible understanding of whether the intent of sustainability principles are being met.” (Heath, 2023)

2.1 Data roles and responsibilities

2.1.1. The role of data in the AASF

Data collection plays a crucial role in supporting agricultural sustainability reporting. While the AASF requires sources of data to report on progress against goals under the principles and criteria, a two-way flow of data can in turn benefit the Australian agricultural industry by providing harmonised information. By aggregating and analysing data, AASF stakeholders can assess performance (*measurement*), track progress (*accountability*), and make informed decisions that contribute to a more sustainable agricultural sector (*evidence* and *continuous improvement*). Using the AASF as a data aggregator could also help streamline data collection activities across the industry, by employing the ‘tell us once’ principle to report on sustainability via information collected for related purposes (e.g., carbon sequestration, workforce statistics, biodiversity management etc.)

Measurement and Assessment:

By collecting data on factors such as those outlined in the overarching Principles and supporting Criteria of the AASF, stakeholders can quantify and understand the environmental, social, and economic *impacts* of agricultural practices. This information serves as a basis for evaluating the effectiveness of sustainability initiatives, identifying areas for improvement, and tracking progress over time.

Transparency and Accountability:

Accountability about goals and achievements is key to the success of any sustainability initiatives, to ensure expectations are managed and trust is engendered (Mori Junior et al., 2016). Transparent reporting builds trust among consumers, investors, and other stakeholders, who can make informed decisions and hold agricultural entities accountable for their sustainability performance. It can also foster healthy competition among agricultural businesses, encouraging them to improve their practices and demonstrate to the market their commitment to sustainability.

Evidence-Based Decision Making:

Robust and comprehensive data sets enable policymakers, researchers, and agricultural practitioners to analyse trends, identify patterns, and derive insights which can guide the

development of effective policies, regulations, and incentive mechanisms that promote agricultural sustainability. Data-driven decision making also helps farmers and agricultural businesses optimise their resource allocation, meet market requirements, adopt targeted interventions, and make informed choices to enhance sustainability performance. Collation of more data points can also be used to create *sustainability-related sensitivity analyses* which can be of great benefit to producers in making decisions about farm practice and business management.

Continuous Improvement:

By collecting data on key indicators, stakeholders can identify areas where they are reaching or falling short of sustainability goals, replicate success and pinpoint inefficiencies, and implement specific responses. Data-driven feedback loops enable a cyclical process of improvement, enabling stakeholders to refine their practices and enhance their overall sustainability performance. Legitimacy of sustainability reporting requires building trust among all relevant stakeholders *via a demonstrated commitment to continuous improvement*, underpinned by empirical evidence of positive social, environmental and economic outcomes (McRobert et al., 2020).

Sustainability outcomes are reliant on a system to *demonstrate improvement measured against transparent and robust baseline data*; however, the Australian agricultural statistics system has been criticised as incomplete, out of date or purposeless (McRobert et al., 2019). The perceived paucity of baseline data has been a major barrier for farmers and land managers in demonstrating their sustainable practices, and also for Australia to demonstrate compliance with international obligations (Williams et al., 2019). “We don’t have the right data to make the best decisions” is a common catch-cry in Australian agriculture.

The AASF does not need to be the owner – or even primary collector – of sustainability data.

This situation is changing across the country and across jurisdictions. The Australian Bureau of Statistics (ABS) is modernising the way official agricultural statistics are produced, to incorporate automated data, combine existing public and private sector data sources, and reduce reporting burden¹². The CSIRO in undertaking a wide-ranging program of work on sustainability credentials directly relevant to agriculture, including the Valuing Sustainability Future Science Platform¹³, HandPrint and Sable¹⁴, and the LOOC-C¹⁵ / LOOC-B¹⁶ tools. Many private initiatives to collect, manage and analyse agricultural data on sustainability are finding a ready market.

Data to support agricultural sustainability goals is not complete, but it is available. To advance both the AASF intentions (to inform the *economic, environmental and social sustainability goals of Australian agriculture*) and for the benefit of the sector as a whole, a system must be designed which can:

- help stakeholders outside the agricultural industry understand and measure the industry’s goals and progress, and
- assist those inside the industry to more easily see where they are succeeding or overlooking sustainability goals.

¹² www.abs.gov.au/statistics/detailed-methodology-information/information-papers/modernising-abs-agricultural-statistics#partnerships-to-improve-abs-agricultural-statistics

¹³ research.csiro.au/vsfsp/sustainability-knowledge-commons/

¹⁴ www.csiro.au/en/research/environmental-impacts/sustainability/handprint

¹⁵ research.csiro.au/digiscape/digiscapes-projects/digital-services-for-carbon-farming-markets/

¹⁶ research.csiro.au/digiscape/digiscapes-projects/biodiversity-co-benefits-calculator/

While it needs data, **the AASF does not need to be the owner – or even the primary collector – of sustainability data.** The AASF can play a vital role for industry by engaging with and influencing the structuring of data delivery models, to support the evolution of robust agricultural data sets.

2.1.2 Responsibilities as a data intermediary

As recommended by Lemon, (2022), Gregg, (2021) and McRobert et al. (2022), the AASF has a clear and valuable role to play as an **intermediary** in the Australian agricultural data landscape. Gregg proposed a role for the AASF as a central platform or coordinator for researchers and independent organisations to:

- Access sustainability criteria that are globally accepted;
- Access reporting data (that can be compared to population surveys or data to generate industry performance outcomes);
- Provide for a centralised mechanism that provides for improved effectiveness and reduced cost of assurance programs (e.g., sampling and checking of certified producers as a mechanism to generate assurance over certification programs themselves), and;
- Provide reporting of sustainability research outcomes and centralisation of literature, data and reporting on those.

Lemon (2022) conducted reviews of industry and datasets to understand the publicly available Australian data landscape and the opportunity to use such data to support the AASF. A key finding of this review was the usefulness of other industry and environmental sustainability frameworks and certification schemes which have interests in many of the same data sets of use to the AASF. Lemon recommended that those organisations with a stake holding in data of use for agricultural sustainability activities (*data providers and users*) be **brought together into a formal group** to:

- determine and agree on data needs,
- address gaps in data,
- secure funding to support the development and/or maintenance of key data sets,
- influence the owners of key data sets to improve availability and interoperability of key data sets, and
- share services for manipulating and analysing data.

The AASF has an important role in coordinating cross-jurisdictional efforts to synthesise multiple existing public and private data initiatives.

As the Framework is a high-level document which guides stakeholders to industry sustainability frameworks (ISFs) for commodity-specific detail, the data mechanisms of the AASF should likewise facilitate access to the existing data sets and platforms which already collect and collate the data required to report on indicators for the Framework criteria.

Creation of a **formal agricultural sustainability data-sharing ecosystem with AASF as the intermediary or moderator** (utilising the Forum) is an imperative for success, not only for the AASF project but also for sustainability efforts across the Australian agricultural industry. Noting the extensive sustainability reporting efforts underway across industry bodies, RDCs, private initiatives, research organisations, the Department of Agriculture, Fisheries and Forestry and other government bodies, an agricultural sustainability data-sharing ecosystem need not be created from scratch. Rather, an important role for the AASF could be in *coordinating existing cross-jurisdictional efforts* to synthesise (and facilitate access to) the multiple existing public and private data initiatives. Establishment of such an ecosystem might involve the following elements, supported by Technical, Information and Social architectures (see Figure 22, *Appendix C: Architecture for an AASF ‘data club’*):

1. **Stakeholder Engagement:** The AASF could convene a diverse group of stakeholders representing various sectors within and related to the agricultural industry (i.e., the current project Community of Practice and/or proposed Forum) to both inform and hold accountable the following activities / processes.
2. **Data Sharing Framework:** Development of a collaboratively designed data sharing framework outlining the *principles, protocols, and standards* for sharing data within the AASF could address concerns related to data privacy, security, confidentiality, and intellectual property rights while promoting openness, transparency, and collaboration.
3. **Data Collection and Validation:** Mechanisms for collecting, validating, and aggregating agricultural sustainability data from participating stakeholders will need to be agreed and communicated. This could involve adoption (or creation) of standardised data templates, data collection tools, and verification processes to ensure the accuracy and reliability of the shared data.
4. **Data Management and Storage:** If the AASF is to be responsible for managing shared sustainability data securely, and storing data (i.e., in a centralised repository or by developing systems of managing sources of storage), appropriate data management systems must be employed, including data encryption techniques and compliance with data protection regulations.
5. **Data Analysis and Reporting:** Analysis of the aggregated data will enable identification of trends and generation of reports on the industry's sustainability performance, to provide information for decision-making, policy formulation, and benchmarking progress.
6. **Knowledge Exchange and Learning:** The Forum facilitated by the AASF could serve as a platform for knowledge exchange, learning, and collaboration among stakeholders. It could, for example, organise workshops, conferences, webinars, and other events to share best practices, innovative solutions, and research findings related to agricultural sustainability.
7. **Continuous Improvement and Feedback:** Regular evaluations and updates could be conducted to address any shortcomings and ensure the system remains relevant and valuable to the stakeholders.
8. **Governance and Oversight:** Data management is too crucial to the AASF's core purpose to be bundled with other operating functions. A governance mechanism within the AASF entity structure would be required to oversee the data-sharing ecosystem. This could be a dedicated committee or board with responsibility for setting guidelines, monitoring compliance, and resolving any disputes or issues that may arise.

Shared data capability will not only benefit the AASF but also enable value chain innovation, improve industry competitiveness, and accelerate efforts to protect natural capital.

The agricultural sustainability data sharing ecosystem (or 'data club') recommended by Lemon, (2022) would have benefits reaching far beyond the already-ambitious goals of the AASF. Shared data capability across agricultural sectors, natural resource management, science and the public sector will not only enable value chain innovation and improve industry competitiveness, but also accelerate efforts to protect natural capital in related jurisdictions (such as the environment, water, and energy portfolios etc.).

A paucity of data is not the issue; at the beginning of 2020, the number of bytes in the digital universe was said to be 40 times bigger than the number of stars in the observable universe¹⁷. Nor are the means to collect, process and make use of data lacking; remote sensing, machine learning, the Internet of Things (IoT), artificial intelligence and quantum computing are already here, with new methods of application emerging every day. The remote sensing, climate, geological, astronomical,

¹⁷ <https://seedscientific.com/how-much-data-is-created-every-day>

oceanographic, biodiversity (to an extent), and the synthetic biology communities have all tackled the concept of data-sharing and can provide lessons for the AASF.

However, disincentives for sharing data have stymied most attempts at collaboration within Australia agriculture to date. These include potentially high costs of data collection and/or data sharing, with no guaranteed return for the collector or sharer. This unclear (or negative) cost/benefit value proposition has led to an unwillingness to share data in agriculture, resulting in low investment in data curation and under-appreciation of data as an asset.

Collaborative aggregation initiatives for agricultural sustainability data are already underway (or in development), including private offerings in the market and public-good initiatives. These include (but are not limited to) the [Australian AgriFood Data Exchange](#), CSIRO's [HandPrint](#) and Sable projects, the Australian Sustainable Agriculture Initiative ([SAI Platform](#)), Acclimate's [Placelink® platform](#), AgForce Queensland's [AgCarE](#), [Farming for the Future](#), Food Agility's [Framework for Sustainability Reporting project](#), TerraCipher's [AgriTrakka](#), plus [FLINTpro](#), [Agworld](#), [AgriWebb](#), [Ruminati](#) and a \$100 million program of work under the Australian Government's [National Traceability Strategy](#).

Integrating with existing aggregation initiatives for agricultural sustainability data would be highly beneficial for a data-sharing ecosystem supporting Australian agricultural sustainability. By leveraging these initiatives, the AASF ecosystem would gain access to a broad dataset, encompassing diverse agricultural practices and outcomes and supply chain information. Integration would reduce redundancy and promote consistency in data collection and reporting standards. It would enable comparative analysis, facilitating benchmarking and knowledge exchange across international boundaries. Integrating with established initiatives would also provide access to expertise, resources, and networks dedicated to agricultural sustainability, enhancing the credibility and influence of the data-sharing ecosystem. An integration approach would also foster collaboration and improve data-driven decision-making, accelerating steps towards a more resilient and sustainable agricultural landscape in Australia.

2.2 Data use principles

The collection and use of data for sustainability reporting is a process which is dependent on social licence – i.e., data providers must **trust** that their data will be used as agreed, and accept that sharing of the data will create enough value to make the process worthwhile (McRobert et al., 2019). For this trust and acceptance to translate to social licence, guidelines on use of data for the AASF (and the benefits of sharing) must be completely clear to all participants in the process. The following section details some of the underlying principles which should guide development and implementation of an AASF data-sharing ecosystem.

Recognition of the value in publishing accessible, shareable and interoperable information has resulted in creation of initiatives such as the Data FAIRport and the Open Data Charter. While not all data used within the AASF would be open¹⁸, the six Open Data Charter principles (ODC, n.d.) represent a globally-agreed set of aspirational norms on data usage and publication, namely:

- | | |
|--|--|
| 1. <i>Open by default</i> | 5. <i>For improved governance and citizen engagement</i> |
| 2. <i>Timely and comprehensive</i> | |
| 3. <i>Accessible and usable</i> | 6. <i>For inclusive development and innovation</i> |
| 4. <i>Comparable and interoperable</i> | |

The Data FAIRport initiative (started in 2014) established a set of guiding principles and practices to enable data providers and data consumers – both machine and human – to discover, access and sensibly re-use the vast quantities of information being generated by contemporary data-intensive science. The term 'FAIR' was coined to describe principles to make data **Findable, Accessible,**

¹⁸ i.e. some data collected for use in AASF reporting may feasibly be commercially sensitive or private

Interoperable, and **Reusable**. Based on these principles, a set of metrics has been defined to quantify levels of FAIRness. In addition to FAIRness, McRobert et al., (2019) coined the acronym 'TRUE' to emphasise that data in shared systems must also be **Trustworthy, Relevant, Useful** and **Explainable**. The CARE Principles for Indigenous Data Governance are also applicable to the AASF:

- **Collective benefits (C)**: Data ecosystems shall be designed and function in ways that enable Indigenous peoples to derive benefit from the data.
- **Authority to control (A)**: Indigenous peoples' rights and interests in Indigenous data must be recognised and their authority to control such data be empowered.
- **Responsibility (R)**: Those working with Indigenous data have a responsibility to share how those data are used to support self-determination and collective benefit.
- **Ethics (E)**: Indigenous peoples' rights and wellbeing should be the primary concern at all stages of the data life cycle and across the data ecosystem.

While broadly applicable to data-sharing initiatives and often taken to be implicit, these principles (FAIR, TRUE and CARE) must be **explicit** in any data collection and distribution systems constructed by the AASF. Upholding these principles will be foundational to stakeholder trust in supporting the AASF's role as an aggregator and communicator of data sets.

The data processing supply chain example presented in McRobert et al., (2019) depicted in Figure 15 demonstrates the ways in which various data could be processed and assessed for suitability within an aggregated sustainability statistics system. Additional to the necessary criteria of data being **usable, accessible** and **sustainable**, the flowchart example includes principal requirements of governance and production which should be met before potential data sources are incorporated into statistics collections, i.e.:

- | | |
|--|---------------------------------------|
| • <i>availability</i> | • <i>fitness for use</i> |
| • <i>integrity</i> | • <i>user needs</i> |
| • <i>consistency</i> | • <i>timeliness</i> |
| • <i>accessibility</i> | • <i>relevance</i> |
| • <i>harmonisation (national and global)</i> | • <i>legal and regulatory issues.</i> |
| • <i>respondent burden</i> | |

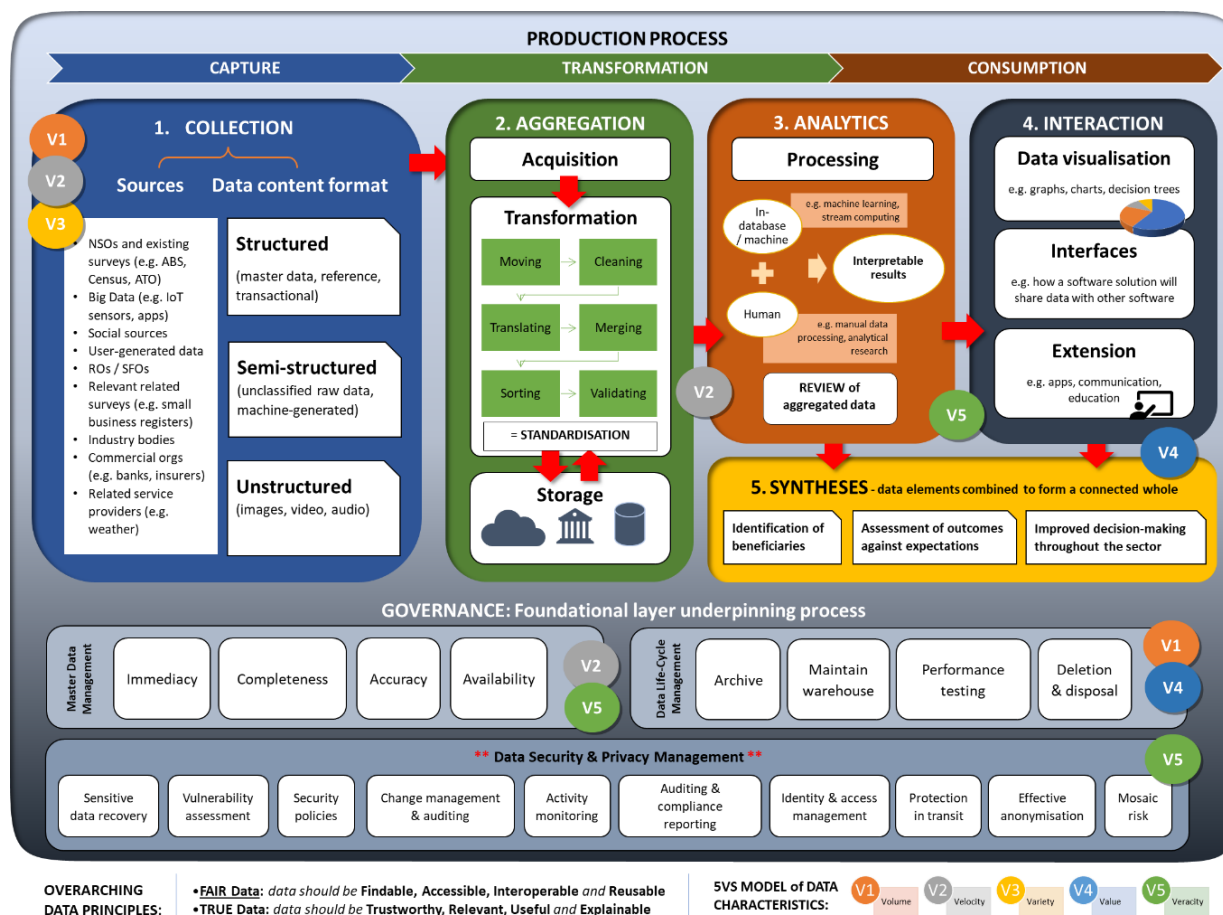


Figure 15: Data processing supply chain example (for agricultural and other data sets). Source: McRobert et al. (2019)

2.3 Outcomes vs practices approaches

The imperative to deliver a more sustainable, decarbonised economy is embraced by a majority of governments around the world, yet significant tension can arise in negotiations about *how* to deliver against this fundamental objective – particularly on the standards, metrics and goals that are set.

Often, the most tense sustainability discussions involve debate about **practices** employed in farming operations. It is rare that the fundamental **principles** of sustainability are under discussion. Sustainability principles derive from the values shared by all stakeholders. Shared values underpin societal structures, enabling us to work together to achieve outcomes for the common good. Discussions about how to deliver sustainable outcomes can become so focused on the *practices* being deployed that the underpinning values of sustainability are assumed or overlooked.

The AASF has been constructed on a Principles, Criteria, Indicators scaffold to ensure that discussions on agricultural sustainability differences between Australia and its trading partners do not become mired in disagreements on region-specific practices, but rather focus on shared values to enable better understanding of these differences.

Tensions over animal welfare standards in the Australia-United Kingdom Free Trade Agreement (FTA)¹⁹ negotiation are a good example. British farmers have expressed strong views that meat imported from Australia under the new FTA will be produced using lower animal welfare standards than what is required in the UK. Regulations in the UK which govern the transportation of stock are different to those of Australia; some regulations which UK farmers must adhere to are not required in Australia. The UK regulations have been developed to deliver against the principle that *animals must be transported in a way that is not likely to cause injury or undue suffering*. This is a value statement that all stakeholders can support as an agreed outcome. Problems with measuring goals or progress against this statement stem from how regulations are designed to comply with that principle.

While the purpose – to not cause injury or undue suffering – is clear, providing evidence of ‘the avoidance of undue suffering’ is difficult in a regulatory compliance context. Regulation thus becomes practice-based by necessity because the capability to objectively measure ‘avoidance’ or ‘undue’ is absent. Practices which are assumed to deliver the desired outcome are used as a proxy to being able to directly measure animal welfare outcomes. While welfare outcomes in stock transportation depend on many factors (weather conditions, condition of the transport vehicle, condition of the stock, the way the stock are handled, and more), arbitrary limits for the length of time or distance that stock can be transported have become the regulated proxy for measurement of this principle. A more meaningful (albeit currently impractical) result would be to directly measure the wellbeing status of the stock in real time, and to have regulation based on whether the animals are experiencing undue harm in transport.

Practice-based proxies are good bridging measures to ensure progress against goals is not stalled while better indices are developed, however they cannot substitute entirely for outcomes-based measurement.

Practice-based proxies are good bridging measures while indices are developed, but cannot substitute entirely for outcomes-based measurement.

The validity of claimed sustainability outcomes from practice or method-based approaches has come sharply into focus recently, notably via the Australian Competition and Consumer Commission investigation on greenwashing by businesses in Australia²⁰. Criticism of corporate greenwashing is invariably more focused on statements on **implementation of practices** rather than **verified measurement of outcomes**. Reliance on practice-based techniques is understandable given the lack of options for scalable and efficient measurement of desired or claimed outcomes; however, this can risk undermining stakeholder trust in the claims being made.

Commentary about agricultural sustainability often goes straight to **what** practices are undertaken, not **why** they are used and **how** they align with universal values. Values alignment – such as that delivered by the 17 overarching Principles of the AASF – is the first step on the pathway to provide **evidence of outcomes** for those values. The next (more difficult) step is for agricultural industries, with assistance from Government, to further develop robust systems by which evidence of outcomes can be measured, accumulated, and reported. Without that evidence, *practices as proxies for outcomes* must be used for sustainability reporting.

2.4 Materiality

As noted in parallel work streams under the AASF an independent materiality assessment is a critical step in developing a sustainability framework. The KPMG 2023 Report for AASF: *Pilot Program Design* recommended the need for an AASF Materiality Assessment to be completed prior to the commencement of any pilot activities, reflecting feedback from industry, supply chain and finance stakeholders during the pilot co-design consultation process.

¹⁹ <https://www.dfat.gov.au/trade/agreements/not-yet-in-force/aukfta>

²⁰ <https://www.accc.gov.au/system/files/Greenwashing%20by%20businesses%20in%20Australia.pdf>

To date, the AASF has relied on **implicit materiality** by drawing on the Australian agricultural ISFs which have already undertaken extensive commodity-specific materiality assessments. However, to ensure the robustness and relevance of the Principles and Criteria, and to assist in identifying appropriate Indicators in the next stage of work, an explicit, for-purpose materiality assessment of the AASF (based on internationally recognised methodology) is a necessary next step in bringing the Framework to life. Examples of materiality mapping for agricultural sustainability are presented in Figures 16-18.

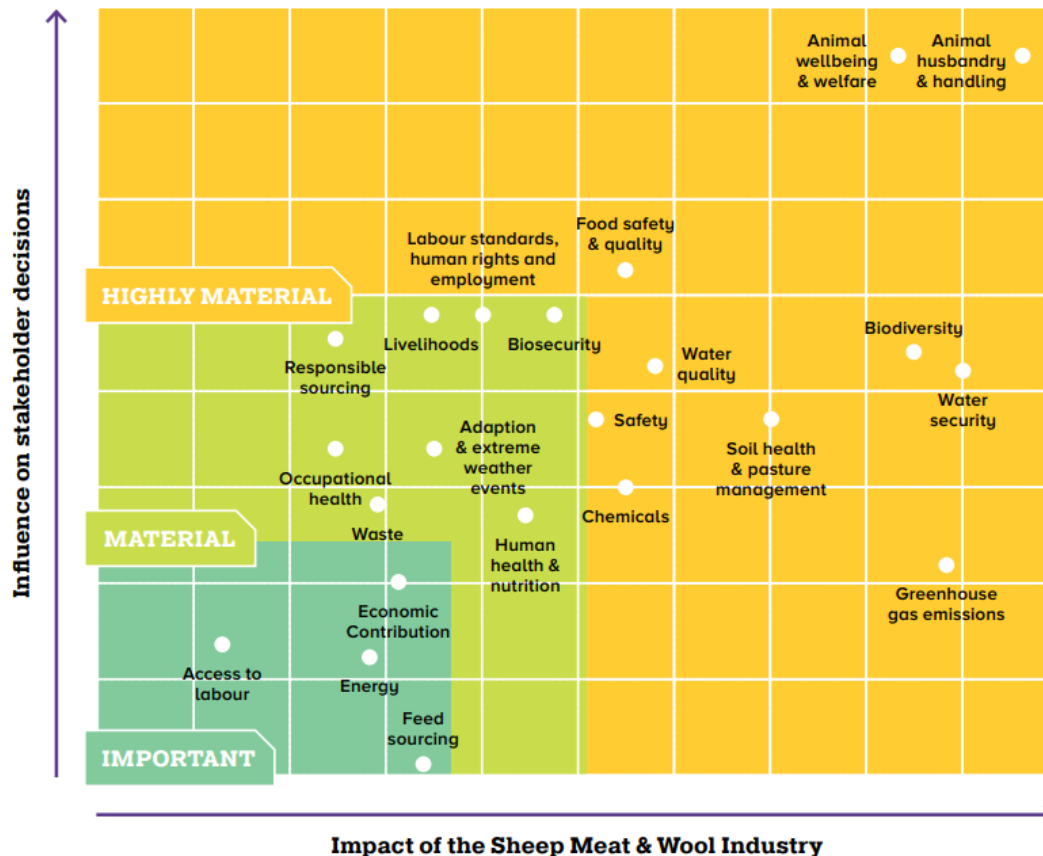


Figure 16: Materiality in the Australian Sheep Sustainability Framework. Source: ASSF

Conducting a materiality assessment on this scale will be no small task: relevant data and information about operations, supply chain, stakeholder expectations, and industry trends must be collated (e.g. by engaging with internal and external stakeholders through surveys, interviews, and workshops to understand their perspectives and concerns). Identified issues must be evaluated based on their potential impact on the Australian agricultural industry's **performance, reputation, and capacity to create long-term value**.

The assessment should take into account both qualitative and quantitative factors, such as regulatory risks, market trends, stakeholder expectations, and operational risks. These issues must then be prioritised, by categorising them into different levels of significance based on their potential impact and urgency. The most material issues would then be integrated into the Framework as key performance indicators, with the potential to inform development of goals and/or targets (see 3.1.1 *Definition of key terms*). Regular monitoring and reporting of the material issues will ensure that the AASF stays accountable and transparent in its sustainability efforts while effectively addressing the concerns of its stakeholders.

As a potential template, the FAO's Sustainability Assessment of Food and Agriculture Systems (SAFA) adopts the International Integrated Reporting Council (IIRC) definition framework which considers the commonality of materiality definitions from various reporting frameworks. This builds on the concept that material matters are those which "are of such relevance and importance that they could substantively influence the assessments of the intended report users" (AICPA, 2013).

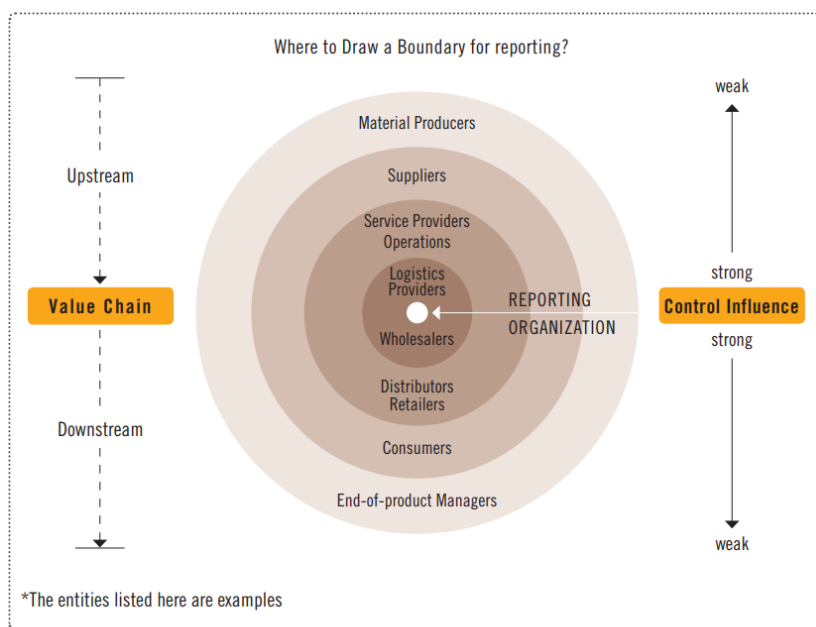


Figure 17: The GRI Boundary Protocol used in SAFA materiality assessment.
Source: SAFA

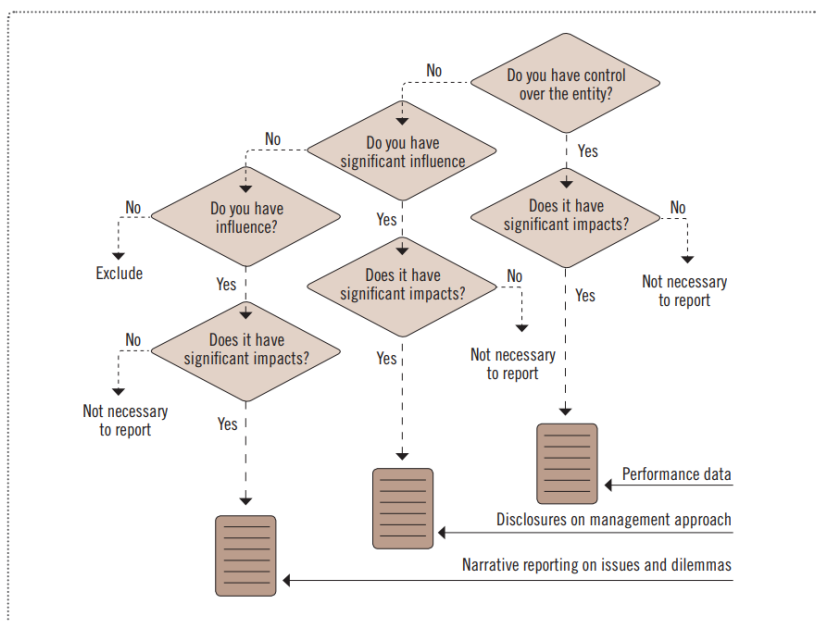


Figure 18: GRI decision tree for boundary setting in materiality assessment.
Source: SAFA

3. A RESPONSIVE FRAMEWORK

The Framework builds on significant work undertaken by the Australian agricultural industry. It reflects the rapidly maturing sustainability schemes already operating domestically and globally, and maps existing industry-level information into a catalogue of overarching sustainability principles for Australian agriculture as a whole.

Global investment in and development of in climate- and nature-related financial disclosure mechanisms highlights the need for the AASF, which can provide a platform for Australian agriculture to proactively communicate stewardship credentials on the international stage.

3.1 Framework development

The current iteration of the Framework identifies **17 overarching principles of sustainability for Australian agriculture** (i.e., ideal states) accounting for environmental stewardship; people, animals and community; and economic resilience. The AASF Principles are underpinned by supporting Criteria (i.e., conditions to be met). The Framework is presented as a continuum (Figure 21) to emphasise that there is no ranking hierarchy to the Principles and Criteria and that all elements of the framework are part of a spectrum – i.e., there are no ‘hard lines’ dividing the closely interrelated sustainability elements of social capital, the economy and the natural environment.

This Framework builds on the significant work undertaken by the Australian agricultural industry in recent years. It reflects the rapidly maturing sustainability schemes already operating domestically and globally, and maps existing industry-level information into a catalogue of overarching sustainability principles and criteria for the entirety of Australian agriculture.

The first version of the Framework (V1) was developed in mid-2021. This was refined in two more iterations of content and structure. Version 3 was published in April 2022, with an update to the visual presentation in October 2022 resulting in Version 4.0²¹. All versions drew on extensive feedback from a diverse Expert Reference Group (see McRobert, Gregg, et al., 2022) with strong global and domestic experience in agricultural and environmental reporting, managers and designers of Australian commodity-focused sustainability frameworks, as well as project team members at NFF, KPMG, Schuster Consulting, CSIRO and other contributing organisations.

As a foundation for the Framework content, a thorough desktop review of related international and domestic initiatives was undertaken. Some of the many frameworks, schemes and programs and systems of principles which have been considered are noted in the downloadable AASF document²². In particular the AASF seeks to strongly reflect the Sustainability Assessment of Food and Agriculture Systems (SAFA), Sustainable Development Goals (SDGs), Global Reporting Initiative (GRI) standards for agriculture, Sustainable Accounting Standards Board (SASB) and the Sustainable Agricultural Initiative (SAI) Platform, as well as leading Australian industry sustainability frameworks.

Through this process, key design choices were made that the Framework would:

- be built on a Principles > Criteria > Indicators scaffold, reflecting global best practice and enabling consistent understanding between the AASF and other initiatives,

²¹ NB: V4.0 was sometimes still referred to as V3 in related project literature as the content was unchanged in the update. To mitigate this confusion the subsequent version presented here is labelled V4.1 rather than V5. The fifth iteration will be developed in future work stages.

²² <https://www.farminstitute.org.au/the-australian-agricultural-sustainability-framework/>

- ensure each Principle described an ideal state to be attained, with a balance of positive or negative framing of intent depending on context (i.e. avoiding or reducing harm where harm is present in the agricultural system; protecting and enhancing that which is beneficial), and
- employ an ESG (Environmental, Social, Governance reporting) themed structure with sustainability framework language to direct heterogeneous stakeholders to material Principles and Criteria, with recognisable categories as indicative navigation tools.

The initial stages of Framework development have focused on producing succinct, cohesive, all-of-agriculture Principles and Criteria, with the intention to draw Indicators from Australian agricultural commodity frameworks, relevant regulations and accepted standards in the next work program. Such Indicators will need to be **aggregated for the industry as a whole** (see *example* in Section 3.4), and **directive to commodity- and/or region-specific indicators** in other initiatives. Metrics to support and report on the Indicators will also be identified in the next stage of work.

3.1.1 Definition of key terms

As the development of bespoke reporting initiatives has flourished, a lack of system-wide consistency means that the language of sustainability is often confused between different agricultural commodities, locations (locally, regionally and globally) and even within connected agrifood supply chains (McRobert, Gregg, et al., 2022). Stakeholder discourse on agricultural sustainability is often stymied by misconceptions of foundational ideas.

Discourse on agricultural sustainability is often stymied by misconceptions.

Misunderstanding, misuse or misalignment of key terms is a barrier to sustainability progress which must be removed. Leveraging the definitions provided in leading initiatives referred to in this report (by SAFA, GRI, SAI et al.), the following table and figures **define the core terms** used in this Framework and throughout this report (Table 5, Figure 19 and Figure 20).

Principles, criteria, indicators, metrics and measures are presented separately to goals, objectives and targets in these definitions, as the former are generally used in a reporting context, while the latter are frequently used in the wider community. We note that many people quite reasonably use goals, objectives and targets interchangeably. The definitions proffered here are intended to bring clarity and consistency to the language used in Australian agricultural sustainability reporting, to avoid and mitigate obstacles arising from unintended misunderstandings between stakeholders.

Table 5: Definitions of key sustainability reporting terms

Term	Definition
<i>Within a framework or reporting context:</i>	
Principles	are fundamental (overarching) <u>statements</u> about a desired outcome.
Criteria	are <u>conditions</u> which need to be met to comply with a principle.
Indicators & Metrics	are <u>measurable states</u> enabling assessment of whether a criterion has been met. are <u>measures of quantitative assessment</u> which provide context via comparative data points. <i>NB: these two terms are often conflated, and <u>can be</u> interchangeable.</i>
Measures	are non-contextual <u>numbers, figures, descriptions etc.</u> – AKA <u>data</u>
<i>In an industry or societal context:</i>	
Goals	are high-level desired <u>outcomes</u> incorporating change (similar to Principles, but with an action).
Objectives	are <u>contributions</u> towards the agreed/desired goals.
Targets	are specific, measurable <u>outputs</u> which support achievement of the objectives.

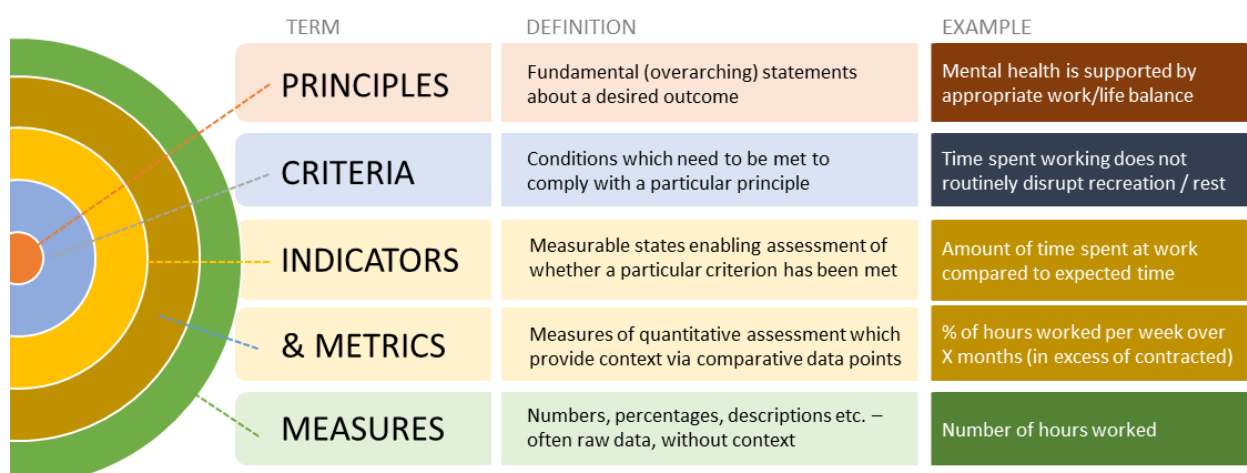


Figure 19: Principles, criteria, indicators, metrics and measures definitions for Frameworks. Source: Authors

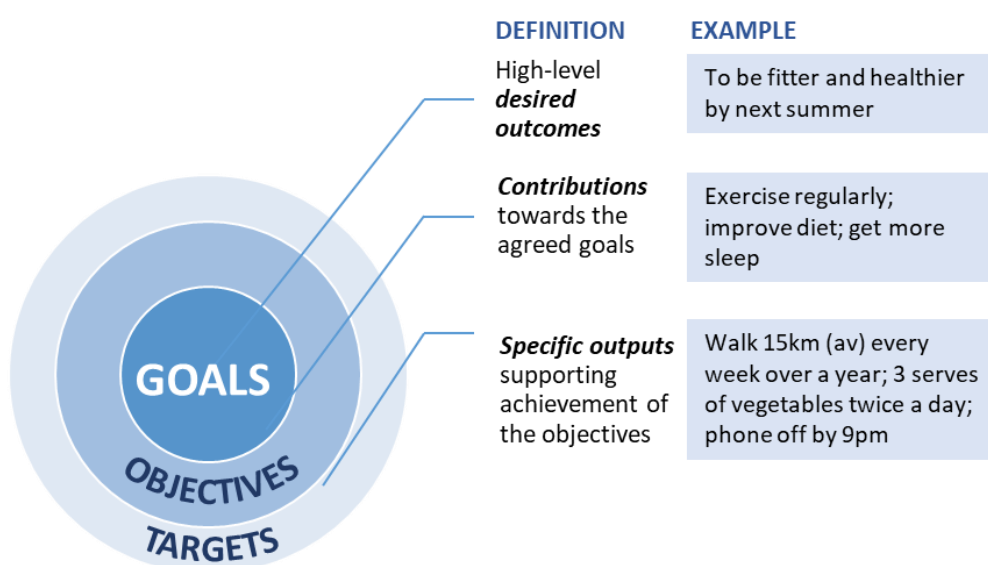


Figure 20: Goals, targets and objectives definitions in societal context. Source: Authors

3.2 Review and revision

3.2.1 CoP feedback

In reviewing the current Framework, the AASF Community of Practice (CoP) was consulted and surveyed to ensure material issues for Australian agricultural industry stakeholders were considered and/or addressed. The survey specifically sought input from CoP members on understanding of the language used in describing Principles and Criteria, identification of missing elements and suggestions for appropriate indicators / metrics.

Key common points raised across the CoP feedback included:

- perceived or expected difficulties in gathering measurable data on Principles and Criteria,
- a general sentiment or preference for the use of positive language in Principles, rather than a mix of positive and negative,
- the need for clarification on ambiguous, subjective or generalised terms such as ‘support’, ‘functioning’, thriving’, ‘good’, ‘adverse’ and ‘beneficial’ etc., and
- a desire for more direct, less bureaucratic language.

Some survey commentary reflected a lack of understanding on the key term definitions – for example, respondents frequently suggested additions to Criteria or Principles which are more

appropriate as indicators or goals, objectives and targets. This has been retained for reference in the next stages of AASF development, and reinforces the need for the definitions presented in Section 3.1.1. It also reflects the need for clearer and more consistent communication of these terms and expectations, not only by the AASF project team but by stakeholders working across the sustainability reporting landscape.

Given the linear nature of the survey format, it was also unsurprising that many responses did not consider the Framework as a whole (sum of its parts), instead critiquing Criteria and even Principles as standalone elements without a clear view of the connections between them. Again, this highlights the need for clearer communication of the Framework's structure and intended application.

The preference expressed for the use of exclusively positive language in Principles highlights a potential issue with overreliance on industry guidance for sustainability reporting. As noted at the start of this section, the choice to use a mix of positive and negative framing was deliberate. While industry stakeholders consistently (and quite reasonably) express a desire to "tell our story" of positive change, external stakeholders expect sustainability reports to explain how an industry or organisation is undoing, reducing or preventing damage. For this reason, contemporary conceptualisations of sustainability performance tend to capture negative impacts (e.g., accidents, emissions), as is evident in 'footprint' approaches aimed at reduction of harm (Kühnen et al., 2022). However, "doing less bad" is no longer the preferred option, as demonstrated by the shift in carbon emissions/sequestration focus from offsetting to insetting. Being mindful of the tensions inherent in this aspect of the ever-changing sustainability reporting landscape, the AASF currently uses both positive and negative framing, noting this may seem inconsistent to some stakeholders. The authors consider this is **appropriate for this stage of Framework maturity**, and recommend review of this choice in future iterations.

Other points raised in the survey which should be considered as the AASF matures (i.e., in future Framework reviews) included:

- Given that bushfire risk will increase with climate change, and Australian farmers manage around half the national estate, specific inclusion of bushfire management and First Nations preventative fire practices could contribute to agricultural sustainability.
- Considering potential inclusion of deforestation as an explicit criteria (noting that this is currently implicit, and expected to be addressed in future work on indicator development).
- Stronger emphasis on use of First Nations science and knowledge in multiple criteria.
- The contribution of agricultural management to the recovery of surface and groundwater quality (again, currently implicit and to be addressed in indicator development).
- Use of pesticides is contentious in jurisdictions outside Australia, particularly Europe. As with deforestation, while chemical use is covered implicitly under current Principles and Criteria, consideration should be given to making this clear and explicit in future work.
- Commitment to good stewardship of all veterinary medicines (and antibiotic use), not just antimicrobials, would better reflect the industry's sustainability intentions (rather than responding to a particular issue).

3.2.2 Landscape / market scan

In April-May 2023, the AFI research team scanned the sustainability landscape and consulted with topic specialists to test the currency of V4.0 content. Of particular interest were:

- International Sustainability Standards Board (ISSB) and International Financial Reporting Standards (IFRS) disclosure standards on general sustainability and on climate (June 2023)
- The EU's forthcoming Corporate Sustainability Reporting Directive, Corporate Sustainability Due Diligence Directive and Deforestation Due Diligence Directive
- The Australian Sustainable Finance Taxonomy project final paper (March 2023)

- The Taskforce on Nature-related Financial Disclosures (TNFD) fourth and final beta framework for nature-related risk management and disclosure (March 2023).

ISSB and IFRS disclosure updates

The ISSB is a private-sector, independent body that approves and develops IFRS Disclosure Standards. Since the last iteration of the AASF, the ISSB released its first set of IFRS sustainability standards, one on general sustainability and one on climate disclosure. The expectation is for corporate reports align to these frameworks by 2025.

- IFRS S1 has been designed to apply globally to corporates in all sectors. It attempts to better unify disclosures on areas such as emissions and waste.²³
- IFRS S2 is more detailed on topics such as climate adaptation and mitigation.²⁴

The finalised IFRS Sustainability Disclosure Standard, which incorporates draft feedback from consultation, is due to be released June 2023. Treasury has been conducting consultation regarding the application of these standards in Australia. The Australian Accounting Standards Board (AASB) will develop a response and provide insights to how much of the standards will be adopted here, who they should apply to and over what time period.

- *Recommendations: The AASB response will inform potential integration of these standards within the AASF - project team to monitor and review before September 2023.*

EU Corporate Sustainability Reporting Directive (CSRD)

The CSRD aims to improve the comparability and quality of corporate ESG disclosures in the EU. Entered into force in early 2023, it substantially increases the number of companies which are now considered in scope for reporting, as well as the level of detail and extend companies must report on. More than 50,000 large and listed companies will now be required to regularly report on the risks they face and the impact they have on the environment and society.²⁵

- *Recommendations: Develop relationship between CSRD and AASF with a view to having AASF accepted as a quasi-standard*

EU Due Diligence Directives on Corporate Sustainability and Deforestation

These two directives focus on sustainability due diligence and combating deforestation within supply chains. They force large companies to conduct their own due diligence to identify, prevent, end or mitigate the actual and potential impacts of their activities on the environment. The Directives cover large EU companies as well as non-EU companies active in the EU with high revenue thresholds. SMEs (small-to-medium enterprises) are not directly bound by the proposed Directives but could be indirectly affected as larger companies look throughout supply chains for risks. These proposals were adopted by the EU Commission in February 2022, and once approved by the Parliament and Council, Member States have two years to transpose into legislation.²⁶ Deforestation is not covered explicitly in the AASF, but is currently implicit within P4 and P5, with plans to be address the issue in indicator development. The lack of explicit direction on deforestation in the AASF could cause a perception problem for European stakeholders.

- *Recommendations: Consider appropriate method of including deforestation in future Framework development (e.g. criteria, indicators etc.)*

²³ www.ifrs.org/content/dam/ifrs/project/general-sustainability-related-disclosures/exposure-draft-ifrs-s1-general-requirements-for-disclosure-of-sustainability-related-financial-information.pdf

²⁴ www.edie.net/issb-to-launch-first-two-sustainability-standards-by-june/

²⁵ finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en

²⁶ commission.europa.eu/business-economy-euro/doing-business-eu/corporate-sustainability-due-diligence_en

Taskforce on Nature-related Financial Disclosures (TNFD)

The TNFD beta framework released in March 2023 provides guidance on assessing and disclosing nature-related risks and opportunities via specific metrics and targets. Understanding and integrating the TNFD's guidance can assist the AASF in aligning with global indicators on biodiversity, soil, water, and climate change impacts.

The TNFD beta release contains draft guidance for four sectors, including Agriculture and Food²⁷. TNFD recommends that organisations in the agriculture and food sector (i.e. agricultural products; meat, poultry and dairy; processed food; food retailers and distributors; and restaurants) should disclose metrics for dependencies and impacts on nature. These impacts could include climate change, change in use of natural (land/freshwater/ocean) resources, pollution / pollution removal, and resource use / replenishment.

The TNFD strongly encourages organisations to include disclosures against all of the **core sector indicators** of relevance to their business model, sector(s), biome(s) and priority locations. If organisations do not report against any of the core sector indicators and metrics, they should provide an explanatory statement as to why not. The next stage of AASF development will involve identifying metrics and indicators for each of the criteria. Ensuring alignment and/or interoperability with the TNFD metrics (as well as other financial reporting disclosures) will be vital. Several indicators and metrics included in the beta framework which will likely be relevant for the next stage of AASF development are highlighted in Table 6.²⁸ The TNFD also encourages the use of scenario analysis to assess the potential impacts of different nature-related risks and opportunities.

Table 6: Examples of indicators and metrics for Agriculture and Food in the TNFD beta framework

Driver of Nature Change	Indicator	Metric
Climate Change	GHG emissions	Scope 1, 2 and 3 GHG emissions
Pollution/pollution removal	Volume of wastewater discharged and concentrations of key pollutants in the wastewater discharged	Volume of water discharged (total, freshwater, other) (cubic metre or equivalent) and concentrations of key pollutants in the wastewater discharged by type, referring to sector-specific guidance on types of pollutants
Pollution/pollution removal	Total amount of hazardous waste generated	Total amount of hazardous waste generated by type, referring to sector-specific guidance on types of waste (tonnes)
Resource use/replenishment	Water withdrawal and consumption from areas of water stress	Total water withdrawal and consumption from areas of water stress (cubic metre or equivalent)

- **Recommendations:** By considering incorporating scenario analysis into its framework, the AASF could guide Australian agriculture in enhancing resilience and preparedness in addressing future challenges and emerging opportunities.

Australian Sustainable Finance Taxonomy paper

The Australian Sustainable Finance Institute (ASFI) Taxonomy Project aims to direct capital into economic activity that meaningfully contributes to sustainability outcomes, guide an orderly and just transition to a sustainable economy, and address greenwashing. A sustainable finance taxonomy is a set of definitions of activities or assets that are considered sustainable, and which can be used to define sustainable investments credibly and transparently. Calls from the finance sector for a “credible framework to help guide the capital allocation to decarbonisation activities in the Australian economy” were the key driver for the ASFI taxonomy project. Development of a

²⁷ <https://framework.tnfd.global/draft-recommended-disclosures/disclosure-metrics-annexes/>

²⁸ The full list of TNFD indicators and metrics for Agriculture and Food is available at the link above.

taxonomy relevant for Australia is critical in maintaining access to global finance. The majority of Australia's exports are destined to countries with net zero pledges in place, and we are a net recipient of direct foreign investment. ASFI has found that development of *a taxonomy which is science-based* will be critical to credibility internationally. However, other jurisdictions have found usability challenges, particularly around data limitations and how criteria are applied to different users. ASFI notes that to enable broad uptake, the taxonomy must be applicable to financial decision makers *in the Australian context*.

The March 2023 summary report (ASFI, 2023) notes key recommendations and considerations for the design of the taxonomy and indicates the roadmap for development. When considering sectors of the economy they believe the taxonomy should apply to, stakeholders ranked agriculture roughly in the middle. Electricity, mining and oil and gas extraction were ranked above agriculture.

- ***Recommendations:** AASF should remain informed and engaged with the ASFI Taxonomy project. There is strong potential for alignment of the AASF and Taxonomy to create opportunities for investment into Australian agriculture.*

Landscape scan summary

The landscape of mandatory financial disclosures and climate impact reporting for corporate entities is a fast-moving and complex space. ESG reporting systems are crucial for the AASF to consider in alignment of intent and outcomes; however, the AASF exists in the wider context of international and domestic sustainability initiatives. Disclosure mechanisms (such as the TNFD) define and measure risk and potential mitigation strategies, whereas the AASF concentrates on aspirational principles which will pre-emptively anticipate and avoid risk.

Global investment and activity in climate- and nature-related financial disclosure mechanisms highlights the need for the AASF. The Framework provides a platform for Australian agriculture to proactively communicate its stewardship credentials on the international stage.

The challenge continues to be balancing the international materiality of sustainability components with their application in an Australian agriculture context.

3.3 Version 4.1

Thanks to the robust process which has supported development of the Framework content and structure to date, the reviewed iteration stood up well to scrutiny.

While maintaining awareness of global sustainability developments (a 'watching brief') must be part of the AASF continuous improvement process, the authors do not *at this stage* recommend any substantial changes to the Framework Principles, Criteria or structure. However, our review combined with stakeholder feedback identified some anomalies and/or inconsistencies in V4.0 which have been revised in V4.1, as noted in Table 7 and presented in Figure 21.

As noted previously the next stage of work should focus not only on further refinement of the Principles and Criteria, but also on developing industry-wide Indicators which reflect Australian agricultural commodity frameworks, regulations and appropriate standards, along with Metrics to support and report on the Indicators.

Table 7: Revisions to the Framework from V4.0 to V4.1

V4.0	V4.1	Rationale
PRINCIPLES		
P1. Net anthropogenic GHG emissions are limited to minimise climate change	P1. Net anthropogenic* GHG emissions are limited to minimise climate change	Addition of clarifying footnote: <i>*‘Anthropogenic’ meaning that which originates from human activity – e.g., emissions from farmed livestock are under human management</i>
P8. Safe agricultural outputs are produced for public consumption	P8. Agricultural outputs are safe and beneficial	Stakeholders noted that ‘for consumption’ sounds specific to food products and does not account for additional well-being attributes (e.g., natural fibres, plants etc.)
P14 (biosecurity) in ‘biosecurity’ category; P15 (lawful conduct) & P16 (resilience) in ‘good governance’ category; P17 (accountability) in ‘fair trading’ category	Reordered as: P14 (biosecurity) & P15 (now <i>resilience</i>) in <i>new category</i> of ‘biosecurity & resilience’; P16 (now lawful conduct) & P17 (accountability) both in ‘fair trading’ category (NB: this also resulted in a renumbering of the associated criteria)	More sensible distribution of principles to appropriate categories. Potential for stakeholders to disagree with removal of biosecurity as a standalone category – however, authors note that categories are merely navigation aids and <i>not material aspects</i> of the Framework: <u>principles</u> are the most important element.
P17. Unconscionable conduct is eliminated from the supply chain via demonstrated transparency and accountability	P17. Supply chain accountability ensures a level playing field and the elimination of unconscionable conduct	The ‘ideal state’ being described was not clear in language of V4.0.
CRITERIA		
C2. Carbon emissions are sequestered throughout lifecycle	C2. Carbon emissions are sequestered wherever possible throughout production lifecycle	Survey respondents noted that the wording of Cs 1-3 could be misread as emissions MUST be sequestered, which is not always practical.
C15. Residues and waste are reused or recycled	C15. Residues, by-products and waste are reused or recycled	Addition of by-products to capture more within ag systems.
C23. A rewarding and enriching work environment is provided	C23. Participants are provided both a living wage and a rewarding, enriching work environment	Addition of ‘living wage’ reflects the need to mitigate the risks of modern slavery and ensure employees are paid fairly.
C30. Indigenous culture is recognised, valued and actively supported	C30. Indigenous culture is recognised, respected, valued and actively supported	Addition of ‘respected’ to emphasise intention of the criteria.
C43. Carbon footprint accounting is harmonised	C43. Sustainability accounting is harmonised to ensure fair and just assessments of baselines and progress across the industry	Placement of criteria (under P17. Unconscionable conduct is eliminated...) didn’t sit right with stakeholders. Harmonisation of C footprint accounting considered to be a goal or indicator rather than criteria.

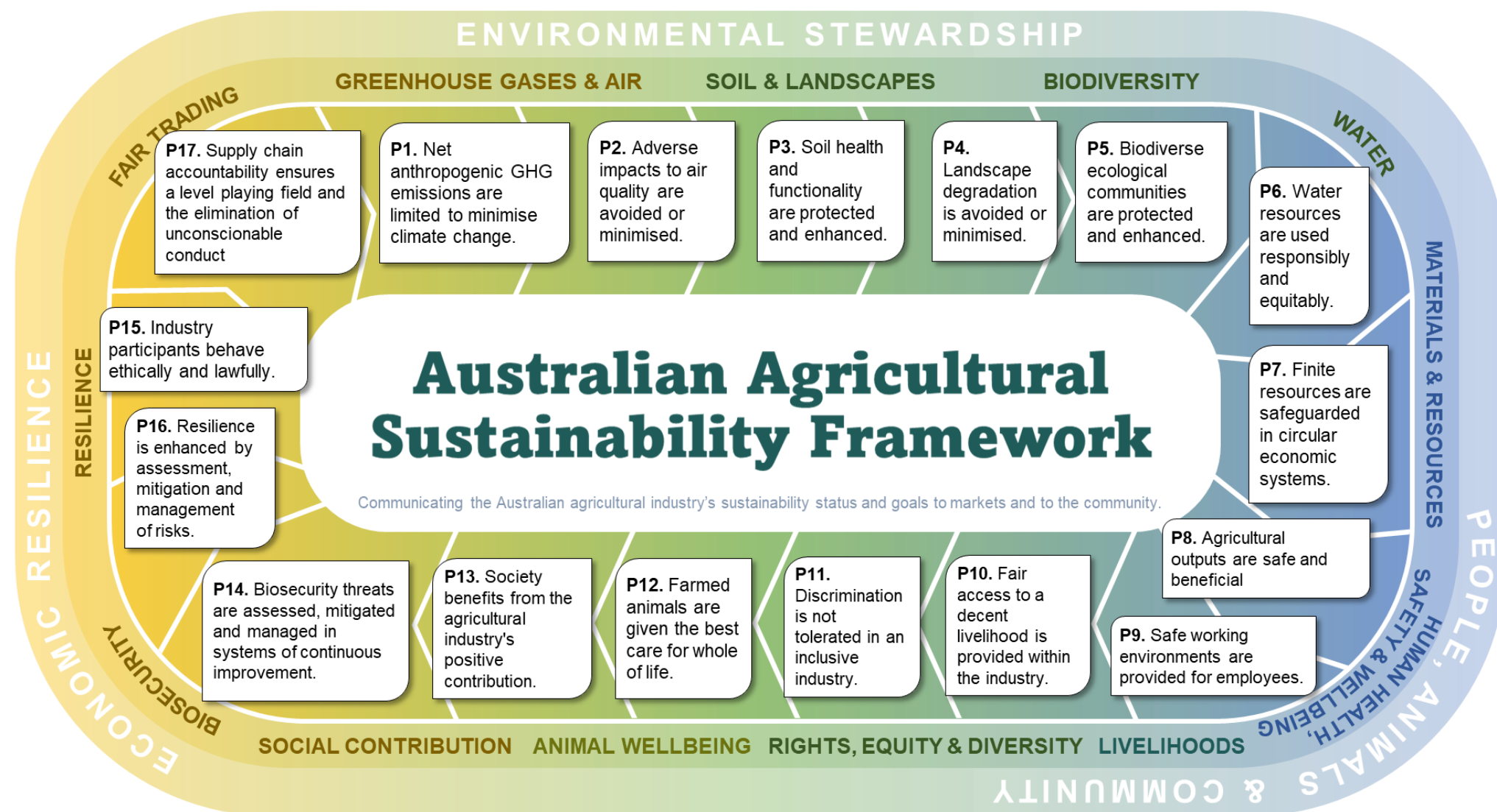


Figure 21: Version 4.1 of the Australian Agricultural Sustainability Framework. Source: Authors

3.4 Use case: an AASF model report

A prototype 'model report' has been produced on one AASF Principle, to demonstrate:

- the potential use of the Framework in communicating a consistent national view of Australian agricultural sustainability,
- the centrality of industry sustainability frameworks in reporting,
- a process for developing AASF Indicators to support the overarching Principles and Criteria,
- a method by which data availability and gaps can be ascertained, and
- the importance of an ongoing Forum to inform these methods and processes.

The Principle and Criteria chosen for the exercise are:

P6: Water resources are used responsibly and equitably

C11: Water is used efficiently in agricultural systems

C12: Adverse impacts to surface water and groundwater quality are prevented.

This Principle was chosen because the majority of Australian domestic ISFs include water as a priority in their initiatives/frameworks, and supporting datasets are available.

Sources were reviewed for applicability to the Principle, and relevant indicators collated to determine commonalities which reflect stakeholder expectations. A list of suggested national indicators is proposed, noting this exercise provides merely a starting point for indicator development, not a comprehensive list of applicable indicators.

While the AASF Principles and Criteria describe desired outcomes rather than practices, national industry-wide Indicators for the AASF will likely describe practices undertaken to meet the intended outcomes.

The example proffered in the model report can serve as a guide for the next stage of work. It should be socialised with the AASF CoP and wider project team for feedback to develop a robust template for a future AASF report. Likewise, as the indicators and data sources are reviewed, the identification of data gaps and need for improvement in certain areas will also evolve.

Evolution of the basic structure provided here will enable creation of a future model to best reflect the expectations of stakeholders in both communicating and reporting on a consistent national view of Australian agricultural sustainability.



AASF (model) report: June 2023

Principle 6: Water resources are used responsibly and equitably

Criteria 11:	Water is used efficiently in agricultural systems
Criteria 12:	Adverse impacts to surface water and groundwater quality are prevented

Indicators	Ability to report (access to data)	Progress (towards ideal state)	Sources
Water use efficiency in irrigated systems	→	↑	Smartcane BMP; Cotton mybmp; Rice Growers Australia
Water use efficiency in raising livestock (cattle, sheep, goats, pork, chicken)	→	↑	Australian Beef Sustainability Framework;
Av. kilolitres of water used per tonne in processing (beef, dairy, sheep)	↑	→	Australian Beef Sustainability Framework; Dairy Sustainability Framework, Sheep Sustainability Framework
Litres of water recycled on farm	↓	⊘	Dairy Sustainability Framework
Litres of groundwater & surface water recovered for the environment in the MDB Plan	↑	⊘	MDBA , Cotton Data Portal
Land Management Targets under the Great Barrier Reef Water Quality Improvement Plan	⊘	⊘	Reef 2050 Water Quality Improvement Plan
More indicators to come – Work in progress (WIP)			

KEY	Ability to report	Progress
↑	Good access to multiple sets of robust data	Moving in positive direction
→	Reasonable access to some sets of reliable data	Neutral / stayed about the same
↓	Limited access to some sets of unverified data	Moving in negative direction
⊘	Not applicable / unable to report	

Next steps:

- Greater clarity on industry work in progress
- Refinement of indicators
- AASF data ecosystem to explore additional datasets



AASF (model) report: June 2023

How are we tracking?

Australian farmers are continually investing in measures to increase their water use efficiency and minimise their impact on water quality in the environment.

While sector-wide indicators are under development, commodity-specific indicators show positive progress towards the AASF Principle:

Overview	Source
18% reduction in water used for raising cattle from 2015 to 2020	ABSF 2023 Annual Update
9.2% increase in water use intensity ²⁹ from 2020 to 2022 due to the low throughput of processing cattle leading to reduced efficiency	
40% of cane producers accredited under Smartcane BMP in 2023, which includes targets for Water Use Efficiency (WUE) – 2% increase from 2021-22	Canegrowers and Smartcane BMP
Australian rice growers have improved their water efficiency by 60% in the past 15 years	RGA Water Use Facts, 2023
Water use productivity by Australian cotton growers improved by 48% between 1992-2018	Australian Cotton Sustainability Report
2.2% reduction in dissolved inorganic nitrogen, 0.6% reduction in sediment, 1% reduction in particulate nitrogen, 0.8% reduction in particulate nitrogen in 2020 in Great Barrier Reef catchments	Reef 2050 Water Quality Improvement Plan

Work in progress

- The *Murray-Darling Basin Community Values* project is developing a set of indicators to be used to help the Australian Government better understand and monitor water-related values, community conditions and wellbeing in Murray-Darling Basin (MDB) communities. The project is being undertaken by the University of Canberra, Marsden Jacobs and Associates and Latrobe University, which forms part of the Murray Darling Basin Authority's [Basin Condition Monitoring Program](#).
- *Land Management Targets* for sugarcane, grazing, grains, horticulture and bananas are currently being reviewed under the [Reef 2050 Water Quality Improvement Plan](#).

What are we missing?

- Water use data on some commodities (e.g. chicken meat, pork)
- Harmonised water datasets across Australian agriculture:
 - Several commodity initiatives reference the data gaps in accessing an industry-wide WUE measurement.
- National indicators for water quality and datasets to measure against:
 - Most domestic frameworks focus on WUE rather than water quality.
- Methods to disaggregate data for a more granular view of industry:
 - How can we use national datasets/indicators which do not segregate industries to report against the AASF? (e.g. MDB water quality and environmental water.)
- Connection of agricultural sustainability principles with environmental/social plans:
 - How can we align with major water basin strategic plans? (e.g. MDB, Lake Eyre Basin, Great Artesian Basin).

²⁹ Kilolitres of water used per tonne HSCW (hot standard carcase weight) when processing beef



AASF (model) report: June 2023

Background detail

NOTE: The following table of indicators collated from domestic frameworks and initiatives *is not a comprehensive list* of applicable indicators. This prototype list provides *a starting point for indicator development* - this example 'scorecard' will continue to evolve with input from the AASF CoP and project team.

Indicators (detail)	Source
<ul style="list-style-type: none"> Calculating Amount of Water to Apply; Calculating How Often To Apply Water; Seasonal Water Allocation Management; Run-Off and Deep Drainage Management; Recycle Pits; Irrigation Water Quality Testing; Using Effluent Water for Irrigation; System Management; Surface Drainage System Design; Subsurface Drainage System Design 	Smartcane BMP (% land under cane accredited) https://smartcane.com.au
<ul style="list-style-type: none"> Water management (irrigation) Water storage and distribution systems Irrigation system design, installation and management Dryland water management (rain grown) Tailwater and Stormwater management (irrigated and dryland growers) 	Cotton myBMP (% land under cotton accredited) mybmp.com.au (Water Module)
<ul style="list-style-type: none"> Water use efficiency in irrigated rice growing 	Rice Growers Australia – Water Use Facts <i>NB: RGA are currently developing a Sustainability Framework - details are not yet available.</i>
<ul style="list-style-type: none"> Litres of water used per kilogram of liveweight for raising cattle 	Australian Beef Sustainability Framework - MLA Project - B.CCH.2109 (2019) ABSF update 2022 web.pdf
<ul style="list-style-type: none"> Kilolitres of water used per tonne HSCW when processing beef 	Australian Beef Sustainability Framework - AMPC - V.MFS.0048 ABSF update 2022 web.pdf
<ul style="list-style-type: none"> Kilolitres of water used per tonne HSCW when processing sheepmeat 	Sheep Sustainability Framework - AMPC; Environmental Performance Review; CSIRO 2022

<ul style="list-style-type: none"> • Water outputs • Treatment and discharge of water • Water quality • Surface water bodies and waterways and ground water • Ability to provide drinking water (compared to reference area) • Ability to provide recreation activities (compared to reference area) • Dissolved solids in water • Chemicals in water 	<p>CSIRO Sable / Handprint (in development)</p> <p>Data not yet available - Work in progress (WIP)</p>
<ul style="list-style-type: none"> • Percentage of farmers recycling water from dairy sheds 	<p>Australian Dairy Sustainability Framework 2020 Report Card - <i>Land Water Carbon Survey 2020</i></p>
<ul style="list-style-type: none"> • Water use and water productivity to utilise 2.0 tonnes of dry matter per ML used 	<p>Australian Dairy Sustainability Framework 2020 Report Card - <i>Data source not identified</i></p>
<ul style="list-style-type: none"> • Megalitre (ML) of water consumed per ML of milk processed 	<p>Australian Dairy Sustainability Framework 2020 Report Card - <i>Dairy Manufacturers Sustainability Council</i></p>
<ul style="list-style-type: none"> • Percentage of farmers monitoring water consumption 	<p>Australian Dairy Sustainability Framework 2020 Report Card - <i>Land Water Carbon Survey 2020</i></p>
<ul style="list-style-type: none"> • Percentage of farmers with a water security risk management plan by 2020 and are implementing it by 2030 	<p>Australian Dairy Sustainability Framework 2020 Report Card – <i>Land Water Carbon Survey 2020</i></p>
<ul style="list-style-type: none"> • Best-practice irrigation scheduling to optimise water use efficiency is adopted by an additional 30 per cent of growers in warm irrigated regions 	<p>Sustainable wine growing Australia</p> <p><i>Data source not identified</i></p>
<ul style="list-style-type: none"> • % producers with a water security risk strategy • % farms with adequate water for cropped area 	<p>Horticulture Sustainability Framework</p> <p><i>Data source not identified</i></p>
<ul style="list-style-type: none"> • Water use efficiency (WUE) 	<p>Behind Australian Grain</p> <p><i>Data not yet identified</i></p>
<ul style="list-style-type: none"> • Monthly updates on threats to water quality in the Murray-Darling Basin 	<p>Murray Darling Basin Authority</p>
<ul style="list-style-type: none"> • National aggregation of data collected by many water organisations. Multiple parameters reported at various time steps including water quality parameters. 	<p>Bureau of Meteorology</p>



4. CONCLUSIONS

Sustainability is not merely a tagline for Australian farmers – it is a mindset which is fundamental to the continuation of economic systems which depend on natural and social capital.

Development of the AASF as a collaborative project from 2020-23 has delivered a well-articulated framework which reflects global expectations and Australian aspirations for a sustainable agricultural industry and has the backing of both industry and government. Engagement with the AASF Community of Practice has helped not only advance the goals of the project, but also the broader agricultural industry by fostering beneficial connections between programs of work and sharing information.

Yet even with this positive progress, neither the Framework nor the Forum can *by themselves* create sustainable, long-term value for the Australian agricultural industry. These elements of the AASF – particularly the principles, criteria and indicators of the Framework – provide the foundational scaffold on which stakeholders can build goals, objectives and targets which drive action towards sustainability outcomes. Action will be driven by the people who have responsibility *for managing the systems and processes the AASF requires for success*. Thus, to create meaningful impact on sustainability goals for the Australian agricultural industry, bringing the AASF to life as a functioning entity is the next step for the project.

Ever-increasing investment and activity in ESG reporting systems, climate- and nature-related financial disclosure mechanisms, and sustainability reporting policy around the world emphasises the urgent need for implementation of the AASF. The Framework and Forum are purpose-designed vehicles for proactively communicating Australian agriculture stewardship credentials on the international stage. Indeed, the AASF could play a pivotal role in shaping global discussions on these topics.

The AASF could play a pivotal role in shaping global sustainability discussions.

While the challenge continues to be balancing the international materiality of sustainability components with their application in an Australian agriculture context, we cannot afford to wait until a perfect system is in place. As highlighted in the KPMG report for AASF on the market landscape for Australian agricultural sustainability in domestic and international markets, “the time is now” (KPMG, 2022) – industries which fail to act urgently are at risk of loss of access to both physical and capital markets.

We must act as soon as possible to launch, operationalise and resource the AASF Framework and Forum, which can evolve and mature in response to the fast-developing landscape of standard-setting, reporting and disclosure.

Given the imperative to avoid not only actual undue influence but also any perception of undue influence by stakeholders (particularly by consumers and investors), the AASF is more likely to succeed if responsibility of management is tasked to an unencumbered entity. Such an entity could impartially represent the interests of the many heterogeneous stakeholders of the AASF and engender trust across the whole value chain, which will be essential to success. However, the entity cannot be relegated to ‘orphan’ status; success requires strong supporters, advocates and/or guardians particularly in the inception phase of maturity.

Key considerations for establishing an entity to implement and manage the AASF include:

- the importance of *establishing a governance structure*,
- the significance of *actively engaging stakeholders* from different sectors and jurisdictions,
- promoting *collaboration and integration*,
- the need for *standardised metrics and assurance mechanisms*,
- recognising the need for *continuous improvement*, and
- exploring models of *joint public and/or industry co-operative resourcing*.

Recommendations

Distributed governance

Given that the sustainability communication landscape involves distributed influence and information pathways, the AASF ideally should function under a *distributed governance structure*. That is, a structure or model which can incorporate the complexity associated with having intermediaries facilitating the communication of sustainability objectives between consumers or investors to producers and vice versa, and *amplify* (not sideline) *the roles of stakeholders*.

Joint public / industry resourcing

While the AASF is neither a *pure* public nor a *pure* private good, it provides outcomes for both. As such, a combined approach to public and/or industry co-operative resourcing is the most appropriate funding model to support the intended activities of the AASF.

Avoid identified pitfalls

While this question of who will 'own' the AASF is still open, guide rails on potential pitfalls the AASF must evade will help to inform this decision. Specifically, the AASF should **avoid**:

- *undue influence* by industry or specific organisations
- becoming a *regulatory arm* of government,
- being a '*paper tiger*' without an authoritative voice,
- becoming an '*orphan*', or
- *overreliance on private investment* (which could manipulate public good outcomes).

Facilitate a sustainability data ecosystem

Creation of a formal agricultural sustainability data-sharing ecosystem with AASF as the intermediary or moderator (utilising the Forum) is an imperative for success, not only for the AASF project but for sustainability efforts across the Australian agricultural industry.

This ecosystem should:

- explicitly adopt data use principles (FAIR, TRUE and CARE),
- assist in identifying appropriate indicator sets to inform AASF Principles and Criteria.

Develop formal relationships with global initiatives

Building relationships with global sustainability reporting initiatives and policy bodies to have AASF accepted as a proxy standard is a vital and urgent need. Prioritising strategic relationships with global initiatives will provide a tangible leadership opportunity for Australian agriculture and ensure the industry's stewardship credentials are proactively communicated on the international stage.

Keep a 'watching brief'

The AASF project team must continue to closely monitor activity in the global sustainability landscape, particularly developments in:

- ISSB and IFRS Sustainability Disclosure Standards,
- The ASFI Taxonomy project and Australian Accounting Standards Board decisions,
- Taskforces on Nature-related and Climate-related Financial Disclosures (TNFD and TCFD),
- EU Due Diligence Directives on Corporate Sustainability and Deforestation,
- EU Corporate Sustainability Reporting Directive (CSRD).

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Appendices

Appendix A: AASF V4.1 Principles, Criteria, themes and categories as a list

AASF Principles (desired outcome or ideal state)

- P1. Net anthropogenic³⁰ GHG emissions are limited to minimise climate change
- P2. Adverse impacts to air quality are avoided or minimised
- P3. Soil health and functionality are protected and enhanced
- P4. Landscape degradation is avoided or minimised
- P5. Biodiverse ecological communities are protected and enhanced
- P6. Water resources are used responsibly and equitably
- P7. Finite resources are safeguarded in circular economic systems
- P8. Agricultural outputs are safe and beneficial
- P9. Safe working environments are provided for employees
- P10. Fair access to a decent livelihood is provided within the industry
- P11. Discrimination is not tolerated in an inclusive industry
- P12. Farmed animals are given the best care for whole of life
- P13. Society benefits from the agricultural industry's positive contribution
- P14. Biosecurity threats are assessed, mitigated and effectively managed in systems of continuous improvement
- P15. Resilience is protected and enhanced by assessment, mitigation and management of risks
- P16. Industry participants behave ethically and lawfully
- P17. Supply chain accountability ensures a level playing field and the elimination of unconscionable conduct

AASF Criteria (conditions to be met to comply with a principle)

- C1. GHG emissions are reduced throughout lifecycle
- C2. Carbon emissions are sequestered wherever possible throughout production lifecycle
- C3. Where necessary (i.e. if C1 & C2 are impractical), GHG emissions are offset throughout lifecycle by purchasing recognised credits or participating in recognised projects
- C4. Plant, equipment and machinery are appropriately maintained and operated to maximise efficiency
- C5. Activities which generate particulate matter are conducted within regulatory guidelines
- C6. Soils are managed to provide ecosystem services, including sustainable agricultural production
- C7. Land under productive agricultural management delivers beneficial environmental services
- C8. Natural waterways are preserved and improved
- C9. Farms support a diverse range of beneficial flora and fauna species
- C10. Farm-related ecosystems are functioning and thriving
- C11. Water is used efficiently in agricultural systems
- C12. Adverse impacts to surface water and groundwater quality are prevented
- C13. The use of inputs and resources that cannot be reused or recycled is minimised
- C14. Renewable sources of inputs are prioritised
- C15. Residues, by-products and waste are reused or recycled
- C16. Food and fibre is produced, packaged and distributed to world-leading standards of safety
- C17. Food produced by the industry is healthy and nutritional
- C18. Producers practice good antimicrobial stewardship
- C19. Occupational health and safety are upheld in the working environment
- C20. Labour rights are respected and compliance with relevant legislation is demonstrated
- C21. Physical health and mental wellbeing are valued and actively supported

³⁰ 'Anthropogenic' meaning that which originates from human activity – e.g., emissions from farmed livestock are under human management

- C22. Profitability and competitiveness are encouraged
- C23. Participants are provided both a living wage and a rewarding, enriching work environment
- C24. Human rights are respected unequivocally
- C25. Workplace diversity is valued and actively supported
- C26. Best practice on-farm husbandry is demonstrated
- C27. Safe transportation of animals is demonstrated
- C28. Humane end of life for farmed animals is ensured
- C29. Industry contributes to local community economic growth and social capital
- C30. Indigenous culture is recognised, respected, valued and actively supported
- C31. Community trust in the industry is upheld
- C32. Farms have systems in place to monitor risk, prevent and mitigate adverse impacts from biosecurity threats
- C33. Industry has systems in place to monitor risk, prevent and mitigate adverse impacts from biosecurity threats
- C34. Government has systems in place to monitor risk, prevent and mitigate adverse impacts from biosecurity threats
- C35. Government and industry develop and extend overarching national scenario planning for industry risks
- C36. Industry participants develop, implement and regularly review risk management plans
- C37. Innovation and infrastructure are well-resourced and supported by government and industry, and can be equitably accessed by industry participants
- C38. Compliance with applicable laws and regulations is demonstrated
- C39. Fair access to participate equally in markets is ensured
- C40. Zero tolerance for bribery or corruption is demonstrated
- C41. Product provenance information is readily available (i.e. traceability)
- C42. Information asymmetry in the supply chain is eliminated where perverse outcomes are a risk
- C43. Sustainability accounting is harmonised to ensure fair and just assessments of baselines and progress across the industry

AASF Themes:

- **Environmental stewardship**
- **People, animals and community**
- **Economic resilience**

AASF Categories:

- Greenhouse gases & air
- Soil & landscapes
- Biodiversity
- Water
- Materials & resources
- Human health, safety & wellbeing
- Livelihoods
- Rights, equity & diversity
- Animal wellbeing
- Social contribution
- Biosecurity & resilience
- Fair trading

Appendix B: CSIRO Review of a sample of publicly available data sets for the AASF

In 2022 CSIRO undertook a project to gain an understanding of the publicly available national data landscape in Australia and the opportunity to use such data to support the Australian Agricultural Sustainability Framework. The conclusions of that report by Lemon, (2022) are summarised here:

This review found that, for the proposed AASF criteria, where data sets to support can be found, their sustainability, useability and accessibility varies. These data sets come in different forms, have different governance arrangements, are collected for different purposes, are managed by different organisations, and have different funding arrangements.

For the purposes of the AASF, the task to collect data to support reporting activities will be complex as it will include the need to:

- Develop and manage data access arrangements with a range of organisations. Data will need to be sourced from many different organisations over significant time periods. These arrangements are needed to ensure continuity of supply.
- Encourage and support the development and enhancement of new and existing data collection activities and programs. This is needed to address both gaps in data availability (where no data exists) as well as improve the sustainability of existing data sets (where data sets exist but are not yet on a sustainable footing).
- Have access to data collection, processing and manipulation capabilities. This may be in-house or outsourced to a third party and is required for repurposing and preparing data sets.

All data sets reviewed are collected for purposes other than AASF. That is, none of them is collected with the primary purpose of supporting sustainability reporting or other sustainability activities.

For these data sets to be of use to the AASF it is likely that they will need to undergo some form of repurposing (transformation); e.g., intersecting spatially explicit, continental data sets with land used for agriculture, or integrating with other data sets to calculate useful indicators.

However, most, if not all the data sets reviewed, are likely to be of interest to others with similar goals to AASF. For example, many of the data sets may be of interest to the many of the agricultural sector level sustainability frameworks operating or in development. That is, the AASF is not on its own with respect to wishing using these data to support sustainability activities and hence there may be an opportunity to work with others to achieve common goals.

To this end, it is recommended that those organisations with a stake holding in data of use for agricultural sustainability activities be brought together into a formal group. These stakeholders would include data providers and users and would work together to:

- determine and agree on data needs
- address gaps in data
- secure funding to support the development and/or maintenance of key data sets
- influence the owners of key data sets to improve availability and interoperability of these
- share services for manipulating and analysing data

The creation of a formal agricultural sustainability data sharing ecosystem would improve the accessibility, useability, and interoperability of data to support agricultural sustainability frameworks and certification schemes. Without this group, individual frameworks and schemes will continue to work in isolation and potentially at cross purposes creating inefficiencies and confusion.

Key steps to creating this ecosystem are:

- Work with key stakeholders to co-design the ecosystem to ensure it is fit for purpose and meets the needs of all stakeholders.
- Implement appropriate governance to support and guide the data sharing ecosystem. This will address: scope of activities, how decisions are made and by whom; funding of activities and functions of the infrastructure supporting the eco system.
- Work across agricultural industry sectors to identify opportunities for harmonisation of sustainability indicators so that data can be collected at a whole of industry scale. This would enable greater use of the data and enable more efficient data capture. A key focus here would be the many industry sector level surveys undertaken.
- Work with key data providers (e.g. ABS, ABARES, the agricultural research, development corporations and, in the future, the private sector) to influence the data they are collecting and how they are reporting it to enhance sustainability reporting at all levels of the industry.
- Develop appropriate standards to support data sharing within and across the ecosystem. These standards need to at least address content (the information being shared) and interfaces (the mechanisms through which the information shared).

There are a range of publicly available data sets which could be used to support the AASF. However, their accessibility, useability and sustainability vary. Working with others in a coordinated fashion provides a path by which the challenges with using these data sets can be addressed and opportunities realised to support the AASF and other agricultural sustainability activities.

Appendix C: Architecture for an AASF ‘data club’

Three architectures necessary for a data-sharing ecosystem: *Technical, Information, and Social*:

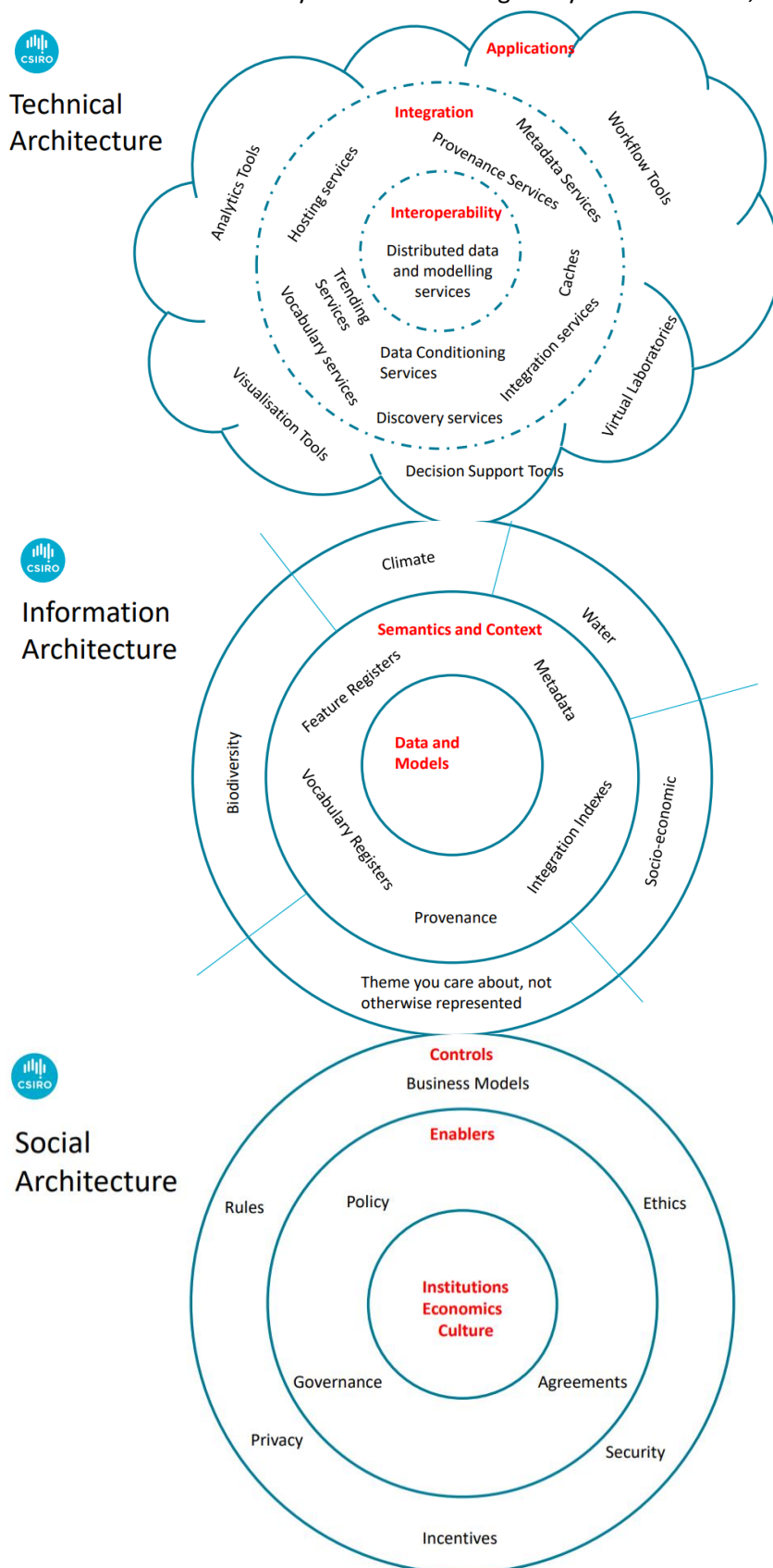


Figure 22: Data club architectures. Source: D Lemon, presentation (2022)