Research Report

Australian Farm Institute

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Recognising on-farm biodiversity management

Australian Farm Biodiversity Certification Scheme Phase 1 Report

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Australian Farm Biodiversity Certification Scheme

Phase 1 REPORT

Australian Farm Institute
New thinking about agriculture

Contents

Executive summary

Deterioration in biodiversity undermines the ecological systems which support all life and form our store of natural capital, and agriculture is more reliant on natural capital than almost any other sector of the economy. As such, biodiversity management is one of the most significant issues that Australian agricultural and environmental policy-makers must address.

In 2019 the Australian Government announced funding for an Australian Farm Biodiversity Certification Scheme to be developed as part of the national Agriculture Stewardship Package, currently in development. The National Farmers' Federation was tasked with development of the Scheme across three phases. The Australian Farm Institute was engaged in March 2020 to conduct Phase 1, namely desktop and consultative research into existing verification or certification schemes, sustainability frameworks and best management practices, both domestically and internationally, and determine their applicability in Australian agricultural systems.

This research project identifies the critical success factors required for consistent, robust and defensible verification of Australian farm biodiversity, and recommends considerations for further investigation and development of a farm biodiversity verification scheme trial.

This project has focused on reviewing best practice management standards and collating extensive feedback from stakeholders with skin in the game to address the value proposition and potential barriers for adoption of a scheme within farming and NRM communities. Altogether, more than 500 individuals contributed their thoughts, opinions and expertise to the project. Information gathered in the desk review and consultation has been analysed to determine key criteria for success of a scheme, which in turn have informed recommendations for further investigation and development of a farm biodiversity certification or verification scheme trial.

Given the breadth of this project's scope, many of the conclusions and recommendations presented here are relevant not only to development of a farm biodiversity scheme, but also to the wider Agricultural Stewardship Package and supporting policy. It is also important to note that biodiversity is one measurable aspect of a highly complex and interconnected system; a factor frequently raised by stakeholders representing a range of diverse interests during the consultation process.

Two pervasive themes evident in this research were the need for a scheme to have a **clear objective** to ensure the value proposition to participants is consistent and clearly communicated, and of establishing robust, well-governed **data frameworks** to measure these objectives.

A clear message from consultations was that considerable effort on verifying farm biodiversity and sustainability is already underway in the industry, which must be recognised or accounted for in any new scheme.

This report recommends that an Australian farm biodiversity scheme should verify new and existing relevant schemes which deliver the desired outcomes against an **overarching framework or meta-standard of biodiversity and sustainability stewardship**, incorporating a level of flexibility to allow for commodity and geographical differences in biodiversity priorities, targets and management strategies, and recognising existing systems already in play.

The scheme must recognise the parallel and additional market benefits that can be realised by farmers delivering multiple sustainability outcomes: for example, biodiversity outcomes could be rewarded by co-stacking benefits via additional or premium payments extended through existing schemes or programs.

Systems intended to incentivise biodiversity improvement cannot succeed without the **solid foundation of data**, to ascertain defensible baseline measurements, evaluate ongoing changes, justly incentivise participants and demonstrate societal value via the improvement of natural capital. The scheme must deliver evidence-based demonstrations of positive social, environmental and economic outcomes within a bespoke, transparent and structured data management framework. Scheme targets must be concordant with global standards to leverage stewardship efforts in the global marketplace and enable progress towards international sustainability reporting obligations.

The concept of certification was not strongly supported by the 500+ stakeholders consulted for this project. While the project authors understand certification as the policy-agnostic official confirmation of certain characteristics, many stakeholders perceive certification differently. Some see it as a blunt instrument requiring extra work which is not always used for positive outcomes. Others are cautious about its value as either a stand-alone process or first step in a complex approach, and were conditionally supportive of certification as part of a more integrated and defined pathway to reward.

Consultation for this project confirmed that the **overall objective** of and the **rewards for participation** in the farm biodiversity certification or verification scheme must be clearly defined to alleviate confusion, and that any 'top-down' and/or regulatory approach is likely to alienate farmers and land managers.

Respondents noted that the impact of a biodiversity scheme will **differ across the Australian farming landscape**, and agreed on the need for a scheme to be **long-term and have bipartisan support** in order to maximise benefits to both the environment and participating farmers or land managers.

Recommendations in brief:

1. An Australian farm biodiversity certification scheme should verify relevant initiatives (new and existing) which deliver the desired outcomes against an **overarching framework or meta-standard of biodiversity and sustainability stewardship.**
2. The scheme must deliver **evidence-based demonstrations** of positive social, environmental and economic outcomes within a bespoke, transparent and structured data management framework, founded on good governance with clear metrics as the outcome.
3. The scheme must be **concordant with global standards** to leverage stewardship efforts in the global marketplace and enable progress towards international sustainability targets.
4. As confusion still exists regarding the scheme's intention, the **primary objective** and the rewards for participation must be clearly defined by the scheme's designers.
5. Local and industry knowledge, experience and expertise embedded in existing programs must be recognised and integrated into the scheme, to avoid alienating farmers and land managers via a 'top-down' and/or regulatory approach.
6. A Government-facilitated scheme must **complement (and not disrupt) rapidly emerging commercial opportunities** to be rewarded for agricultural stewardship.
7. The scheme must recognise **parallel and additional market benefits** that can be realised by farmers delivering multiple sustainability outcomes.

Glossary of key terms

This project provides a high-level view of **critical success factors** required for the development of an Australian Farm Biodiversity Scheme. During the consultation for this project it was evident that many key terms are used interchangeably by stakeholders, conflating similar but separate concepts and somewhat confusing the discourse. Adding to this confusion, the project methodology (as noted in Section 1.4) requires the research to consider "sustainability/biodiversity outcomes" in the context of "certification/verification schemes". In both cases one term is specific and the other more generic, but the overlaps are obvious and some degree of conflation is inevitable.

The following glossary covers some terms which the reader may feel to be self-evident; however, the authors wish to establish an unambiguous understanding of how these terms are presented in the context of this report.

While the literature review summary (Section 2.4) and conclusion (Section 4) use these terms as defined below, it should be noted that the literature review preliminary sections (2.1-2.3) and consultation reporting (Section 3) faithfully present summations of the work and opinions of others, and therefore may not always strictly adhere to the same definitions.

Accreditation

Accreditation is a specific organisation's process of certification, i.e. the act of granting credit or recognition for a particular status or activity. According to the International Organization for Standardisation (ISO), accreditation is the formal recognition by an independent body (generally known as an accreditation body) that a certification body operates according to international standards. Certification is thus a result of the accreditation process.

Additionality

The concept of an activity 'being additional', particularly in determining whether an action or intervention has an effect when compared to a baseline. In the context of sustainability or biodiversity management, this describes the extent to which a new action or item (e.g. practice change, tree planting, wetland management etc.) adds to, not replaces, the existing inputs and results in a greater aggregate; i.e. the improvements provide new contributions to biodiversity conservation over and above the existing levels.

Best management practice (BMP)

Agricultural best management practices (BMPs) are actions taken by agricultural producers to improve their long-term productivity, profitability and sustainability. While 'management practice' is a generic term, BMP is understood to refer to specific programs (usually industry-led) which enable producers to benchmark their practices against industry standards, identify opportunities to improve their business performance and demonstrate good stewardship of resources (animals, land, water) to consumers.

Biodiversity

Biodiversity refers to *biological diversity*, the variety of living things found in a particular place which may be defined in size from micro (an acre on one farm) to macro (the variety of creatures present in a country or on the whole planet); i.e. the variety of different plants, animals and micro-organisms and the ecosystems of which they are a part. Species richness (the count of species in a given area) is the most commonly understood measure of biodiversity, for example numbers of birds/species per hectare; however the term also encompasses genetic variety within species and the variety of and within ecosystems created by species.

Certification

Certification is the formal attestation or confirmation of certain characteristics via the provision of an official document to someone (a person) or something (an organisation). This confirmation is often supported by an external review, assessment or audit. Accreditation is an action of the certification process.

Meta-standard

Originally meaning "beyond", in current vernacular 'meta' refers to that concerning or providing information about members of its own category (e.g. meta-data is data about data). In this context, a meta-standard refers to an overarching standard which informs other related standards, specifically in the field of agricultural biodiversity and sustainability.

Social licence

Social licence refers to the perceptions of stakeholders that an organisation is operating in a way which is considered acceptable or legitimate by a 'reasonable person' in the community. In the Australian agricultural industry this is sometimes misrepresented as pandering to special interest groups. While these groups often attempt to influence social licence via concerted campaigning, it must be recognised that social licence is an innate and intangible asset for all businesses; one which should be protected by proactively addressing the emerging concerns of the community in which the business operates (for example, regarding biodiversity and sustainability in agricultural systems).

Sustainability

The obvious definition of sustainability is *the ability to be sustained*, i.e. maintained or supported into the foreseeable future. The common understanding now prevalent (derived from the Brundtland Report of 1987) is the ability to meet the needs of the present without compromising the ability of future generations to meet their needs. Sustainability is comprised of three pillars: ecological, human, and economic health or vitality (sometimes referred to as planet, people, profit). Sustainability presumes that resources are finite, and should be used wisely with a view to long-term consequences and priorities.

Verification

More general than certification, verification refers to *a process which delivers evidence* that establishes or confirms the accuracy, validity or truth of something (e.g. a claim or practice).

1. Introduction

1.1 State of the environment

Biodiversity loss is one of the most significant ecological issues Australian policy-makers must address (Torabi et al., 2016). Deterioration in the stocks or condition of biodiversity has serious implications not only for economies but also for the ecological systems which support all life and form our store of natural capital.

Agriculture is arguably more reliant on natural capital than almost any other sector of the economy (McRobert, Admassu, et al., 2019) and biodiversity is a significant marker of natural capital health within inextricably linked ecosystems (Figure 1). With natural capital under increasing pressure from climate change and competing resource use, preserving and improving biodiversity in Australian agroecological systems has never been more important (Cresswell & Murphy, 2017).

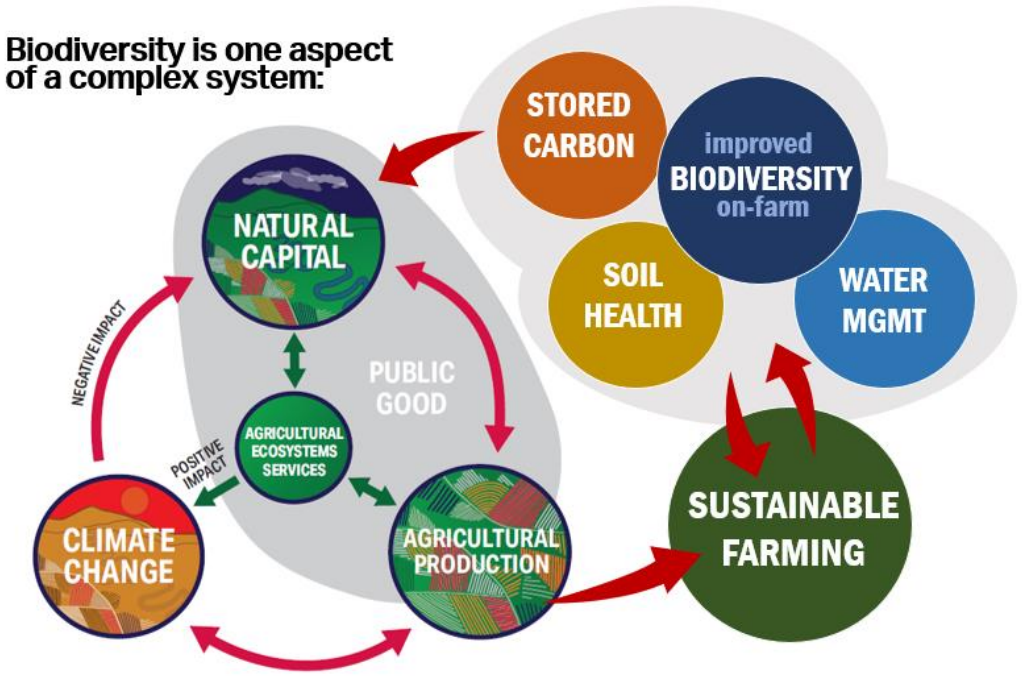

Figure 1: Biodiversity is part of a complex and interconnected system

While the Environmental Performance Index (EPI) ranks Australia 25 out of 180 countries for biodiversity and habitat management, our ecosystem services ranking is much lower at 120. (EPI, 2020), and the Food Sustainability Index has ranked Australia equal 32nd with Nigeria for environmental biodiversity out of 67 countries (The Economist Intelligence Unit, 2018).

Biodiversity is degraded by an array of factors including invasive pests (flora and fauna), pollution and catastrophic events. For example, recent natural disasters, including severe drought, extensive flooding and the megashock of the 'Black Summer' bushfires of 2019-20, have had dramatic impacts on Australian biodiversity. However, with land clearing and habitat fragmentation exerting some of the most intense impacts on biodiversity outside these disasters (Cresswell & Murphy, 2017; Neldner, 2018), Australian farms undoubtedly have an important role to play in protecting biodiverse ecosystems.

Clear opportunities exist to improve environmental stewardship in agriculture, for example through diversification and land management practices (Barrios et al., 2018; Whitehorn et al., 2019). The

challenge for the Australian agriculture sector is to improve biodiversity and other sustainability outcomes, while remaining profitable and increasing productivity to meet growing demand.

1.2 Agricultural stewardship

While farmers provide benefits of environmental stewardship to the wider community, the current model is reliant on significant contributions of time and money by farmers and land managers (Martin, 2018). Upholding the public good of caring for natural assets is growing more difficult and more costly as weather extremes amplified by climate change impact not only the health and integrity of the natural environment but also farm incomes (McRobert et al., 2019). Variability in farm income directly related to climate change impacts will increasingly compromise the capacity for farmers to utilise equity for environmental projects.

The proposed Australian Farm Biodiversity Certification Scheme aims to support these stewardship activities by providing incentives for biodiversity management in agricultural businesses, thus enabling the continued provision of natural capital benefits to the economy and society.

This scheme is being developed in a macro environment of political attention focused on the need for alternative sources of drought-proof income for farmers, increasing societal pressure for environmental stewardship and rapidly emerging opportunities for businesses to capture financial benefits from sustainability activities. The authors recognise that many other interests are pursuing similar goals and objectives to the farm biodiversity scheme, and welcome the collaborative efforts providing impetus for protection of our natural capital.

The Australian Government's four-year, $34 million Agriculture Stewardship Package aims to address this vulnerability by developing an Agriculture Biodiversity Policy (identifying alignment between the public and farm sector on biodiversity best practice), an Agriculture Biodiversity Stewardship Pilot Program (to incentivise the adoption of improved biodiversity practices in small and medium farm businesses) and a Farm Biodiversity Certification Scheme, to "showcase best practice biodiversity management and ensure these actions are recognisable by the community" (DAWE, 2020). At the end of 2019, a $4 million grant agreement was signed with the National Farmers' Federation (NFF) to lead work on the development of the certification scheme, which includes this discovery phase project.

In April this year, more than 70 Australian farming, conservation and land management organisations wrote to the Prime Minister and all state Premiers proposing a $4 billion combined economic stimulus package for the conservation and land management sector. While this proposal is intended not as a substitute for a longer-term package of ecosystem protection (i.e. to support post-bushfire environmental recovery, protect threatened species and increase natural capital on farms and landscapes) but as a stimulus response to the COVID-19 crisis, the extensive list of signatories demonstrates the strength of industry and social support for urgent, transformative action on biodiversity in Australia.

In addition, the recent *Independent review of interactions between the EPBC Act*[1] *and the agriculture sector* has recommended that an initial allocation of $1 billion over four years be provided to establish a National Biodiversity Conservation Trust fund, to support protection of matters of national environmental significance through the adoption of a market-based approach that incentivises farmers (and others) to protect and actively manage matters of national environmental significance outside of legislated requirements (Aither, 2018).

[1] Environment Protection and Biodiversity Conservation Act 1999

1.3 Natural capital on the balance sheet

The recognition of natural capital as an asset that underpins the agricultural economy is growing rapidly. Many livelihoods, such as those of farmers, fishers and timber workers, are dependent on biodiversity (Cresswell & Murphy, 2017).

While the need to preserve the natural resource base that agriculture relies on has always been understood, financial institutions are now moving to a more direct valuation of natural capital as a balance sheet item to reflect the link between healthy natural capital and financial resilience of farm businesses. A healthy economy depends on a healthy environment, and finance and industry are moving quickly towards sustainable investment goals (KPMG, 2019).

Australia has a strong reputation as a producer of clean, green food and fibre (Austrade, 2017). However, reputation alone is not enough to maintain position – or indeed social licence – in a global market which is increasingly requiring proof of performance against evolving sustainability demands.

Future business, trade and expansion opportunities rely on not only consensus of what constitutes sustainable agriculture but also demonstrable credibility in meeting international standards (Williams et al., 2019). While food and fibre production is a public good, agriculture in Australia is an industry and changes made to farming systems must be supported within the business model of the sector (Admassu et al., 2019). Immediate opportunities in a market for ecosystem services which incentivises farmers have been identified, but lack of a tradeable metric within the market is still a barrier (KPMG, 2019).

1.4 Scope of this project

In 2019 the Australian Government announced funding for an Australian Farm Biodiversity Certification Scheme to be developed as part of the $34 million national Agriculture Stewardship Package, which is also currently in development[2]. The NFF was tasked to lead work on the development of the Scheme in three phases:

- research on existing certification/verification schemes, sustainability frameworks and best management practices internationally and domestically, and identification of critical success factors (Phase 1);
- the development of a certification/verification scheme (Phase 2);
- undertaking necessary trials and assessment of the readiness of farmers to participate (Phase 3) (DAWE, 2020).

AFI was engaged in March 2020 to conduct Phase 1, namely desktop and consultative research into existing **verification or certification schemes, sustainability frameworks and best management practices**, both domestically and internationally, and determine their applicability in Australian agricultural systems.

The stated aim of the Australian Farm Biodiversity Certification Scheme is to reward farmers for managing biodiversity on farm through market-based mechanisms and thus enable the continued provision of natural capital benefits to the wider community. The purpose of this Phase 1 project is to provide an overview of existing literature and Australian stakeholder feedback on the critical

[2] DAWE'S strategy is to first develop a farm biodiversity certification scheme, then an agricultural stewardship program, followed by the establishment of an Agriculture Biodiversity Policy concurrent with Natural Capital frameworks and strategies.

success factors which could underpin the practical development and trial of biodiversity market mechanisms to be developed in Phases 2 and 3.

The following describes the project's objectives, methodology and deliverables as set out in the Terms of Reference. It is important to note that (in line with DAWE's grant agreement with the NFF) the project terms do not limit the primary objective to certification and include a broad remit to investigate farm biodiversity management and sustainability outcomes. As such, this project's findings not only map out critical success factors required for defensible verification of Australian farm biodiversity but also can be applied to subsequent stages of the agricultural stewardship package development, or other related systems and program designs.

Project Terms of Reference

Primary objective

To identify the critical success factors required for an Australian Farm Biodiversity Scheme and recommend a strategic plan for further investigation and development of a trial for said scheme.

Methodology

1. Desk review

A review of literature describing farm biodiversity schemes will be performed to deliver a catalogue of biodiversity conservation certification schemes for further analysis and consolidation in relation to applicability to Australian agricultural systems.

The project will review domestic and international certification/verification schemes to determine their potential applicability in Australian agricultural systems based on:

- Capacity to **allow farmers to showcase best practice management** of natural resources and gain recognition from the community and other farmers for farming practices that improve sustainability/biodiversity outcomes on farm and regionally.
- Capacity **to recognise a range of agricultural commodities produced using sustainable farm practices that deliver a range of sustainability/biodiversity outcomes** on (e.g. increased species richness) and off farms (e.g. by providing habitat corridors).
- **Interaction with current farming systems** and how these issues may relate to the Scheme and biodiversity impacts.
- Understanding opportunities in farming systems which may relate to **enhancing sustainability and biodiversity outcomes**.
- On-farm biosecurity (management of plant and animal pests) and how this may relate to the Scheme and agricultural productivity, profitability and sustainability.[3]

The desk review will include (but not be limited to):

- Project reports on research into agricultural biodiversity conservation schemes
- Descriptions of commercial farm biodiversity conservation schemes and performance indicators
- Federal, regional and local level biodiversity conservation data

This review will inform interview guides which will be used to collect feedback (through key informant interviews, stakeholder meetings and focus group discussions) to cross-reference the

[3] NB: this final point in the methodology was requested in the initial request for services, but discarded when it became evident in the reviewed literature and via consultation that it held little relevance for this project.

catalogue of schemes resulting from the literature review with existing best practice and schemes in Australia. This feedback will inform the categorisation and prioritisation of biodiversity schemes for further investigation and development of the most suitable options to be applied in the Australian context.

2. Stakeholder engagement

Key informants and stakeholders across the country will be consulted at length to identify critical success factors that will be required for implementation of biodiversity schemes in Australia. The interviews, discussions and forums will take place in two stages across three primary tasks.

Stage 1:

After the initial desk review of international and domestic biodiversity schemes, the resulting catalogue of schemes will be presented to stakeholders for feedback via open group forums, targeted stakeholder meetings and key informant interviews. The feedback will be directed towards determining desirable and non-desirable elements of the schemes contained within the catalogue in relation to their applicability to Australian agriculture. Given the range of industries and environmental conditions within Australian agriculture these consultations will need to be broad and inclusive to ensure that the majority of use cases and the intersections with other biodiversity actors are captured.

The feedback gathered from Stage 1 of the engagement will be used to inform an extended, detailed analysis of the catalogue of schemes produced through the desk review. This analysis will identify and recommend schemes or parts of schemes that appear to be suitable to Australian application or aligned with existing schemes being implemented in Australian agriculture.

Stage 2:

Following further analysis informed by Stage 1 outcomes, commentary and recommendations for a range of options for biodiversity schemes will be canvassed with primary stakeholders (i.e. the Project Steering Committee and invited guests). The purpose of this consultation will be to confirm conclusions on critical success factors that will underpin the development of further phases of the Australian Farm Biodiversity Scheme Trial.

3. Analysis and synthesis

Information gathered in Stages 1 and 2 will vary from structured and rigorous to unstructured and anecdotal. The synthesis of this information will need to be sensitively conducted and clearly presented in order to accurately inform the required analysis. There are multiple contexts to the need for biodiversity to be enhanced on Australian farms. These include:

- Protecting the sustainability of landscapes so that ecological collapse is avoided
- Providing the ability for ongoing demonstration of the environmental credentials of Australian agricultural production
- Retaining community trust to operate
- Meeting requirements for market access and trade.

These contexts potentially have different emphases in terms of outcomes and mechanisms to deliver those outcomes. The importance of farm production and profitability would also be weighted differently depending on the prism through which the need for farm biodiversity is viewed.

The recommendations resulting from the analysis and synthesis stage of this project will aim to deliver a path forward for implementation of a **Farm Biodiversity Pilot Scheme** which delivers a practical, profitable and productive future for Australian farmers, while recognising the array of potential approaches to improving farm biodiversity. It is vital that recommendations for a pilot scheme:

- Meet international standards
- Align with trade and market access indicators
- Align with known best practice in Australian production
- Are practical and deliverable.

It will also be vital that any proposal considers the jurisdictional dynamics inherent in this topic, as landholders are more directly impacted by the States than the Commonwealth. Existing compatible offerings (e.g. sustainable agriculture, land care and NRM initiatives) and State regulatory context will strongly influence landholder appetite for investment in the next phases of a proposed Scheme.

This stage of the project will involve both AFI internal capacity and an external specialist in environment and agricultural management and ecosystem services. The resulting analysis will be reviewed by the AFI Research Advisory Council to ensure the conclusions are sound.

Project deliverables

This project will deliver a written report outlining the findings of the systematic research of domestic and international best practices and consultative research. The report will act as a benchmark and roadmap for the implementation of Phase 2 and 3 of the trial, and will include but not be limited to the following elements:

- A stocktake of the existing Australian agriculture sector BMPs/sustainability frameworks (*Appendix, Catalogue of Schemes*);
- A high-level international search for comparative schemes (*Section 2*);
- Assessment of the areas of commonality across schemes (*Section 2*); ;
- Analysis of international and domestic standards and schemes in the context of those most likely to inform trade and market access requirements (*Sections 2 and 3*);
- The findings of consultations with the Steering Committee and industry stakeholders to benchmark preliminary findings (*Section 3*); and
- Program implementation options for later stages of the trial (*Section 4*).

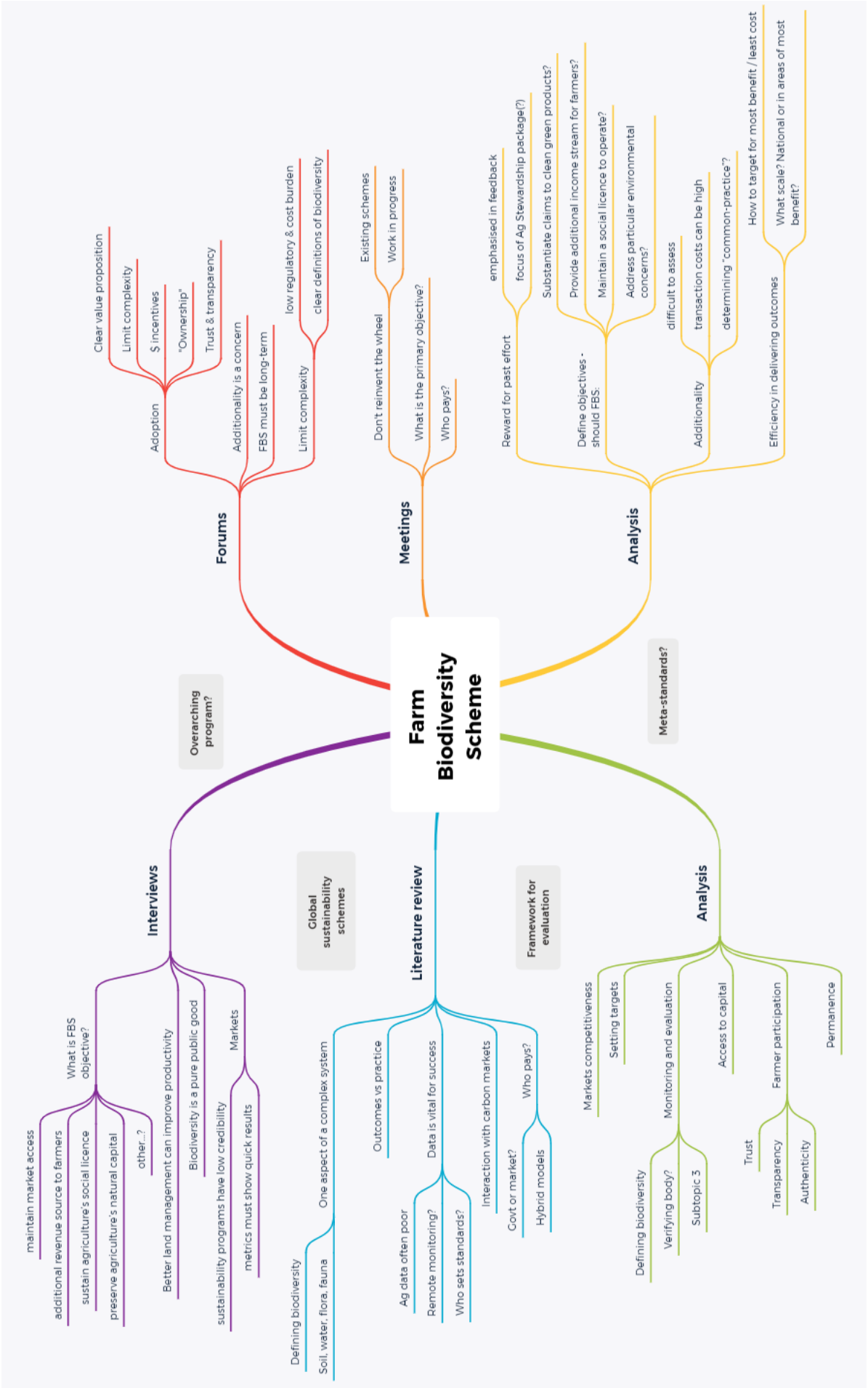

Figure 2: Map of emerging project topics and considerations

2. Literature review

2.1 Literature overview

This section provides a brief view of some of the particularly relevant literature utilised in deriving recommendations for project rather than providing an exhaustive list of all literature consulted.

Mori Junior et al., (2016), undertook a global review of literature to identify key components impacting the effectiveness of sustainability certification schemes. In order to achieve success, the authors found that schemes need to manage the expectations of stakeholders', be effective and deliver accountability surrounding their goals and achievements. They also note the following as key components which impact the effectiveness of schemes:

- **Sustainability awareness -** Schemes can lead to an increase in awareness of natural resource management with consumers, business representatives and the wider public. Schemes and the promotion of credentials can also allow consumers to consider environmental performance characteristics when making their purchasing decisions.
- **Market access -** The authors noted a scheme can create new market opportunities for certified products, however, can lead to accessibility challenges for smaller producers and barriers to trade and uncompetitive products in developing countries.
- **Management systems & productivity -** Adoption of a scheme can improve the productivity of managers and/or employees through increased awareness of management systems.
- **Social, environmental & economic impacts -** Literature notes there are positive correlations between implementation of schemes and beneficial impacts. However, there have been criticisms that schemes don't effectively address all important environment, economic and social areas.
- **Monitoring outcomes -** Schemes need to have a monitoring mechanism in place to measure accomplishments and direct improvements in the future and deliver accountability to stakeholders.
- **Competition, overlapping & interoperability -** Although there are some benefits to competition, overlapping and duplication of schemes can increase costs of compliance, create confusion for participants and contribute to greenwashing. Schemes should not replace regulation but rather align or compliment it.
- **Stakeholder participation -** To achieve success, it is essential for stakeholders to participate and cooperate in the development, monitoring and reviewing stages of a scheme.
- **Accountability & transparency -** Trust levels in a scheme can be poorly impacted when violation or non-compliance within the standards does not result in consequences. Schemes should have measures in place to ensure negative actions of participants does not poorly reflect on the trustworthiness of the whole scheme.

These eight key components were identified by the authors as affecting the effectiveness of sustainability certification schemes. Their findings also note a scheme should allow for improvement opportunities and flexibility in its design.

Gavin & Healy, (2015) undertook a review of Australian certification schemes for NRM Regions Australia. They identified and classified 18 schemes based on the following categories: catchment-based, sector-based EMS, Australian government initiatives and corporate initiatives. When the

study was conducted in 2015, they noted there was largely an absence of market signals to foster participation in schemes but that other benefits of participation in a scheme could be overlooked by focusing solely on market advantages, such as resilience and improved condition of resources. Identifying the total costs to participate in schemes was highlighted as a difficulty, as time and resources of landholders often aren't included in the advertised price.

A report on natural capital by KPMG (2019) investigated enabling the sustainable finance and ecosystem services market in Australian agriculture. It notes that there are immediate opportunities in accelerating development of a market for ecosystem services which incentivises farmers and has clearly defined values. However, a key barrier to this is the definition of a tradeable metric within the market. Some of the key recommendations made by the authors were for the valuation methodology of natural capital to become mainstreamed and for further research into agtech's role in evaluating and measuring improvements in biodiversity and the environment.

A comprehensive global literature review was undertaken by Tröster & Hiete, (2018). A framework was derived from a review of 226 records, to depict generic success factors for schemes. Participation and adoption characteristics as well as the influence of the quality of requirements were widely discussed in the reviewed literature. Another main focus of the analysis was the transparency of scheme and the involvement of stakeholders leading to success and acceptance of a scheme. The authors note there may also be an opportunity to involve behavioural science disciplines in the development of a scheme to better understand farmers' motivations for practice change.

Ansell, et al., (2016) provide learnings from agri-environment schemes in Australia in their book with input from a range of authors across multiple disciplines with an interest in agriculture and biodiversity conservation. Varying perspectives and challenges of running and designing effective schemes are presented in each of the chapters. One of which, authored by David Pannell, provides a checklist of key elements of good design of an agri-environmental scheme. This list summarises some of the key focus areas for the development of a successful scheme. Although this checklist is more applicable to government-funded programs, there are key areas which are highly applicable to market-based mechanisms schemes as well.

1. **Designing programs**
    a. Would farmers have adopted the desired practices even without the program?
    b. Will farmers continue their adoption of the new practices once program support ends?
    c. Are the institutions that are responsible for program delivery incentivised to pursue outcomes?
    d. Is the typical project size large enough without being too large?
    e. Is there adequate time for planning?
    f. Will the practices being promoted require ongoing funding that the program is unable to provide?
2. **Designing projects**
    a. Does it have appropriate targets?
    b. Are the project activities sufficient to achieve its targets?
    c. Does it use the right policy tool?
3. **Ranking projects**
    a. Are actions (projects, not problems, issues or regions) being ranked?
    b. Is ranking based on value for money?
    c. Are benefits being measured against a counterfactual?

    d. Are all relevant benefits and risks being factored in?
    e. Is a robust metric being used for the ranking?
4. **Managing uncertainty**
    a. Have the key uncertainties been identified?
    b. Have feasibility assessments been done?
    c. Can we learn from the early stages of implementation?
5. **Managing people's interests**
    a. Has independent expert review been undertaken to balance overoptimistic expectations?
    b. Have efforts been made to deal with self-blindness?
    c. Have arguments for equity undermined the effectiveness of the program?
6. **Managing transaction costs**
    a. Does the program support projects which are too small to justify the transaction costs needed to deliver and demonstrate benefits?
    b. Does project selection start broad and finish deep?

Another chapter in the book authored by Whitten and Coggan discusses transaction costs in agri-environment schemes, noting they can impact the efficiency and total costs of a scheme for all participants. The direct expenses involved in participating in a scheme as well as the cost of effort and time are all classified as transaction costs. The authors note that although it is important that transaction costs are considered in scheme design and implementation, aiming to minimising them may not be the answer to maximising scheme success. Increased costs may be needed to ensure efficient program design and increased confidence in delivering the anticipated outcomes of a scheme.

Neldner, (2018), provides commentary on the impacts of land use change on biodiversity in Australia. He discusses how land use classification and categorisation, such as extensive and intensive use, can be useful but do not provide clear information of biodiversity trends. Rather, a comprehensive monitoring framework is needed to measure direct and indirect indicators of biodiversity, both at a site and landscape level. The driving force for land use change is potential economic returns, with biodiversity services as a public good and the cost of loss of such services is seldom accounted for in changes of land use. The author concludes that multiple options, both legislative and incentive-based are required to protect biodiversity, both in preserving remanent landscapes and encouraging restoration of degraded land.

The Environmental Impact Reporting in Agriculture (EIRA) is a European initiative to develop a practical tool to fill the data gap of environmental impacts from agriculture to improve the flow of capital to improving sustainable agriculture practices and attract more investors. The tool hopes to enable a mutual reinforcement of demand and supply for information on environmental impact. As primary data models are improved, errors minimised, and scientific robustness measured increased capital investment will be attracted and further increasing the demand for improved data. The EIRA report (Negra et al., 2019) outlines information on the initiatives aims, likely users of the tool and likely evolution of data benchmarking and aggregation. This report flows from a feasibility study conducted in 2018 on the area. The initiative is currently in the prototyping phase, with aims to produce a minimum viable product in 2021-22.

Ansell et al., (2016), reviewed global literature on agri-environmental schemes (AES) for biodiversity conservation to determine how many included the costs and cost effectiveness of the scheme in their evaluations. The ISI Web of Science and Scopus database and broad search terms were utilised

to identify relevant studies, from 2014 onwards, which were then screened and refined further by the authors to form the 293 references used as the bases of the analysis. The authors noted that only 15% of studies reviewed cost effectiveness with less than 50% of studies mentioning costs altogether. Philosophical aversion of the combination of conservation and economics as well as minimal understanding of evaluation tools and data were identified as potential reasons for limited consideration of costs.

Torabi & Bekessy, (2015) investigated the numerous biodiversity and carbon market options in Australia to understand the opportunities and risks of bundling and stacking in schemes. Benefits of stacking and bundling identified by the authors through interviews included reduced monitoring costs for regulators and minimising transaction costs for participating landholders. However, they also identified significant barriers to creating stacked/bundled markets which included considering the rule of additionality, uncertainties in the political and market settings and the lack of standards to demonstrate that co-benefits exist.

Kragt et al., (2017) undertook a survey to investigate the barriers and drivers of broadacre farmers in the Western Australia wheat belt to partake in carbon farming programs and adopt practices of carbon farming. The researchers utilised Qualtrics software to program the survey and local natural resource management organisations and grower groups to distribute the survey. ***Table 1*** notes the key findings from the survey.

Table 1: Key findings on driver and barriers of adoption

Drivers of adoption	**Barriers to adoption**
• Knowledge and perception of co-benefits (for yield, productivity & environment) • Knowing another adopter • Believing that changes to farm management are an appropriate method to reduce Australia's GHG emissions	• Policy and political uncertainty • Lack of information • Uncertainty • Costs

Source: (Kragt et al., 2017)

The authors note that these findings provide insights in designing policies to ensure high levels of farmer adoption. They conclude the co-benefits of participating in a scheme should be highlighted and promoted to encourage uptake as well as the provision of more information on costs of participation.

Rolfe et al., (2018) investigated the causes of low participation in conservation tenders through a review of relevant literature. They categorised concerns regarding participation into two categories: issues or flaws with the design of the scheme and farm characteristics which limit adoption. Developed countries were found to have low participation rates in tenders. The authors identify that three simultaneous decisions go into the decision of participating in a scheme, these include: (1) whether to undertake the practice change, (2) whether to be involved in a contractual public program and (3) how to set a bid or price for a tender. They also note factors such as risk considerations and landholder attitude can impact each stage of the decision-making process. Understanding the complexity of the decision-making process farmers going through when deciding to participate in a tender can provide insights into scheme design.

Greiner, (2015) conducted a choice experiment involving graziers and pastoralists across rangelands in Northern Australia to develop an understanding as to the motivational and attitudinal influences for participation in agri-environment schemes. The results found high variation in the preferences of scheme attributes across participants (i.e. significant preference heterogeneity for contract attributes). However, a strong willingness to participate in biodiversity schemes was noted among the landholders. A scheme with negotiable contract attributes was found to improve participation.

Blackmore and Doole, (2013) used regression analysis and qualitative data from interviews to investigate the levels of importance of participation drivers for farmers in conservation tenders in Victoria. Low administration burden and strong relationships between landholders and agencies were revealed as drivers of strong participation. Landholders were found to be confident to undertake conservation activities independently without assistance, support or education opportunities, meaning these provisions were found to potentially drive lower rates of participation. The authors also note there was some evidence to suggest contracts with a timeframe of 10 years may be favoured by participants.

Page and Bellotti, (2015) surveyed farmers in two LLS regions in Australia to determine their perceived impediments and motivation for participating in conservation programmes. They note social, financial and psychological factors highly influence farmers' participation in schemes. A lack of available information and awareness were farmer factors which attributed to higher non-participation in schemes. Uncertainty surrounding policy and government were most frequently noted as an impediment which could deter participation. The authors note that further research into payment levels and contract duration would provide further insights into the development of schemes which foster increased participation.

Torabi et al., (2016) developed a Bayesian Belief Network (BBN)[4] of landholder participation in carbon farming and biodiversity programs using interviews, a review of literature and expert input. The key finding of the research was that the characteristics of a program provide more influence over participation than financial incentives. Co-benefits of a scheme were also identified as important to landholder participation. More flexible permeance options in a scheme and the ability to bundle or stack credits were also likely to increase participation. Figure 3 depicts other influences identified in the research. These findings allow policymakers to design schemes which focus on aspects most likely to foster increased participation from landholders.

[4] A BBN is a tool used for decision-making with uncertainty and useful when combining qualitative and quantitative data and in numerous fields including natural resource management.

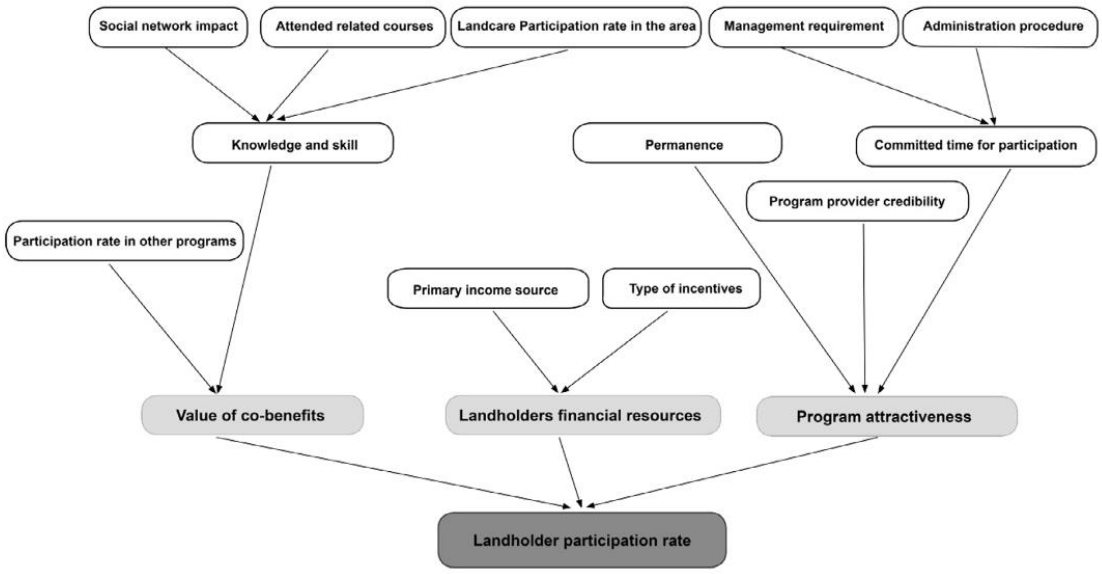

Figure 3: Influence diagram depicting the web of key correlates affecting the participation of landholders
Source: (Torabi, et al., 2016)

Cullen et al., (2018) wrote an informative paper after a workshop with a range of experts in field such as ecology, agri-environmental policy, agricultural economics and agricultural extension. They discuss the past EU AES being action-based and subsequently suboptimal in their performance, with a move now occurring to results-based schemes. Action-based schemes can be increasingly complex, have conflicting objectives and geographical dispersion. Whereas, results-based schemes allow farmers a greater degree of flexibility in management decisions, thereby reducing transaction costs. However, the authors noted that action-based schemes provide farmers with knowledge of conservation efforts and raise awareness of issues. A challenge for policymakers is designing a scheme which allows direct involvement from farmers.

Herzon et al., (2018) utilised a range of sources including technical reports, peer-review literature, scheme practitioners and agri-environment climate policy experts to analyse results-based schemes to look at critical factors impacting the success and performance of schemes. Table 2 notes a typology of scheme types developed from their analysis. The authors note there are several advantages of results-based schemes compared to management-based schemes across areas of farmer adoption, development of local biodiversity-based projects and environmental efficiency. Conclusions from the research include schemes involving results are more effective for landscapes which are already in good condition rather than the restoration of habitats in poor condition, due to the knowledge base of the farmer.

Table 2: Examples of typology of the payment schemes for biodiversity on agricultural land

Scheme type	Category	Main characteristics	Basis for payment
Results-based payment schemes	Pure results-based	No management actions are either specified or required	Solely biodiversity results measured with indicators: single payment threshold, stepped payment thresholds or continuously variable payments

	Hybrid: Results-based with baseline management requirements	Holders have to undertake some defined management actions (or abstain from certain activities) as a baseline requirement of a results-based contract	Single or stepped payment thresholds payment is wholly dependent on biodiversity results, measured using one or more environmental indicators; management actions have to be undertaken as an unpaid condition
	Hybrid: Management-based with an optional results-based top-up	Similar to the above but the contract is management-based, and the results element is optional	Basic payment for management actions and an extra (top-up) payment if results are achieved
Management-based schemes	Management-based schemes	Holders only have to undertake specified management actions or abstain from certain activities	Payments linked to management actions having the conservation of biodiversity as their primary purpose
	Farming system-oriented schemes	Same as above	Payment linked to defined farming systems known or believed to produce biodiversity benefits.

Source: (Herzon et al., 2018)

Gordon et al., (2015), identified that biodiversity offset policies can produce behaviours which worsen the decline of biodiversity. The authors note a well-designed policy could incentivise four negative outcomes: (1) further declining baseline measurements, (2) reducing conservation efforts not related to offset policies, (3) unsettle volunteer efforts for conservation, and (4) providing false public confidence that offset actions are gains. To avoid risks to the environment, awareness of these perverse outcomes from offset policies is key.

2.2 Lessons from existing schemes

Sustainability and best practice schemes have been implemented in agricultural sectors globally for some time. Certification schemes are most common in heavily traded commodities in developing countries located in tropical rainforest ecosystems, such as coffee, cocoa, palm oil and tea (Ting et al., 2016).. Important staple foods such as rice, wheat and corn have lower coverage of certification, however schemes still exist globally for these commodities (Tayleur et al., 2017).

Tayleur et al., (2017) reviewed 12 voluntary sustainability standards for crops to assess their contribution to conservation of biodiversity and their coverage globally. They found 133 countries with certified cropland (with the area increasing from 2000-12) but only 1.1% of global croplands certified. Cooperation is needed from a range of stakeholders including government, corporate businesses and finance sectors to increase certification and verification of standards.

The research has produced a catalogue of **40 relevant global and domestic schemes** (see Appendix). While not exhaustive, the catalogue provides a broad overview with a high-level categorisation of schemes according to basic elements to enable comparison and help identify common themes.

Commonalities evident from the categorisation of schemes include:

- All schemes analysed are **voluntary**;
- Many schemes utilise **independent parties** to certify or verify standards;
- Most schemes utilise a **management-based method** for compliance;
- Fewer schemes were found to directly address biodiversity - many schemes address **sustainability** or **best practice** (which also benefit biodiversity);
    - Biodiversity considerations are sometimes included as a principle or module of the standards, however many schemes indirectly addressed biodiversity in environmental/natural resource principles/modules of the scheme

The multiplicity of extant schemes suggests a strong need for harmonisation under a clear set of metrics, rather than development of an additional scheme. Indeed, an agreed meta-standard could certify existing credits (e.g. carbon credits) as carrying biodiversity or other benefits. The Climate Change Authority has suggested that such a program could operate in much the same way as the Heart Foundation tick on food – verifying attributes that the community values under a common framework (Climate Change Authority, 2018).

The Authority has recommended that the Australian Government lead development of a multiple benefits accreditation standard for ERF and other carbon offset projects, beginning with the biodiversity benefits associated with vegetation and soil.

2.3 The data problem

While support for a system to reward Australian farmers for managing biodiversity appears strong from political, industry, market and stakeholder perspectives, it is unclear how success will – or should - be measured under such a system. The challenge for the Australian agriculture sector is to improve biodiversity and other sustainability outcomes, while remaining profitable and increasing productivity to meet growing demand.

Improvement must be measured against transparent and robust baseline data; however, the Australian agricultural statistics system has been widely criticised, with data often incomplete, out of date, and irrelevant or purposeless (McRobert, Darragh, et al., 2019). The paucity of natural resource baseline data and ongoing land management data is 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). Lacking a foundation of good data, policy made in the absence of evidence is at significant risk of failure or creating perverse outcomes.

The rapid emergence of new sustainability certification schemes (SCS) with heterogeneous governance structures, scope and practice has resulted in a **divergence in metrics**, which in turn raises questions about SCS effectiveness.

Mori Junior et al. (2016) contend that **accountability** about goals and achievements are key to the success of any SCS, not only from a scientific validation standpoint but also to ensure stakeholders' expectations are managed and trust is engendered. Legitimacy cannot be achieved without building trust among all relevant stakeholders, and this trust must be underpinned by transparency and the **evidence-based demonstration** of positive social, environmental and economic outcomes.

As well as social, environmental and economic impacts, some key components or variables noted in this article which influence the effectiveness of SCS included (but were not limited to) sustainability awareness; management systems and productivity; monitoring outcomes; and accountability and transparency.

To investigate what drives landholders' participation in biodiverse carbon plantings, Torabi et al. (2016) developed a **Bayesian Belief Network** (BBN) of participation in biodiverse carbon planting schemes to investigate which factors were most likely to influence uptake. Variables in their research included the compatibility of biodiversity/carbon programs with existing primary land management practices; the value proposition of the environmental and productivity benefits of the scheme; the influence of trusted peers; and specific scheme characteristics, e.g. transaction costs and administrative burden.

The authors explain BBNs as tools employed for decision-making under uncertainty which can be especially useful when **combining qualitative and quantitative data**. Bayesian networks consist of a qualitative component (i.e. a directed acyclic graph) and a quantitative component (conditional probabilities). Based on probability distribution modelling, BBNs represent causal relationships among variables via an influence diagram.

The BBN model presented by Torabi et al. provides an approximation of the network of causal variables influencing landholders' participation in planting schemes; however, the authors note that the empirically derived data required for a more precise network was not available.

Gordon et al. (2015) caution that perverse outcomes can result from well-intentioned biodiversity offset schemes, particularly when data is lacking or opaque. The implementation of incentive structures to 'offset' biodiversity losses by achieving additional biodiversity gains elsewhere can risk introducing unintentionally antithetical incentives.

The authors highlight the example of the US Endangered Species Act. While aiming to protect species habitat through restricting land use, a perverse incentive was introduced. Landowners wishing to avoid land-use constraints instead pre-emptively cleared habitat for endangered species.

To reduce or mitigate these kinds of risks, the authors recommend coupling offset **crediting baselines to measured trajectories** of biodiversity change, along with maintaining **clear and publicly visible accounting systems.**

Gordon et al. note key variables to consider in the measurement of biodiversity schemes, including understanding the interaction between offsetting and other related policies; methods of recording the environmental losses (impacts) and associated gains (offsets); and impacts of any legal agreements and financial flows associated with the offset.

Ansell et al. (2016) comprehensively reviewed global literature to determine how widely cost-effectiveness is considered in the evaluation of agri-environment schemes (AES). Outside Australia, many farmers receive payments for providing public goods such as biodiversity. These AES or PES (payment for ecosystems services) programs account for a significant proportion of global conservation expenditure in agricultural landscapes. However, the authors contend that **cost-benefit analysis** and **integration of economic and ecological data** in evaluations is significantly lacking.

Of the studies on AES reviewed by the authors, less than 50% referred to the costs of the schemes at all, and fewer than 15% included any measure of cost-effectiveness. While there has been a steady increase in the number of published AES evaluations since 2000, the authors found that the (annual) proportion of studies published which consider economic data in evaluation is relatively consistent.

This low level of cost-benefit data integration is attributed to lack of access to (or adequate understanding of) economic evaluation tools, data and training, and a cultural aversion to the conflation of environmental outcomes with economic ones.

Without **quantitative data to accurately assess schemes**, the effectiveness of AES is extremely difficult to ascertain.

Assessment of ecosystem health is notoriously problematic, encompassing a range of variable data sources which can be difficult to integrate or compare. Vihervaara et al. (2015) investigate methods of incorporating airborne laser scanning (ALS) data on a boreal forest ecosystem with bird data collected from citizen-science sources. The paper states that due to inadequate measurement or presentation of data, land use management decisions often fail to **adequately account for the value** of ecosystem services and biodiversity. The authors are concerned less with the specific forest studied and more with the question of using different biological data sources to make effective (and cost-efficient) ecosystem assessments at landscape scale.

Vihervaara et al. note that such assessments are **dependent on qualified, spatially and temporally comprehensive data** covering many known and unknown variables. For example: clear distinctions between the different species as measured by forest biomass at observation sites; lack of spatially explicit indicators, as measurements are often recorded at global or national scale; and the feasibility of maintaining consistent indicator sets over time due to changes in species composition from climate impacts.

The authors conclude that the challenge of measuring the different aspects of biodiversity (e.g. structural, functional, ecosystem, community, species, and genetic diversity) can be addressed via combining new technological data systems (e.g. remote sensing, ALS) with citizen-science sources.

In the State of the Environment (SoE) report, Cresswell and Murphy (2017) note that Australia has been a contracting party to the United Nations Convention on Biological Diversity since 1993, which includes 5-yearly reports on progress against the Aichi Biodiversity Targets (as part of the UN Strategic Plan for Biodiversity 2011–2020). Australia also reports to a number of other international bodies on biodiversity management; however, there is no overarching framework under which to consolidate this reporting.

The SoE highlights that while “massive effort” has been mobilised in Australia for environmental works which should have significant benefits for biodiversity in recent years, such as revegetation, weed control, fencing of waterways and improved stock management, documentation of the impacts of these actions has been poor, with no standardised way of reporting.

Of the two highest-ranked risks noted to Australian biodiversity in 2016 by Cresswell and Murphy, one was the failure of processes for **adequate data collection to provide early warning of threats and opportunities**.

2.4 Literature summary

The literature review highlights the importance of a scheme having a **clear objective** to ensure the value proposition to participants is consistent and clearly communicated, and of establishing robust, well-governed **data frameworks** to measure these objectives.

Adoption of biodiversity schemes in agriculture requires trust from participants, built on a value proposition underpinned by the evidence-based demonstration of social, environmental and economic benefits (Torabi, Mata, Gordon, Garrard, Westcott, et al., 2016; Vihervaara et al., 2015). The success of related schemes is closely correlated to the **level of participation by landholders**. Motivators and barriers to adoption include the economic, social and psychological factors influencing landholders’ decisions to participate.

High transaction costs are one of the leading barriers to farmer / land manager participation discussed in the literature. A potential avenue for reducing of these costs of taking part in a scheme is the ability to stack or bundle the benefits of multiple programs. However, policy uncertainty is noted as a significant barrier for landholders participating in these types of schemes.

A key barrier to the establishment of a market-based mechanism noted in the literature is the lack of an established (trusted) tradeable metric. Such a metric is likely to also impose high transaction costs on farmers, which will in turn deter participation.

To achieve success, land use management policy decisions must **account for the value** of biodiversity via transparent goals and achievements (Mori Junior et al., 2016; Vihervaara et al., 2015). However, data gaps in agricultural systems are impeding the development of evidence-based policy (Darnell et al., 2018). Care must be taken to avoid potentially perverse outcomes of proposed biodiversity schemes; a particular risk when data is lacking or opaque (Gordon et al., 2015).

Both quantitative and qualitative data are essential to effectively implement and accurately assess ecosystems services schemes, thus **frameworks for decision-making under uncertainty and integrating disparate data sets** must be considered in the foundational stages (Ansell, Freudenberger, et al., 2016; Torabi, Mata, Gordon, Garrard, Westcott, et al., 2016; Vihervaara et al., 2015).

Systems intended to incentivise biodiversity improvement cannot succeed without the **solid foundation of data**, to ascertain defensible baseline measurements, evaluate ongoing changes, justly incentivise participants and demonstrate societal value via the improvement of natural capital.

The literature review has highlighted the significant volume of work completed and currently underway within this research area. The complexity of establishing a national scheme for certifying or validating farm biodiversity and sustainability has been emphasised throughout the review. The findings of this review have informed the development of the consultation process and conclusions.

3. Consultation

Key informants and stakeholders across the country were consulted at length *to identify critical success factors required for implementation of farm biodiversity schemes in Australia.*

The initial work plan proposed a series of 10 face-to-face forums in key regional areas in all six states, with the aim of reaching up to 350 attendees. Due to restrictions on travel and gatherings imposed by the COVID-19 pandemic, these meetings were cancelled on the eve of the first leg of travel and replaced with online events. While the changes caused significant disruption to the project team, the online format offered the opportunity to reach more stakeholders than originally proposed and enabled a comprehensive record of consultation feedback to be retained (via Zoom recordings).

Twelve online forums and three webinars were held from March and May 2020, with most meetings focused on core agricultural regions (as initially proposed pre-COVID) to determine whether points of difference on key concerns would be apparent between geographic areas. These regions included: Central Queensland; the Western Australian Wheatbelt; Southern Queensland / northern New South Wales; Central West NSW; the Northern Territory and northern WA; Gippsland and the Wimmera in Victoria; Tasmania; South Australia; and the Riverina in NSW.

In addition, the project team met virtually with key stakeholder groups and conducted interviews with topic specialists. Altogether, **more than 500 individuals** have contributed their experience and expertise to the project.[5]

The summaries provided here (of the key points derived from the forum and interview processes) demonstrate the views expressed during the consultations and **should not be read as standalone project outcomes or recommendations**. Readers will note, for example, that views on additionality differ between forum participants and interviewees. These points have subsequently been analysed in the context of the literature review findings to develop the project conclusions.

During the consultation it was also evident that many key terms are used interchangeably, conflating similar but separate concepts. Adding to this confusion, this project was required to consider "sustainability/biodiversity outcomes" in the context of "certification/verification schemes". Initially public consultations included the term "certification" in promotion, but this was later excluded as participants expressed confusion at the disparity between the project's stated primary objective (including a broad remit to investigate both biodiversity and sustainability) and the narrowed focus of one specific solution. In addition, many participants expressed a lack of confidence in certification as a viable tool to incentivise biodiversity and/or sustainability outcomes, and were concerned that the consultation process should avoid seeking to confirm any foregone conclusions.

As a result, the consultation has covered topics which *could be considered as outside the scope of the project objective*. These comments and opinions have been included as they are considered an extremely useful resource for subsequent stages of the overall project development; however, **only those which are directly material to the objective have been considered in the conclusions presented herein.**

[5] An additional survey was also conducted by the NFF in parallel to this project; however, the findings of this survey (while instructive) were considered neither robust enough nor materially different to the forum and interview findings to justify inclusion in this report.

3.1 Forums

The forums each ran for three hours, beginning with project backgrounding from AFI and followed by a presentation from an industry or regional context by a guest speaker. Participants were then invited to join smaller virtual 'breakout rooms' to discuss set questions in two workshops sessions focused on **what the scheme should aim to achieve** and **how this could be done**.

Registration rates were very high, with a total of 769 people registered and many forums fully subscribed[6]. However, as events were free and there was no penalty for not attending, the number of participants in the forums varied. With an above-average attendance rate of 59%[7], the forums and webinars reached a total of 422 people (Figure 4).

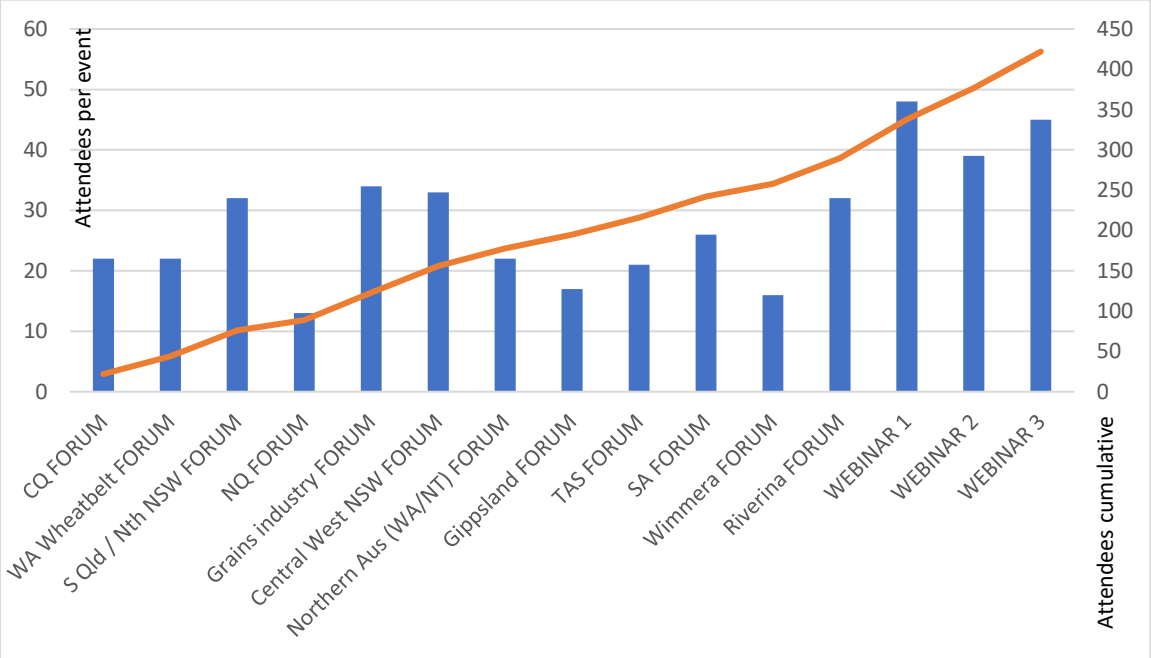

Figure 4: Forum & webinar attendees (per event / cumulative)

The clear majority of forum attendees were **agricultural producers and NRM practitioners**, with a minority representation from representative organisations and academic institutions. The consultation format naturally involved a strong degree of self-selection bias, as only those with an interest in the topic (and access to the technology) were likely or able to attend. To mitigate the risk of dominant voices in breakout sessions weighting the collated opinions, each breakout session was moderated by a scribe from the project team.

Although each region demonstrated emphases on specific considerations and unique points were raised, the common themes readily apparent across all forums are summarised below[8]. Again, the authors stress that the paraphrased opinions presented here reflect those of the 422 forum participants, and should not be read as project recommendations.

[6] Attendance numbers were capped to ensure breakout workshops could be managed by available staff, ranging from 50-60 maximum attendees for forums and 100 for webinars.
[7] Calculated by dividing the number of registrations by the number of participants. While online meeting trends have changed dramatically worldwide in the past three months, an average webinar attendance rate was recently reported by the ON24 platform to be 46%.
[8] The complete notes transcribed during the forums were collated into a 40,000-word, 99-page document which has been made available to NFF and the Department of Agriculture, Water and the Environment.

3.1.1 Clarity of purpose

A consistent theme across all forums was the need to provide a **clear value proposition** for a national farm biodiversity scheme. The language used in a scheme should be clear and consistent to alleviate any confusion or misinformation about the scheme's objectives, as well as communicating the value of participation to landholders. Participants reported frustration over the apparent conflation of certification with verification and of biodiversity with sustainability, and this became a recurring point of discussion throughout the process.

While forum participants articulated the importance of biodiversity in landscapes and its role in maintaining healthy, functioning ecosystems, many **questioned the specific focus on biodiversity** for a scheme, rather than an overarching goal like sustainability. Producers and NRM stakeholders cautioned against biodiversity being treated as separate from other aspects of sustainability in farming and farm management. It was seen as crucial that biodiversity is recognised by policy-makers not as a standalone issue, but as **part of a systems approach** to whole-of-farm sustainability and profitability. Given the varied interpretations of what can be encompassed under biodiversity, many also noted the need to **clearly define what would be covered within a scheme**; for example, will a scheme assess species richness, soil condition, ecosystem management or a combination of factors?

"Don't present biodiversity as being separate from other aspects of sustainability in farming and farm management."

It was generally agreed that a scheme cannot be all things to everyone and that 'success' means different things to different people, underscoring the need for a clear value proposition and consistent language to **unambiguously communicate the scheme's objectives, parameters and expected outcomes**. Another strong point from forum feedback was the need to consider how a national scheme would fit in with existing industry schemes and BMP models to ensure land managers were not subject to extra burdens of reporting.

3.1.2 Measuring impact

"A lot of focus is on the higher tier biodiversity rather than the micro-biodiversity. There is benefit in focussing on micro to underpin the macro."

Many forum discussions focused on ways of measuring biodiversity and the current lack of a recognised metric. Participants noted this is a complex area, with many people and programs already working in this space to develop efficient, effective ways of measuring biodiversity. The diversity of the term biodiversity (which incorporates components of genetics, species, interactions, animals, soil etc.) will likely require different methodologies for measuring different components.

Participants noted an urgent need for a **national standardised system for data collection and reporting** on biodiversity to be established before a scheme could be adopted with confidence, highlighting that both qualitative data and quantitative data should be considered in developing metrics to inform a scheme.

Many noted that any technology required for verification (or certification) of farm biodiversity will need to be accessible for people on the ground – something landholders can do themselves rather than provided by external auditors. Some were concerned that creating baselines and benchmarking could create "winners or losers" and set up perverse incentives.
While some suggested that self-assessment by farmers should be considered to reduce transactional costs and empower farmers with knowledge, others expressed concern about the social acceptability of self-assessment in a scheme intended to engender trust. It was

"We must collaborate, and need an overarching body to avoid green-washing or confusion."

generally agreed that a third-party verification system would be necessary, opinions varied on who the third party should be (government, industry, independent auditor etc.).

Forum discussions highlighted the importance of striking a balance between complexity and value within a scheme; i.e., limiting complexity in **standards and criteria** will likely improve adoption and increase participation by landholders - but as a scheme is simplified, value diminishes. Higher levels of complexity in standards result in higher value but limit farmer participation. Finding the correct balance between these factors is an important consideration in the development of a scheme. Participants noted that targets should not be set too low as this compromises the credibility, quality and integrity of a scheme.

Participants also agreed that a national scheme should also align with global measures in order to capture value from export markets and to assist the agricultural industry in reporting against international sustainability commitments.

3.1.3 Removing barriers to adoption

"We need a national framework but with regional/landscape differences considered."

Many participants noted **economic incentives and rewards** are the best motivation to ensure strong participation from land managers. Developing multiple value avenues from participation such as market access, domestic price premiums and branding opportunities, were mentioned by some participants as a method of increasing adoption by landholders. This would mean landholders would have one transaction cost but receive multiple benefits.

Cost-benefit ratios were frequently raised. As expressed in the discussion on value proposition, the benefits of the scheme needs to evidentially outweigh any costs. To facilitate adoption, the benefits also should be targeted to producers, not third-party certifiers, nor be lost in or absorbed by the value chain (as has happened in the wool industry with non-mulesing premiums).

A significant barrier to entry identified by participants was **the cost of conducting baseline measurements** on-farm. Aspects of self-assessment or government assistance (at least in a scheme's early stages) were identified as possible solutions to minimising this cost of participation. In addition, audit costs should not be borne by the land managers but accounted for within scheme administration.

Participants also noted that consideration should be made as to how a scheme will deal with the **fragmentation of farm types**. Absentee, small, large and urban farms will have varying motivators and requirements for participation. It was highlighted that past and current regional efforts have demonstrated it can be very difficult to engage some farmers, and that often "it's the same ones" participating in multiple programs rather than new programs attracting new participants.

Feedback regarding the NSW Biodiversity Conservation Trust and Queensland Land Restoration Fund highlighted that many were strongly against the 'lock-in' elements of these schemes. Participants noted that producers need to be able to opt in and opt out of a scheme rather than being locked in for decades, as this can impact land values and succession planning.

Suggestions on enhancing adoption in a farm biodiversity verification scheme included:

- Build up community support and resilience by providing opportunities for local farmers/groups to share knowledge/practices
- Publicise good news stories and champion farmers

- Follow the example of reduction in fertiliser reliance by showing farmers where they are wasting money and can improve efficiency/profitability
- Fitting in with existing schemes as so much good work is already underway
- Look at what farmers are currently doing on farm and incorporate into the scheme
- Develop an education program for new entrants

3.1.4 Additionality must be addressed

A primary concern raised repeatedly in every forum discussion was additionality; i.e. how to ensure farmers *already* implementing biodiversity improvement practices and/or operating within sustainability frameworks would not be disincentivised from participating in a new certification or verification scheme.

Some producers said they are being **penalised for being early adopters** and good land managers and to benefit from the scheme they would "be better off clearing the trees and starting with cleared land". A farm biodiversity certification or verification scheme must reward good land managers, not discourage them nor create perverse incentives. Participants mentioned that additionality has compromised carbon farming projects because of the difficulty in measurement.

While a number of participants agreed that public money should not be used to pay for something that is already being provided for free, the consensus amongst the forum participants was that early adopters of biodiversity-friendly land management practices should not be penalised because they are unable to demonstrate additionality. Those who have already put in the work should be rewarded under the scheme.

3.2 Interviews

One-on-one interviews were conducted with 20 subject matter experts using a semi-structured format to provide deeper insights on the key success factors of a scheme. Interviewees were selected to cover a diverse and comprehensive range of the agricultural landscape in relation to the research area. Experts consulted included food retailers, economists, supply chain managers, bankers, environmental researchers, and farmers with experience in participating in ecosystem service markets[9]. Summaries of key points from the interviews were qualitatively analysed to determine trends.

The points set out below do not purport to be a representation of any interviewee's opinions on how a biodiversity scheme should operate; rather, they represent a subjective, aggregated selection of recurring or notable statements that arose in discussions. No particular order of importance has been imposed on the points, nor has there been any attempt to resolve inconsistency or conflict among the interviewees' comments. The points, for the most part, bear directly on the more fundamental or contentious questions that underlie the basic design of a biodiversity scheme and how it might sit in the real-world setting of farm businesses dealing with the already complex task of producing a diverse range of products for domestic and international markets.

Again, the authors must stress that the opinions presented here are those of the subject matter experts, which have informed – but do not constitute – project recommendations and identified criteria for success.

[9] A full list of stakeholders interviewed is presented in the appendix.

3.2.1 Additionality

It was suggested that additionality compromises most carbon farming projects because of the difficulty in measurement, and growers with high existing biodiversity should not be excluded from the scheme. To avoid additionality being a disincentive to participation by farmers with 'good' land, management schemes can focus on product markets as retailers generally don't require additionality to be demonstrated.

However, other interviewees maintained that a standard must be focused on additionality and continuous improvement to be credible, and stated that rewarding the status quo will never get market support (nor will the market accept an offset arrangement). Where biodiversity is the objective of a scheme as a public good, it was suggested by some that farmers are unlikely to be able to be paid by the government for existing biodiversity, thus the schemes should only pay for new additional biodiversity. This was not the majority view, and does not account for the role of private investors.

Interviewees who held this view also said that any proposed scheme should aim to deliver additional biodiversity or improved land management, as "it doesn't make sense to pay for what is going to happen anyway". Some said a strict additionality rule is the only way to actually achieve an increase in biodiversity, and while this may discourage participation by those who have already improved biodiversity it should be accepted and not divert the scheme from its intended purpose.

Others expressed the view that maintaining biodiversity is itself an important outcome, and said where this can be demonstrated to be in good condition it has a value that is likely to attract investment. Any scheme being developed needs to cater to a range of investors including public, private, philanthropic and corporate interests (for example, in meeting ESG targets).

There is a clear divergence in opinions between key groups and fundamental expectation gaps which must be considered in designing an effective scheme.

3.2.2 Adoption

Some opinions held that biodiversity schemes need to encourage farmers to spend on restoration using a mix of cash payments, tax concessions, R&D grants, technical support and supply of audit services. A scheme needs to be comprehensive in addressing all aspects of the farm environment so that there are not multiple audits for different schemes (e.g. water, carbon, social issues). It was also noted that productivity improvement does not always deliver an improvement in sustainability. In contrast, other interviewees said that productivity and cost reduction are generated by better care of soils. It was noted that a major barrier to investment in sustainable farming practices is institutional understanding of the effects of improved management. A biodiversity / sustainability scheme has to be driven by improving productivity and tapping into the farmer's desires to improve their land management. The cost-benefit ratio is unclear. If the only mechanism used to increase biodiversity is by utilising co-benefits from carbon farming, this will mean small farms can't participate.

There's a lack of an economic or commercial driver that shows real benefits for the farmer. Many are feel-good projects with benefits that are predominantly public goods. The approach taken to monoculture in cropping is to convince the grower that a loss of area can be made up by the increased performance on the remainder (e.g. a change from square paddock irrigation to centre pivots generates increased irrigation efficiency that makes up for the reduced production area in the corners).

Cost of participation has been a barrier to carbon farming. Aggregators address this to some extent, but not entirely. One disincentive to farmer participation is that income from carbon credits (and likely from biodiversity) are not considered by the Australian Tax Office to be primary production income for taxation and income averaging. The Queensland LRF scheme has found that farmers generally want more money than is offered for the carbon credits produced.

The cost of producing biodiversity services will vary between regions. If land is being purchased for reforestation or habitat reclamation, this land may be cheaper to purchase in the north and west - which may in turn have an impact on land values, with repercussions for agricultural production in those regions.

Other thoughts on adoption of a farm biodiversity certification scheme included that the most effective certification schemes operate when locally based, as this generates good uptake and includes continuous improvement. The scheme must be built by and managed by the people who own and manage the land.

A scheme should aim for multi-commodity schemes because most production comes from farms with multiple enterprises. A stewardship program for biodiversity should not apply only to non-productive land within a farm and should apply broadly across the whole farm area. Small schemes get high participation, as it's easy to ensure equity in how participants are engaged / rewarded and to maintain compliance. In larger schemes, the administrative costs and problems of equity compliance escalate. Most schemes also attract participation from high-end farmers (the minority) who would likely adopt improved practices anyway, and not the bigger cohort who are doing the most damage.

Any new scheme should aim a bit below the early adopters they will do it on their own without help. The target audience will also change over time. The scheme should look for big producers with a lot of land (e.g. AACo in the north along with one or two big cotton producers or rice producers) to lead the way.

It was also noted that many previous biodiversity certification schemes, stewardship programs and biodiversity incentives attempted in Australia have suffered a lack of uptake. This scheme or combination of schemes must aim for a high level of uptake and engagement so that there is a significant and ongoing increase in habit protection and provision.

3.2.3 Carbon farming / carbon markets

In most carbon farming projects the biodiversity improvements are delivered free but are unmeasured. A clear standardised trading unit (like the ACCU[10]) is a key to a workable trading system.

Interviewees suggested it should be possible to broaden the Carbon Farming Initiative (CFI) Act to include biodiversity credits. This could be called the Natural Capital Management Scheme (NCMS), and eventually fold carbon farming into NCMS.

The carbon market works well given that the government is the only buyer and has not been tested as an open market with multiple buyers and sellers. A limitation is that government is a least cost buyer using the funding procurement method, so projects funded are those that cost least to implement rather than those that may deliver the greatest benefit.

[10] An ACCU is an Australian carbon credit unit issued by the Clean Energy Regulator.

The natural events that may affect sequestration are insurable but it is expensive and most tend not to insure other than in the first few years when trees are most vulnerable. Third party carbon projects require landholder consent.

Those involved in carbon abatement projects under the Carbon Farming Initiative Act urge that it is a good model for a market-linked biodiversity scheme. Biodiversity could operate parallel to (or possibly as part of) the carbon farming structure. The combination of:

- a community held commitment to reducing net emissions of carbon,
- enabling legislation enacted by government,
- a dedicated fund for carbon abatement (Emissions Reduction Fund),
- a government regulator and purchaser of credits (Clean Energy Regulator) and
- a private industry backed information and advocacy body that also operates a private market for credits (Carbon Market Institute);

has seen this structure work well, in spite of a number of changes to the policy mandated methodology.

3.2.4 Certification / verification

Some interviewees held that certification is imperative to driving practice change in production. The scheme needs to include objective quantitative measures as the basis for certification and which can be audited – must include formal assurance or certification against independently assessed criteria. For consumers, the credence factors related to better land management are by definition not reflected in the product other than by some sort of certification label.

A view was expressed that industry-controlled certification schemes have questionable credibility because they only reflect the interests of the industry. Evaluation of a sustainability scheme should be based on using high quality monitoring of the land (possibly supported by good case studies) to demonstrate the impact it has on land management. Multi-stakeholder ownership of schemes improves trust.

Others noted that overseas, certification has struggled to deal with smallholders - the 80% of producers who deliver 20% of output. Change in environmental management is easily achieved in more tightly controlled production systems where there are fewer larger operators. In Australia, most family farms don't interact directly with retail supply chains. The more fragmented supply chains make it more difficult to get a certification in place along the supply chain and maintain a chain of custody of certified product. The most effective certification schemes are locally based.

A few large multinationals and corporates are already pushing sustainable practices down their supply chains. The likelihood that introduction of certification schemes for natural capital services will confer preferred supplier status rather and not necessarily a price premium was raised several times.

Most benefits of BMP schemes can be traced to better planning monitoring and record keeping, but these are also characteristics of highly productive farms (chicken/egg conundrum). The risk with using BMP programs as a vehicle for sustainable land management is that industry interests lead to fragmentation and the industry-owned BMP programs lack the commitment to drive land management change.

3.2.5 Complexity

One producer, who reported spending 18 months in the Queensland LRF process, said it was very complicated because it's based around carbon credits and the assessment procedure is very

detailed. The Accounting for Nature (AFN) audit process was also reported as complex and interviewees said it may cost $15-20,000 for establishing a baseline biodiversity audit over 5-6,000 hectare. Additionally, to get the full biodiversity payments the farm would need to be certified, which would have a further cost of $10,000 and includes on-ground works to contribute to the biodiversity (in one case, this meant costing in $4 million of capital works on the farm). However, other interviewees said the AFN framework has not been used widely for biodiversity assessments to date so it is too early to tell whether it is too expensive or complex for use as an assessment tool.

Schemes have different degrees of complexity. That is, schemes aimed at management practices as proxies for biodiversity may be adequate for companies as a basis for buying commodity outputs, schemes based on public funds to look after habitat or threatened species are required to be more rigorous and usually demand additionality, and formal biodiversity credits and offset markets are more rigorous again and require a huge amount of input and cost on the farmer.

Interviewees noted that schemes need to avoid becoming so big and complex that they become too difficult for producers to adopt. Simple schemes get high adoption and low achievements across large areas while complex schemes get low adoption and high achievements across small areas. Any proposed schemes will also need to acknowledge that the way we address biodiversity will change over time as climate changes and the threat to species changes.

3.2.6 Consumer appetite

Consumer sentiment need not be a strong motivator since consumer priorities tend to be changeable and more emotive than science based. Overseas customers for Australian commodity exports (and consumers who are mostly less wealthy than Australian consumers) can be considered to be less willing to pay for the scarcity of biodiversity than Australian consumers.

Younger consumers have different ways of searching for product and product attributes and their influence will drive the market development and the way product descriptions evolve and are transmitted to the market. Also, consumers will pay more for cuddly animals than for bugs or microorganisms – a scheme must show consumers that farms are improving the things that consumers value (market pull rather than production push).

A biodiversity scheme would assist retailers who have an interest in improving the sustainability of their supplies of agricultural products – e.g. Woolworths' primary interest in sustainability is a desire to be a good corporate citizen. Retailers don't look through manufacturers to upstream suppliers but may place requirements on manufacturers who in turn would put conditions on suppliers. Branding is not essential to retail.

Interviewees suggested that biodiversity is not a concept that is saleable to consumers, thus the scheme objective should be broadened to sustainability to have sales appeal. Retailers say that industry has to drive the development of natural capital services schemes. They do not want to be telling farmers how to run their business.

Participants also suggested that agricultural production in eastern Australia is strongly domestically focussed while production in South Australia and Western Australia is mostly exported – thus, biodiversity may be more tractable as an issue in the eastern states. A farm business in areas where the production is consumed locally is potentially more able to incorporate a biodiversity cost into the business than areas where the production is predominantly exported. Value of biodiversity services may be higher in the eastern states (note: this hypothesis can be tested).

Interviewees noted it should be possible to have one national accreditation scheme that includes biodiversity but also has multiple modules for other credence factors (such as soils, water, etc.).

3.2.7 Continuous improvement

Many interviewees favoured an outcomes-based, measurement-based approach as preferable, as it allows for inclusion of improved measurement science as it evolves and will facilitate ongoing improvement in the accuracy of the scheme.

Time frames for improvement must reflect the time frames over which farm management can be adjusted, and better measures of environmental quality can be included as the science evolves.

It was noted that the ultimate ownership and management of a farm biodiversity certification or verification scheme will likely be different from its initial ownership and management as it evolves and as the demands it seeks to address shift. Initially the scheme will need a strong focus on technical skills in order to maintain credibility.

3.2.8 Credits (market scheme)

Credits were raised by interviewees as a possibility for market solutions to environmental issues (water and carbon are two prominent examples). It was suggested that biodiversity credits schemes should not be limited to the supply chain of a good, as demand may come from individuals outside the supply chain (e.g. a reef credit). Biodiversity credits earned by farmers could equals a direct incentive to participate and tangible reward for the physical and financial investment.

NSW Biodiversity Conservation Trust (BCT) was discussed as a workable model for the issue of biodiversity credits; however, interviewees said the business structure of BCT may benefit from improvement. The LRF and BCT are both heavily regulated systems, which keeps 'tyre-kickers' away and ensures carbon credits and biodiversity credit transactions work efficiently. NRM groups could be involved in the process of assessment for biodiversity credits as they have an involvement in management of the natural resource base in the region and have knowledge of local conditions.

Key markets need to be changed to allow a market in natural capital services to operate including finance, consumer, property and insurance. There are information failures in these markets.

It should also be made easier to sell carbon credits overseas. Presently the markets are disconnected because Australia's carbon targets are less stringent so the demand is much less. Australian Price $16/ACCU - Canadian price $67/ACCU. Partnering with entities in other countries could expand the market for biodiversity and sustainability type credits (e.g. Europe, Canada, possibly US). There are instances of biodiversity credits for particular species reaching very high prices but for the most part this reflects a very shallow market rather than an indication of the real interest in biodiversity credits. Interviewees reported hearing that people are now looking to buy land to claim "koala credits". Movement is occurring in the marketplace locally and internationally.

Industries and regions in Australia that predominantly supply export markets and have to bear a cost of producing biodiversity services may be disadvantaged when their international competitors do not face similar cost increases.

Both large and small marketers can have a role in accessing and building markets for specific environmental credence factors. A scheme that produces a farm biodiversity credit that goes to the grower is likely to be operational more quickly that having to wait for consumer demand to develop to create a market for products from improved farm biodiversity.

Commitment has to be made to building markets for biodiversity products but the markets will only build slowly and the development of a farm biodiversity scheme should not be limited to the growth rate of the consumer market.

The cost of differentiating products in mainstream markets and charging a margin for environmental standards is not viable in a competitive market.

Regarding credits versus certified products, interviewees noted there are two types of credits: investments credits are standalone items of property and tend to be expensive, complex, and require a robust evidence base, while other models are based around products and mostly work as offsets. For an offset, a processor or retailer invests in biodiversity on a farm and provides credits to the farmer which are then traded between farmers and processors – however, the product may not come from the farms where the biodiversity investment was made.

3.2.9 Examples of relevant / similar schemes

Interviewees stressed that many biodiversity schemes, strategies and projects are already underway which either intersect, overlap with or could complement the new proposed scheme. Some of the many projects mentioned included: Terrain NRM (in Queensland), which is building a biodiversity strategy into its resource management strategy; Greenfleet, a not-for-profit that plants biodiverse forests to offset carbon emissions; the Soil CRC project which is working on ways to brand soil conservation and has already commissioned creative work on how a brand should be promoted. One interviewee strongly recommended that designers of the proposed scheme should consult with Soil CRC on development of a biodiversity or sustainability certification scheme as the CRC's work is already well advanced and there would be mutual benefit in avoiding "recreating the wheel" and undermining the work the CRC has done to date.

The Australian Beef Sustainability Framework is a set of indicators that the beef industry reports against annually. It is a work in progress and some companies have taken up the indicators and are using these to underpin their own accreditation schemes based on their market requirements. It is not a market accreditation system in itself at this stage.

Queensland's Land Restoration Fund (LRF) pilot with three beef producers is an example of trying to create value from biodiversity. It explores CRF carbon farming that delivers co-benefits in biodiversity. The Queensland Government has required Accounting for Nature as the basis of measurement and requires additionality and continuous improvement. The LRF purchases carbon credits (issued by the Clean Energy Regulator) from projects deliver both carbon abatement and environmental co-benefits and which have been approved by LRF. LRF also pays the land holder for the co-benefits including improving biodiversity, habitat for threatened species, soils, wetlands, and water systems. Landholders must sign a binding agreement to preserve the land area for 25 years and submit annual reports on the condition of the land.

Australian Land Management Group (ALMG) is a whole-of-farm, catchment-linked national certification system for land management. ALMG, commenced in 1999, audits achievement of certified land management criteria to verify that the management is continuously improving environmental and animal welfare outcomes on the farm. The whole-farm approach supports biodiversity conservation and complies with the ISO management standard. Certification is based on results rather than a fixed standard.

In North Queensland, the Green Collar program is producing credits that are sold as an offset to any development that may have an impact on the reef, e.g. a new road development or land development. A study by Rolfe (*A Review of Australian Conservation Schemes)* found that

competitive tenders for conservation schemes achieved more biodiversity outcomes per unit of funding than fixed rate grants.

The National Economic Environmental Accounting Strategy was also recommended as a good pointer on integrating various interests. It makes the case that environmental-economic accounts can be used to inform private sector sustainability initiatives and investment decisions; and better equip businesses to integrate consideration of natural capital into their operations

These examples are just a few of those mentioned in the interview process. Many more were brought up in the forums and literature review (see Appendix, catalogue of schemes). The overall sentiment was that considerable work has already been done on scheme design reaching back for more than a decade, and that the current and past work should not be overlooked or repeated in this process.

Interviewees also mentioned overseas schemes, such as the UK Red Tractor scheme as an example of a food assurance scheme that operates along the supply chain. The EU Product Environmental Footprint (PEF) scheme is similar to the UK Red Tractor by also assessing supply chain characteristics and addressing environmental impacts. The EU PEF rules are in pilot stage and will be market-ready in two years. The Sedex Members Ethical Trade Audit (SMETA) operates as a middle man that gathers commercially sensitive data from suppliers' declarations as specified by purchasers to ensure all product meets the purchaser's standards, without competitors seeing each other's declarations and minimising the administrative load on the purchaser.

3.2.10 Government involvement

Interviewees had understandably differing (and often conflicting) views about the role of Government in farm biodiversity. Some said Government's role should be limited to setting the policy objectives; others said Government's role is to coordinate the development of appropriate metrics and priorities across agricultural industries; or that the initial structure of a sustainability scheme should be independent of government and of industry organisations.

It was asserted by some that biodiversity is largely a public good for which governments should bear the cost because it is difficult to draw a line between consumption and impact. Preserving the benefits can only be achieved by government (or council) placing constraints on the land use by for example designating areas as conservation reserves, remnant vegetation zones or similar.

Ongoing modest government support for landholders to participate in schemes that meet criteria is, it was suggested, better public policy than supporting a multiplicity of small projects (which results in higher administrative and transaction costs). Initially governments will need to support the establishment of schemes and their operation by buying the environmental outcomes to generate additional incentive for landholders to participate..

One suggestion was establishment of a government agency to receive registrations, record projects and maintain regulations (the Clean Energy Agency being one example).

Some interviewees questioned how this proposed scheme would intersect with the EPBC Act, and suggested the scheme could be broadened to sustainability bilateral agreements with the States through COAG.

The difficulties of developing a market-based system tends to push the preference toward government schemes such as the NSW BCT or Queensland LRF in which the government auctions credits for biodiversity work. Presently taxpayers/government are the major purchasers of environmental improvements – it's unlikely that consumers will willingly pay a higher price to fund

environmental standards. A limitation is that Government is a least-cost buyer using the funding procurement method; projects that are funded are those that cost least to implement rather than those that may deliver the greatest benefit.

There is no agreement among different parts of the supply chain about who's responsible for resolving degradation of natural capital or what is to be done. Inevitably, said some, it falls to Government to address find the solution if industry can't.

3.2.11 Longevity / permanence

Several interviewees noted that a scheme must have a minimum commitment period (e.g. carbon farming is 25 years). Biodiversity improvements need to be preserved so there should not be opt-out provisions. It was mentioned that a 20-year vision would be required to pursue changes to key markets.

One scheme already underway has a 15-year co-payment period for the biodiversity but the carbon farming project has a timeline of 25 years, and biodiversity outcomes are expected to have permanent protection. These conflicting timelines make it difficult to manage.

The literature is mixed on the ideal period over which environmental scheme should operate, ranging from five to 15 years. Producers prefer shorter periods but certainly not more than a generation. To give reasonable certainty, scheme designers should probably aim for five to 10 years (or five years with an option for a producer to renew their commitment thereafter).

3.2.12 Measurement

There is little agreement on what biodiversity includes or means or how to measure it, even amongst the subject matter experts consulted for this research. Biodiversity is difficult to assess because there are many indicators and diversity differs regionally and there is no global agreement about how it should be assessed. A 'natural capital index' would help to provide a measure of progress in improvement in environmental management.

The science of measuring sustainability or biodiversity is imperfect but good enough to make a start. A scheme needs to be designed to support and achieve continuous improvement. Better measures of environmental quality can then be included as the science evolves. A consideration in establishing a scheme is how its achievements will fit into the Government's State of the Environment (SoE) reporting.

Ecosystem and biodiversity scoring systems have been developed for some regions but they are variable quality and are not perfect measures of ecosystem health. Habitat quality assessments can be reasonable proxies for total biodiversity in some systems. Rangeland surveys and measures of total biodiversity require significant expertise because the ecosystems are complex. NRM regions mostly have biodiversity in their mandate but it typically gets left behind because their main focus is on other more specific objectives.

There is a need for measurement of both management activity and outcomes. Initially, management activity is the only available measure because change in biodiversity takes time to emerge. In later years, the change in natural capital can be measured. Schemes have to be focussed on delivering additionality and measuring the outputs. Projects can be assessed on qualitative management activity initially but this has to be complemented by periodic scientific audit (for example, every four to five years).

Accreditation has to be measurable and able to show quick results (one to two years). As examples, LRF, ABCF co-benefit agreements are in their early stages and first assessments of outcomes are a

few years away so too early to tell how well these will work. Economic environmental accounting is aimed at measuring natural capital stocks and the techniques are evolving. The measurement of flows is much more complex and not well developed and would not be a good basis for a sustainability scheme. Where the science does not allow or is too complex for whole environment measurement, it may be possible to use proxies, indicators or icon species as a measure change in outcomes.

Remote sensing may be one way of reducing surveillance costs in relation to endangered species – e.g. payments for retained koala habitat based on satellite data. Use remote sensing, local observation, and farmer measurement to contain the costs and avoid complexity in the measurement task. DAS aerial mapping is being used in conjunction with NAB and Data61 at CSIRO to map soils into four categories (A,B,C,D) using remote sensing and machine learning. The ABCF uses cameras and videos to record land condition because it suits the circumstances, but it also reduces the cost of verification and could be adopted into a biodiversity scheme.

Carbon is an example of where government has invested effort in infrastructure to facilitate carbon sequestration and trading that is auditable and measurable. A farm sustainability / biodiversity scheme should be similarly rigorous in its approach to how things are measured and in a way that can be audited. Carbon abatement projects have the advantage is that there is a defined and regulated measure of sequestered carbon.

Indicators such as tree scratchings (showing koala activity), counts of bird species, spiders, insects give a good indication of the increased biodiversity on the property. Bird species numbers could also be used as a proxy or indicator of biodiversity. The starting point for any assessment of biodiversity or sustainability is good soil health.

To minimise costs, audits should be comprehensive in addressing all aspects of the farm environment so that there are not multiple audits for different schemes (e.g. water, carbon, social issues). Several interviewees noted that this factor further supports a wider sustainability certification scheme rather than a specific focus on biodiversity.

Measurement of success (of the scheme itself) could primarily be based on farmer adoption, but again this depends on how biodiversity is defined. A measure of community trust might be a factor but is difficult measure and influence. Evaluation of projects has to be a mix of scientific and economic outcomes.

3.2.13 Objectives

Interviewees consistently emphasised the need to clarify the objective(s) of a potential farm biodiversity certification or verification scheme. Many questions were asked and suggestions proffered on the ideal objectives. The following notes again present somewhat contradictory ideas as they represent a collation of the 20 interviews.

A biodiversity verification scheme needs to articulate what the benefits are, how they are valued and who the beneficiaries are. Is the primary objective to preserve a social licence to operate or at improving the environment? Is the objective (a) to maximise the biodiversity gains per dollar invested across the agricultural landscape as a whole (which might see gains concentrated in one or a few regions or industries) or (b) to spread the task and the cost across geography and industries according to some other metric?

If the focus of a scheme is specifically on biodiversity then the government should bear the cost. If the scheme is focussed on other traits or spinoffs from biodiversity then there is more capacity for

the consumer to bear the cost. If markets are coming at Australian agriculture demanding better environmental social governance the objective should be wider than biodiversity.

If the objective is to improve biodiversity of farm land and stop the mining of farmer's natural capital, then the scheme is aiming at increasing the stock of biodiversity. The objective should remain primarily focussed on restoring natural capital, not maintaining market access. We cannot rely on market-based schemes to address the run-down of natural capital. We should philosophically see the objective as being to protect nature. Schemes should avoid too much focus on consumer priorities for biodiversity as that risks diverting leadership from the central objective of restoring natural capital for the public good.

Any biodiversity or sustainability scheme has to be designed around achieving public/market credibility otherwise it will not survive. The definition of biodiversity is not considered to be a barrier to inclusion of other sustainability factors such as water quality and scarcity, soil etc. A focus on sustainability would include social outcomes that address matters such as animal welfare, worker safety, water management and quality, pesticide usage.

3.2.14 Standards / criteria

Some interviewees said that a standard must be focused on additionality and continuous improvement to be credible, and that rewarding a status quo will never get market support. Nor will a market accept an offset arrangement where poor biodiversity is sought to be justified by acquiring better diversity in another location. A market for credits is highly dependent on the soundness of the accreditation.

Given that some corporates have already moved on establishing biodiversity programs or adopted sustainability policies, it was not clear from the interviews whether it might be better to work from the top down or from the bottom up in establishing the parameters of a biodiversity scheme.

It was suggested that working with BMPs may be the most logical way forward to avoids competition at a commodity level and would facilitate the Government achieving co-benefits for biodiversity from other schemes.

Some interviewees said that the EU sustainability schemes are largely a rebranding of subsidy schemes. We should avoid schemes that look like subsidies and the best way is to focus on market-based schemes around the products. This path also meets the need to give credence to our claims to be a clean green producer. In contrast, others said that definitions and objectives of an Australian farm biodiversity certification or verification scheme should be consistent with UN Sustainability Goals as these guide international developments as well as corporate and government policies. One system repeatedly referenced was the ISEAL alliance, an international grouping of sustainability standards and accreditation bodies that undertake to meet the organisation's standards which are focussed on sustainability.

ABCF has developed a verification scheme for carbon projects particularly indigenous carbon projects. The key challenge for a scheme is how to engage people in verifying biodiversity or the state of natural capital. AFN was not developed as a basis for verification for a tradeable biodiversity credits at a farm scale, but for making regional assessments of environmental health. Caution was urged on the need to harmonise standards and criteria. An example of confusion caused by multiple standards is the competition between the Australian Forestry Standard (a management scheme developed by industry for industry) and the Forest Stewardship Council standards (which are market driven and developed by a multi-stakeholder group including environment groups, customers, unions, supply chain and industry).

3.3 Consultation summary

The clear message from all consultations was that **considerable effort on verifying farm biodiversity and sustainability is already underway** in the industry which must be recognised or accounted for in any new scheme.

In addition, the **value proposition** of this particular proposal (for a new Australian farm biodiversity verification or certification process) is still unclear. While most respondents strongly supported the idea of an overarching national set of standards for farm biodiversity and sustainability, the question was repeatedly asked: **what is the scheme's primary objective**? Is its aim to maintain market access, provide an additional source of revenue to farmers, sustain agriculture's social licence to operate among consumers, ensure the preservation of agriculture's natural capital, or something else?

These objectives are not mutually exclusive, but without a clear-eyed, single-minded focus on a simply stated objective, the scheme cannot expect wide business and consumer support, buy-in from farmers and effective use of funds.

While a scheme cannot be all things to all people, a statement of the scheme's objective will enable identification of who will benefit from the scheme and what the benefits will be, and thus enhance adoption. A key factor for success of a scheme lies in better identifying the productivity benefits of improving environmental management. Better natural resource management and greater biodiversity has other benefits than have economic consequences related to risk management, pest management and resilience of the business.

A 'scheme of schemes' structure could work, only if all the schemes are made to adhere to a common set of guidelines and rules. The scheme must integrate with other existing programs dealing with climate change, carbon farming, various sustainability frameworks, and water quality or scarcity, and also consider relativity between industries – for example, one farm may have the capacity to focus on tree planting, another on riparian vegetation, and another on increasing insect numbers via integrated pest management

To support Australia's market reputation as a 'green' producer, credible evidence and defensible data are required. An Australian biodiversity verification scheme could address this, understanding that the environmental benefits and the productivity benefits are interconnected at the farm level. The proposed scheme will produce both public and private benefits, and both need to be promoted to their respective audiences.

However, **support for a new certification scheme was not evident.** Specific certification (rather than overarching verification) was discussed at length in the forums and canvassed in interviews. While some individuals supported the concept, overall the majority of participants did not see a way of providing direct value to the farmers via a certification process. Potential negatives of certification (such as penalisation for non-participants or diversion of capital, resources and energy from existing programs) were raised as concerns.

A clear message delivered from the forum feedback was that a scheme should be **built from the bottom up rather than the top down**, meaning farmers and land managers should be extensively involved in the development and implementation of a scheme as well as the assessment, collection and reporting. The importance of expertise and involvement of cross-disciplines in designing a successful scheme was also stressed. Participants stressed that while having scientists, ecologists and economists involved in the development of a scheme is vital, a scheme must **strongly consider**

what is important to farmers and land managers, not just RDCs, Government or other invested stakeholders.

It was also noted that the role of Government in a national farm biodiversity certification or verification scheme will be important in the start-up phase, assisting with uptake and participation, but the long-term objective of a scheme should be to **operate without relying on continuous Government funding**.

Participants in forums said that a scheme should focus primarily on three key principles: **limit complexity, increase transparency and deliver authenticity**. This is expected to improve adoption and enable consumers to trust that the scheme is delivering outcomes.

It was agreed that a national framework is needed to implement a biodiversity scheme, provided that landscape or regional parameters are included within the overarching framework due to the disparities between different agro-ecological zones. Participants repeatedly stressed that farm systems are complex and unique, and that understanding the local landscape – channels, creeks, soil types and waterways – and developing a scheme around local considerations will likely have a greater positive outcome on biodiversity. Questions were raised on whether locations with the highest biodiversity value should be targeted for implementation of a scheme.

All forum participants agreed on the need for a scheme to be **long-term and have bipartisan support** in order to maximise benefits to both the environment and participating farmers or land managers.

Interview respondents noted that the impact of a biodiversity scheme will **differ across the Australian farming landscape**. Domestically-oriented farm businesses will face different pressures, capacity to recoup costs and ability to differentiate their products compared to export focussed businesses. Cropping industries will face a different suite of biodiversity options compared to grazing industries. In addition, the regions that can deliver the lowest cost increases in biodiversity may be different to the regions where biodiversity is most depleted or where the community might consider that increased biodiversity is most urgently needed or most important. The eastern wheatbelt of Western Australia is one the most export-focussed cropping regions, with some of the most depleted biodiversity and natural capital, but can a biodiversity scheme achieve strong participation in this region compared to regions on the tablelands of eastern Australia or the northern cattle industry?

Many interviewees commented that **better land management and higher productivity** often go hand in hand. Broadly speaking, BMP programs deliver productivity improvement through embedding better planning, monitoring and recording to the operator's goals. Frequently these processes deliver better resource management outcome as well as productivity gains. A number of interviewees commented that uptake and participation in BMP programs (and resource management programs) would be significantly enhanced by providing clearer statements of the economic benefits that can be achieved. Stronger advocates say that better land management has to be built around offering farmers improved productivity with improved land management integrated into its delivery.

A theme emergent from the interviews that differed from some of the forums was that biodiversity is a **pure public good** – consumption by one individual does not diminish the amount of the good that is available for others to consume and the benefits flow freely to all members of society. Therefore, there is no incentive for private interests to invest in biodiversity. On this basis, the only viable way in which biodiversity can be continuously increased is by regulatory intervention by

Government (e.g. carbon offsets, EU certified sustainable canola) or by Government paying farmers to deliver greater biodiversity (e.g. box gum grassy woodland regeneration).

The interviews also revealed strongly held views that industry-run biodiversity or sustainability programs have no credibility in the market with consumers or environmental groups. They are seen as **self-serving and lacking in scientific expertise and rigour** needed to run such programs. Competition between the Australian Forestry Standard (industry controlled) and the Forest Stewardship Council is an example. This suggests that a biodiversity scheme should be **independent** of farmer organisations and commodity marketing organisations. Notwithstanding that the scheme will be heavily dependent on Government funding or regulatory impetus, it should also operate at arms-length from Government.

The future of a farm biodiversity scheme in Australia turns substantially on whether reliable **objective metrics of biodiversity** can be developed. A market-based scheme has to be verifiable and auditable to credible and acceptable as a trading unit (as occurs in the carbon market). If the cost and complexity of measurement is high, participation will mostly be limited to a few large enterprises, although it may cover large land areas. Alternatively, simpler, less costly assessments based on management activities that are linked to improved biodiversity are mostly only suited to schemes based on Government payments to farmers, and may struggle to achieve market credence.

A barrier to participation in carbon and biodiversity schemes lies in the **interaction with finance**. Where a commitment to a scheme by a farmer requires a covenant to be placed on a title (or otherwise restricts the future options for land use) the valuation of the land is likely to be reduced by a lender. This reduces borrowing capacity and where there is an existing mortgage puts the business closer to its lending ceiling and therefore at greater risk of a foreclosure or withdrawal of facilities, or both.

An attendant problem lies in the way valuers consider land committed to environmental schemes. When land is valued at a market price (rather than as a going concern) trees on land set aside for biodiversity may be treated as non-productive and have its value discounted substantially or by the amount required to clear the land and bring it back to commercial production or to unwind the prior commitments to a scheme. For example, the placing of a covenant on land title for the purposes of carbon farming can reduce the land valuation and increase risk of a foreclosure as a result of the lower valuation, notwithstanding that there might be additional income as a result. This is an institutional problem for any biodiversity scheme so long as the changes to land management are not 'mainstream' and where the biodiversity may negatively affect productivity.

The design of an overarching biodiversity scheme will take place against a background in which there are already many sets of standards, requirements and guidelines that impinge on markets and producers. These include global food companies (Unilever, Kellogg, Mars, Nestle, Danone) already have sustainability requirements in many of their supply chains. The EU is close to implementing Product Environmental Footprint (PEF) reporting requirements which will require businesses within the EU to report against a set of environmental indicators. The proposed PEF reporting is more detailed than the certified sustainable requirements currently in place for Canola, and like its EU requirements on imported canola, PEF can be expected to spread to importers as a market access requirement.

Many sectors in Australia (e.g. beef, dairy, eggs, cotton) and some international commodity organisations have embarked on developing **sustainability frameworks**. Australian governments

have adopted a State of the Environment (SoE) reporting framework into which the achievements of a biodiversity scheme would be expected to report.

It was difficult from the consultation process to quantify the corporate interest in biodiversity credits, but it does not appear to be significant beyond a few local arrangements related mostly to offsetting impacts of some mining developments. This suggests **limited capacity for an open market in credits** and that, at least initially, government will have to be the market as the clearing buyer. It would require regulation to force businesses to buy credits to offset environmental impacts in order to generate significant private demand.

Retailers (i.e. supermarkets) are interested in biodiversity, but their view is that a scheme must be built around **accreditation based on measurable outcomes** and the metrics must show quick results (one to two years maximum). Accredited product /producers would likely get priority access to retailer shelves but **not necessarily a higher price**. Accreditation does not necessarily have to have a recognisable brand.

The UK Red Tractor scheme is an example of a food assurance scheme that operates along the supply chain. It claims to ensure that the food is traceable, safe to eat and has been produced responsibly. Red Tractor standards cover animal welfare, food safety, traceability and environmental protection[11]. To be successful, a scheme of this type would require substantial investment in promoting the brand to consumers to establish recognition. On-going promotion would be needed to build understanding of the value of supporting biodiversity and sustaining their demand for the products. Whether a scheme focussed tightly on biodiversity can succeed must be considered against the technical economic consideration that **biodiversity is a pure public good**.

Market-linked schemes that increase or stabilise the farm's production income have the advantage of being simpler for accounting, tax and financing compared to schemes that generate a separate source of income which may be subject to uncertainty about scheme rules, longevity or government financing. Banks (and perhaps other corporates) would welcome a visible verifiable accreditation scheme, as it would facilitate assessing and promoting the quality of their customer base.

Many interviewees and forum participants considered that **biodiversity is too narrow a focus** and that matters related to carbon, water, and soil are of equal importance to overall sustainability. However, a valid counter view is that inclusion of other environmental factors would further complicate what already appears to be a problematic objective, and that keeping the scheme more tightly focussed on a singular, biodiversity objective will enhance the prospects of demonstrable success.

As noted earlier, the opinions presented here are those of the 500-plus stakeholders and subject matter experts consulted for this project, which have informed this report's recommendations. While some opinions may be contradictory or outside the scope of this project's objective, given the importance of stakeholder buy-in for adoption (and thus success) of any scheme it is important that the implications of these views be considered by the NFF, DAWE and other agencies or organisations involved in further development of the Agricultural Stewardship Package.

[11] NB: The Red Tractor scheme appears to be a composite good that includes the elements of food safety, animal welfare and traceability that embody significant private good criteria.

4. Conclusions

Information gathered in the desk review and consultation has been analysed to determine key criteria for success of a scheme (Section 4.1). These criteria have in turn informed recommendations for further investigation and development of an Australian farm biodiversity certification or verification scheme trial (4.3).

Given the breadth of this project's scope, many of the conclusions and recommendations presented here are relevant not only to development of a farm biodiversity certification scheme, but also to the wider Agricultural Stewardship Package and supporting policy.

4.1 Criteria for success

The following key themes of value proposition, additionality, geographic context, targets, adoption and longevity have been considered in developing the listed criteria for success of an Australian farm biodiversity certification or verification scheme.

4.1.1 Value proposition

As noted in the consultation process, farm biodiversity certification or verification scheme designers must decide on a clear objective; i.e. is the purpose to:

- Substantiate claims to clean green products
- Provide an additional income stream for farmers – *having a secondary source of income dependent on the rules of a scheme is risky as benefits could shift as the rules change, undermining the reliability of the income source.*
- Maintain a social licence to operate – *if so, an outcome-based scheme may be a better approach as the results are visible and benefits are easily realised.*
- Address specific environmental concerns – *e.g. global warming, water quality, soil degradation, species loss etc.(NB: there are geographical and participatory difficulties associated with this)*

The contexts in which sustainability/biodiversity outcomes could be enhanced on Australian farms via certification/verification schemes include:

- Protecting the sustainability of landscapes so that ecological collapse is avoided and natural capital is protected
- Providing the ability for ongoing demonstration of the environmental credentials of Australian agricultural production to domestic and global markets (thus meeting requirements for maintain market access)
- Retaining community trust to operate

4.1.2 Additionality

Additionality is an assessment of whether a new policy or scheme generates additional benefit that would not have otherwise occurred. When a program pays money to people to change their behaviours, the environmental benefits that result should be additional to the environmental benefits that would have occurred anyway, in the absence of the payments (Pannell, 2017).

Additionality is difficult to assess, as the value proposition for the farmer varies with commodity prices, production parameters, other market conditions, amongst many other factors. Means of assessment include farm-by-farm bioeconomic modelling or a regional or district approach to determine "common practice".

Thamo and Pannell (2016) provide an extensive discussion on the strengths and weaknesses of each approach, with respect to a GHG sequestration scheme. Whilst the farm-by-farm approach is likely to yield the most accurate assessment of additionality, the transaction costs of this approach are large, compared with the "common practice" approach.

Recognition of the existing ecosystem services and habitat provision on farms, regardless of the cause of such provision (for example, through regulatory compulsion or ongoing funding), is pivotal to farmer engagement on additionality questions.

4.1.3 Geographic context

It will also be vital that any proposal considers the jurisdictional dynamics inherent in this topic, as landholders are more directly impacted by the States than the Commonwealth. Existing compatible offerings (e.g. sustainable agriculture, land care and NRM initiatives) and State regulatory context will strongly influence landholder appetite for investment in the next phases of a proposed Scheme.

There is a notable difference between farm businesses in Australia's west and east regarding export and domestic markets. Increased cost of production will affect the west more than the east as international consumers are less willing to pay for biodiversity than domestic consumers.

Phase 2 of the project should consider targeting for most benefit (e.g. difference in local and international market premiums) and targeting for least cost (e.g. adoption may cheaper in WA and north than the eastern states).

4.1.4 Targets

The scope of the scheme (commodities, geographical area, proximity to population, global or domestic markets) is likely to be important in the type of target/s chosen. Some production systems will be unable to reach outcome-based targets as their management activity extends over large areas where change is gradual. Forum participants highlighted diminishing returns to landowners for schemes that have targets that are too onerous to meet.

The ease of compatibility of the target with other frameworks, such as global standards will make participation in multiple schemes easier. For example, a grains farmer who complies and delivers to the EU Canola Certification will have a lower transaction cost when applying for certification for another scheme with similar criteria. Targets should be compatible with other schemes to allow farmer to shift between multiple schemes and have a common set of indicators.

Caution is required regarding the use of targets unless long-term (political and industry) commitment to the scheme can be guaranteed. If the scheme is short-term then farmers can opt in and opt out, meaning there is no guarantee of biodiversity improvement in any given year.

4.1.5 Adoption

Large-scale adoption or uptake in a scheme is critical to deliver a biodiversity outcome. Historically, participation in biodiversity related schemes aimed at broadacre farming systems has been low (Kragt et al., 2017). Consideration must be made in the designing stage of a scheme as to how uptake will be monitored and improved upon. Social networks will play an important role in fostering adoption with adopter types different for biodiversity scheme compared to motivators for the adoption of production technology.

4.1.6 Longevity

Setting a time frame assumes that the environmental issue will be resolved at that point in time. There are risks that on exit, biodiversity condition may worsen if majority of farmers choose not to continue with the management practices.

To ensure longevity of the intended outcomes of these environmental stewardship programs, market-based instruments which provide an ongoing incentive to protect biophysical assets and natural capital are needed.

In the case of a carbon sequestration scheme, Thamo and Pannell (2016) suggest allowing participants to leave a scheme by purchasing replacement abatement so as not to sacrifice the GHG integrity of the programme. They note that this option may increase farmer participation.

Programs such as Caring for our Country, which was combined with the National Landcare Program in 2013, offered multi-year funding to provide certainty for stakeholders in addressing natural capital degradation by protecting and improving the condition of soils, water quality and flows, vegetation and biodiversity on-farm.

4.1.7 The 10 criteria

The following 10 criteria have been identified as necessary to ensure the successful establishment of an Australian farm biodiversity certification scheme. While some of these criteria may seem generic or self-evident, the authors cannot stress highly enough the importance of ensuring there is no room for assumptions or ambiguity in development of a scheme.

1. Clearly and succinctly **define the scheme objective**(s), using SMART goals: specific, measurable, attainable, relevant and time bound.
2. Demonstrate how the scheme's SMART goals **meet relevant global and local standards** used in the target markets and supply chains.
3. Rationalise the **choice of policy instrument** that delivers the scheme objective(s) in the way that provides the least cost pathway for farmers to meet the scheme objective and incentivises participation within the specified time frame.
4. **Account for the participant's track record** in practice, making it easier and more rewarding for them to enrol in the scheme. This will enable participants to **stack benefits** across multiple schemes at a lower cost.
5. Demonstrate a sound process for **measurement, monitoring and evaluation** of goals.
6. **Set out the costs** for delivery, measurement, monitoring and evaluation of scheme goals.
    a. Identify the costs associated with scheme design and administration and costs associated with participation.
    b. Assess which costs are likely to be the most important, who bears them, and how they impact on different aspects of scheme design, implementation, monitoring and evaluation.
7. Specify a **time commitment to participation**, to allow an assessment of the return on investment from participation and a process for negotiating an exit plan for participants that ensures the outcomes that have been accumulated by participation are not lost.
8. Ensure the enduring benefit of the scheme by:
    a. identifying the management activities where **ongoing maintenance** will be required and making allowances in the scheme design provide for these;
    b. encouraging activities that are attractive enough to participants to **continue** after the scheme has ended.
9. Provide evidence on the track record and governance structure for the scheme administrator in delivering similar programs.
10. Assess the **commonality of the management activities** used to meet the scheme objectives at a meaningful landscape scale, within all relevant industries and bioregions.

4.2 Synthesis of findings

4.2.1 Synthesis overview

Farm businesses will deliver biodiversity outcomes and be rewarded for delivering those outcomes through multiple pathways and schemes. This is already happening at a variety of scales, e.g. from premiums for sustainably certified grain through CBH down to premiums for biodiversity provenance at farmers' markets.

Farmers, industry groups and supply chain actors understand and support the need to defensibly promote Australian agriculture's sustainability credentials, recognising the leverage this offers in trade negotiations, market access, meeting international policy obligations, compliance with sustainable development goals (SDGs), and access to competitive finance and insurance.

Identification of and compliance to suitable global standards is essential for leveraging Australian farmers' stewardship efforts in the international marketplace. A whole-of-agriculture approach to providing the evidence of sustainability and biodiversity management for this context will be more efficient than relying on multiple smaller schemes.

However, support for a new certification scheme per se was not evident in the consultation process. The idea of certification (rather than verification) was not seen as providing direct value to the farmers and only limited value to supply chain actors. It should be noted that while the project authors understand certification as the policy-agnostic confirmation of certain characteristics via the provision of official documentation, many stakeholders consulted for this project perceive certification differently. Some see it as a blunt instrument requiring extra work which is not always used for positive outcomes. Others are cautious about certification being pitched as a stand-alone process or first step in a complex approach, and were conditionally supportive of certification as part of a more integrated and defined pathway to reward.

The potential negative outcome of a certification scheme – i.e. penalisation for non-participants – was also raised repeatedly. Another consideration raised was the potential of a new scheme to divert capital, resources and energy from existing programs. This could be solved by stacking or bundling credits under an overarching framework for biodiversity and/or sustainability goals.

In addition, the extent and diversity of Australian agricultural production systems makes it unlikely that a single farm certification scheme could ever be both specific enough yet also have broad cross-sectoral appeal to deliver outcomes at scale. Due to these factors, a single scheme that attempts to certify or verify biodiversity outcomes on farm could be counterproductive. However, existing and developing reward pathways will not deliver the desired whole-of-agriculture demonstration of biodiversity outcomes.

An Australian agriculture solution must avoid compromising, competing with or counteracting the multiple reward pathways through which farmers may wish to participate in delivering biodiversity and sustainability outcomes. To deliver this solution, the Australian government should focus on verifying schemes which deliver the desired outcomes against a meta-standard or overarching framework of biodiversity stewardship.

By verifying schemes rather than certifying farms, the Government will not interfere with supply chains and markets and is more likely to deliver outcomes at scale. In addition, verifying schemes against a meta-standard will enable a wider and more flexible range of potential approaches suitable to different farm businesses across the heterogeneous sectors and AEZs that comprise the Australian agricultural landscape.

Verifying biodiversity schemes under a meta-standard can benchmark outcomes for:

- **Natural capital reporting systems and markets**
- **Certification against hard targets**
- **Schemes that require additionality and/or reporting of existing ecosystem services**
- **Biodiversity measurement systems**
- **Sustainability measurement systems**

All of the above points are valid approaches to delivering biodiversity outcomes; e.g. a large private equity investment into a farm business may use a natural capital accounting approach to demonstrate improvement in environmental performance in compliance with their ESG reporting targets, or a farm operating in an environmentally sensitive area may need to be certified against stringent targets that demonstrate minimal impact.

A common factor of all schemes verified under this approach must be that they provide the mechanism by which farmers showcase biodiversity outcomes. To showcase outcomes, well characterised (and potentially standardised) measurement systems and data transfer will be desirable. Continued iterative research and robust methodological development, governance and consultative structures will be required to enable these systems.

4.2.2 Data

To achieve success, land use management policy decisions must **account for the value** of biodiversity via transparent goals and achievements (Mori Junior et al., 2016; Vihervaara et al., 2015). However, data gaps in agricultural systems are impeding the development of evidence-based policy (Darnell et al., 2018). Care must be taken to avoid potentially perverse outcomes of proposed biodiversity schemes; a particular risk when data is lacking or opaque (Gordon et al., 2015).

Adoption of biodiversity schemes in agriculture requires trust from participants, built on a value proposition underpinned by the evidence-based demonstration of social, environmental and economic benefits (Torabi, Mata, Gordon, Garrard, Westcott, et al., 2016; Vihervaara et al., 2015).

Both quantitative and qualitative data are essential to effectively implement and accurately assess ecosystems services schemes, thus **frameworks for decision-making under uncertainty and integrating disparate data sets** must be considered in the foundational stages (Ansell, Freudenberger, et al., 2016; Torabi, Mata, Gordon, Garrard, Westcott, et al., 2016; Vihervaara et al., 2015).

Systems intended to incentivise biodiversity improvement cannot succeed without the **solid foundation of data**, to ascertain defensible baseline measurements, evaluate ongoing changes, justly incentivise participants and demonstrate societal value via the improvement of natural capital.

The systematic collection, aggregation, analysis and synthesis of disparate data sets (both new and existing) will enable a farm biodiversity verification scheme to assess and appropriately reward land managers for natural capital stewardship. To ensure this happens, the scheme's designers should:

- Establish a data lake (e.g. managed by the Australian Research Data Commons)
- Devise a robust framework for decision-making
- Institute a 'meta-standard' or overarching framework under which relevant programs and initiatives can be harmonised

This meta-standard would provide an independent benchmark against which the relative strength of a verification or certification program could be assessed to provide surety and enable a pathway for

rewards. Given the fast-changing physical and political environments in which these data solutions will be deployed, it will be important for the scheme's designers to take an agile and iterative approach to development, where implementation and evaluation of these interconnected solutions are non-linear and iterative. (Figures 5 & 6).

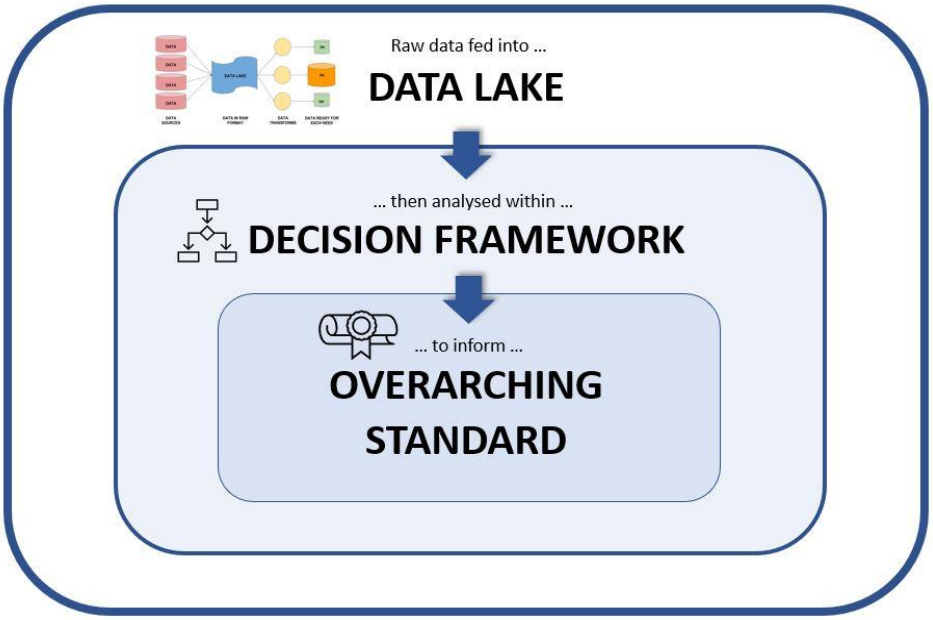

Figure 5: Suggested high-level data management framework

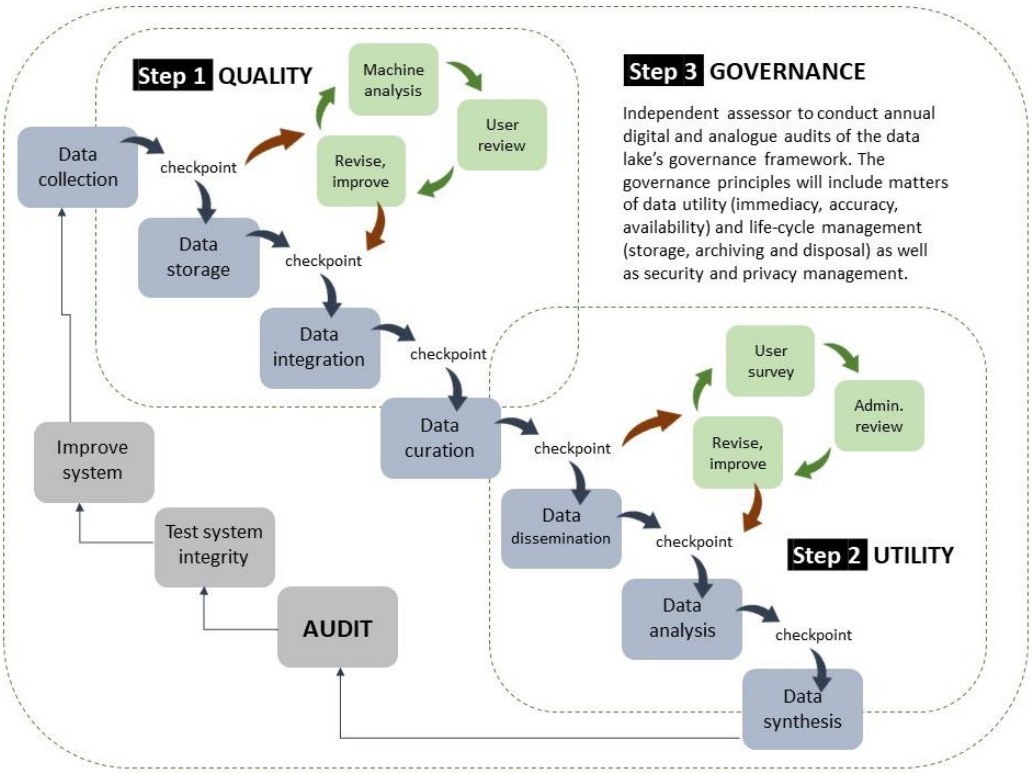

Figure 6: Staged, continuous evaluation of the proposed data lake

4.3.3 Reward

Capital to deliver sustainability outcomes in agriculture is nominally available; however, that capital will be applied through supply chains or large private equity investments (rather than pooled to be available to multiple small farms) for efficiency of transaction at scale.

Different reward pathways will have slightly different requirements for certification and targets, while still having the fundamental purpose of showcasing biodiversity outcomes. Within the broader context of an industry that is demonstrating its biodiversity credentials there will still be competitive market opportunities that are captured through bespoke systems and schemes.

The objective for participation in the scheme must be clearly defined. There are many existing and emerging pathways in which a farmer or farm business may be rewarded for delivering biodiversity outcomes on their farm. The range of possible rewards include:

- **direct financial benefit to the farm business**
    - receiving payments for positive biodiversity outcomes which offset negative outcomes elsewhere
    - trading
    - premiums for outputs
- **industry reward**
    - maintaining market access or developing new markets because of the sustainability credentials of the industry
    - avoiding disruptive regulatory impact
    - building the brand of an industry or region
- **personal reward**
    - delivering a public good and protecting sensitive areas

4.3.4 Regulation

Respondents clearly emphasised that while a farm biodiversity verification scheme would be welcomed, adding an extra layer of regulation on top of existing strictures would be a strong disincentive to participation. Any future scheme must find a way to recognise existing systems in play and offer an easy point of entry into a verification model for those not yet on the sustainability 'journey'.

As noted in the Craik review of the EPBC, farmers already perceive the Act to be complex and difficult to follow and therefore a barrier to development (and conservation of biodiversity). The Craik review found farmers viewed an incentive/market-based approach as likely to be more successful in achieving the Act's objectives, which was supported by the consultation undertaken for this project. Some of the comments illustrating this sentiment included:

- *"Extremely concerned this will be used to create a new minimum standard and force more regulation onto farmers."*
- *"All farmers that I know already use sustainable farming methods. There is already way too much red and green tape for agriculture and farming."*
- *"This is just another way to tie farmers up and stop them from producing the food and fibre that feeds our nation and the world. Governments and bureaucrats need to get out of the way."*

4.3.5 Adoption

Farmers are more likely to embrace and adopt schemes that are immediately relevant to them through connections to industry BMP, local NRM groups, or applicable market supply chains.

Accountability about goals and achievements is key to the success of any scheme, both from a scientific validation standpoint and also to ensure stakeholders' expectations are managed and trust is engendered. Legitimacy cannot be achieved without building trust among all relevant stakeholders, and this trust must be underpinned by transparency and the **evidence-based demonstration** of positive social, environmental and economic outcomes.

Stakeholders consulted for this project noted a scheme should be **built from the bottom up** rather than the top down, meaning farmers should be extensively involved in the development and implementation of a scheme as well as the assessment, collection and reporting. Transparency and authenticity were highlighted as key principles to enhance adoption.

A primary concern raised consistently during consultation was additionality; i.e., how to ensure farmers already implementing biodiversity improvement practices would not be disincentivised from participating in a verification scheme.

4.3 Recommendations

1. An Australian farm biodiversity scheme should verify relevant initiatives (new and existing) which deliver the desired outcomes against an **overarching framework or meta-standard of biodiversity and sustainability stewardship** (*Figure 7*),
    a. allowing for commodity and geographical differences in biodiversity priorities, targets and management strategies, and
    b. recognising existing systems in play.

2. The scheme must deliver **evidence-based demonstrations** of positive social, environmental and economic outcomes within a bespoke, transparent and structured data management framework, founded on good governance with clear metrics as the outcome.
    a. *Metrics:* A market-based mechanism requires a trusted, tradeable metric.
    b. *Governance*: governance principles for measurement must include data utility (immediacy, accuracy, availability) and life-cycle management (storage, archiving and disposal) as well as security and privacy management.

3. The verification scheme must be **concordant with global standards** to leverage stewardship efforts in the global marketplace and enable progress towards international sustainability targets.

4. As confusion still exists regarding the scheme's intention, the **primary objective** and the rewards for participation must be clearly defined by the scheme's designers.

5. Local and industry knowledge, experience and expertise embedded in existing programs must be recognised and integrated into the scheme, to avoid alienating farmers and land managers via a 'top-down' and/or regulatory approach.

6. A Government-facilitated scheme must **complement (and not disrupt) rapidly emerging commercial opportunities** to be rewarded for agricultural stewardship.

7. The scheme must recognise **parallel and additional market benefits** that can be realised by farmers delivering multiple sustainability outcomes;
    a. for example, biodiversity outcomes could be rewarded by co-stacking benefits via additional or premium payments extended through schemes such as the CSF.

Figure 7: Example of potential farm biodiversity overarching (meta-) standard feedback loops

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Appendix

Appendix 1: Subject matter expert interviewees

Name	Current Position	Context
Anthony Fitzgerald	*Executive Director and Co Secretary – Carbon Conscious Investments Ltd*	Carbon Conscious Investments manages projects which deliver ACCUs, including carbon farming, broadacre agricultural production and agroforestry.
Cameron Gibson	*Farmer – Queensland*	Mr Gibson is a participant in the Queensland LRF process.
Dr Mila Bristow	*Senior Manager, Research – AgriFutures Australia*	Dr Bristow joined AgriFutures in early 2020 and will initiate, drive and develop programs to support sustainable growth of levied industries.
Dr Noel Preece	*Director – Biome5*	Biome5 undertake environmental management and consulting services for northern Australian businesses. Dr Preece holds a PhD in ecology and has a special interest in the long-term future of biodiversity.
Dr Steve Wiedemann	*Principal Research Scientist – Integrity Ag and Environment*	Dr Wiedemann's key areas of expertise include waste and nutrient management, carbon accounting, environmental management, ERF projects and environmental guideline development.
Dr Robyn Leeson	*Principal – STR Consulting Australia, and Vice-chair - GSSB*	Dr Leeson has extensive experience in environmental and broader sustainability fields. She is currently developing the GRI agriculture standard (which is on a similar timeline to the wider stewardship project).
Hollie Baillieu	*Manager, Government Relations - Woolworths*	Ms Baillieu's understanding of the agricultural industry and policy environment provides insights into retailers' perspective of a scheme.
Ian McConnel	*Global Commodity Leader, Beef – World Wildlife Fund*	Mr McConnel's role is to coordinate WWF's work on beef production across the world.
Ilona Miller	*Partner & Head of Global Climate Change practice – Baker McKenzie*	Baker McKenzie is a global law firm specialising in new markets. Ms Miller has extensively worked on the development of carbon funds, carbon contracts and carbon transactions in both voluntary and compliance markets.
Jim Adams	*Chief Executive Officer – National Landcare Network*	The National Landcare Network is the representative body for Landcare groups across Australia.
Dr Kate Andrews	*Executive Officer – NRM Regions Australia*	NRM Regions Australia delivers plans and programs to support viable communities, healthy and productive landscapes and sustainable industries. Dr Andrews is also a consultant and visiting lecturer at the ANU Fenner School for Environment and Society.
Lisa McMurry	*Learning and Program Development Manager – Aboriginal Carbon Foundation*	The AbCF supports carbon farming projects, led by Indigenous rangers. Ms McMurry worked on the research and development for the AbCF Core Benefits Verification Framework.
Mark Bennett	*Head of Agribusiness and Specialised Commercial - ANZ*	Mr Bennett's leads ANZ Agribusiness in Australia with a focus on strategy designed to deliver information and promote positive change for the finance industry.
Natalie Williams	*Nuffield Scholar*	Ms Williams studied soil carbon sequestration via a Nuffield scholarship in 2012. She now undertaking biodiversity and carbon farming projects in NSW and QLD.

Prof. John Rolfe	*Professor – Central Queensland University*	Prof. Rolfe has extensive practical and policy experience with agricultural and environmental issues in northern Australia. He operated a cattle property in the Central Queensland region for many years.
Prof. Mark Morrison	*Associate Dean, Research – Charles Sturt University*	Prof. Morrison's past research work and current interests are on areas including market-based instruments, non-market valuation and climate change communications.
Prof. Robert Fraser	*Professor of Agricultural Economics – University of Kent*	Prof. Fraser is currently designing a new CAP for the UK - his research areas include farmer motivation in payment for services schemes and agri-environmental policy design.
Prof. Ross Kingwell	*Chief Economist – AEGIC*	AEGIC provides market insight, innovation and applied technology in the grains industry. Prof. Kingwell has extensive agricultural economics and business analyst experience.
Scott Wallace	*Hort360 Manager – Growcom*	Hort360 is the voluntary best management practice program for horticulture which includes a module on biodiversity.
Tony Gleeson	*Chief Executive Officer – Australian Land Management Group*	ALMG's Certified Land Management (CLM) system provides an independent verification of performance on improvements of productivity, animal welfare, environmental management and risk management for landholders.

Appendix 2: Catalogue of schemes

Name	Countries	Sector/s	Target outcome	Type of scheme	Scope within the supply chain	Participation	Management of accreditation	Method for compliance	Policy drivers	Reward
Cotton Made in Africa	Africa	Cotton	Best practice	Certification	Farm + processor	Voluntary	Independent Auditor	Management-based	Improving farmer conditions	Social Licence
Aboriginal Carbon Foundation	Australia	Various	Carbon	Market mechanism	Farm only	Voluntary	Local Ranger	Approved methodology	environmental improvement and social impact	Economic e.g. sale of credits
Australian Eggs Sustainability Framework	Australia	Eggs	Sustainability	Framework	Farm only	Voluntary	Steering Group/ Committee	Various data sources	Social licence	Social Licence
Beef Sustainability Framework	Australia	Beef	Sustainability	Framework	Whole of supply chain	Voluntary	Steering Group/ Committee	Various data sources	Social licence	Social Licence
Behind Australian Grains ***(under development)***	Australia	Grains	Sustainability	Framework		Voluntary				
Dairy Sustainability Framework	Australia	Dairy	Sustainability	Framework	Farm only	Voluntary	Steering Group/ Committee	Various data sources	Social licence	Social Licence
Emissions Reduction Fund	Australia	Multiple	Carbon	Government payments	Farm only	Voluntary	Independent Auditor	Approved methodology	Combatting carbon emissions	Economic e.g. sale of credits
Hort360 (Growcom)	Australia	Horticulture	Best practice	Certification	Farm only	Voluntary	Independent Auditor	Management-based	Social licence + improved productivity	Social Licence
Horticulture Sustainability Framework ***(under development)***	Australia	Horticulture	Sustainability	Framework		Voluntary				
Making More from Sheep	Australia	Sheep & Wool	Best practice	Guideline	Farm only	Voluntary	Group behind the scheme	Management-based	Improving farms	Improving farm e.g. productivity
MLA CN30 Project	Australia	Red Meat	Sustainability ; carbon	Guideline	Whole of supply chain	Voluntary	Group behind the scheme	Various data sources	Social licence	Social Licence + market access
MyBMP	Australia	Cotton	Best practice	Standards/ certification	Farm + processor	Voluntary	Independent Auditor	Management-based	Social licence + improved productivity	Social Licence
NAB AgForce Natural Capital Project ***(under development)***	Australia				Farm only	Voluntary				

National Feedlot Accreditation Scheme (NFAS)	Australia	Livestock lotfeeding	Best practice	Certification	Processor	Voluntary	Independent Auditor	Management-based	Market access	Social Licence + market access
Reef Credit Scheme (by Green Collar)	Australia	Farms in reef catchments	Improving water quality	Market mechanism	Farm only	Voluntary	Group behind the scheme	Approved methodology	GBR health	Economic e.g. sale of credits
SmartCane BMP	Australia	Sugar	Best practice	Certification	Farm only	Voluntary	Independent Auditor	Management-based	Social licence/market access	Social Licence
Sustainable Grain Australia (Canola into EU)	Australia	Canola	Sustainability	Certification	Farm + chain of custody	Voluntary	Group behind the scheme	Self-declaration & audit	Market access	Market Access
Sustainable Winegrowing Australia	Australia	Grapes & Wine	Sustainability	Certification	Farm + chain of custody	Voluntary	Independent Auditor	Management-based	Social licence/market access	Social Licence
Brigalow Nandewar Biolinks *(completed 2012-17)*	Australia (Northern NSW)	Multiple	Biodiversity	Government payments	Farm only	Voluntary	Group behind the scheme		NRM/social licence	Social Licence
Territory Conservation Agreements (TCA)	Australia (Northern Territory)	Multiple	Best practice; biodiversity	Government payments	Farm only	Voluntary	Group behind the scheme	Management-based & infrastructure	NRM	Social Licence
NSW Biodiversity Offset Scheme	Australia (NSW)	Multiple	Biodiversity	Government payments	Farm only	Voluntary	Independent Auditor	Approved methodology	Protection of biodiversity	Economic e.g. sale of credits
QLD Land Restoration Fund	Australia (QLD)	Multiple	Carbon	Government payments	Farm only	Voluntary	Independent Auditor	Approved methodology	Diversifying income/ Combatting carbon emissions	Economic e.g. sale of credits
Midlands Conservation Fund (Tasmanian Land Conservancy & Bush Heritage Australia)	Australia (Tas)	Multiple	Biodiversity	Market mechanism	Farm only	Voluntary	Group behind the scheme	Outcome-based	Be rewarded for conservation efforts	Economic e.g. sale of credits
Australian Sustainable Products (ASP Certified)	Australia + some Asian countries	Grains/pulses mainly - also grazing, hort & viticulture	Sustainability	Certification	Farm only	Voluntary	Independent Auditor	Management-based	Social licence / price premium	Social Licence
CRSB Certified Sustainable Beef Framework	Canada	Beef	Sustainability	Certification	Whole of supply chain	Voluntary	Independent Auditor	Outcome-based	Social licence /environmental	Social Licence
Farm Sustainability Readiness Tool	Canada	Grains & Pulses	Sustainability	Self-assessment	Farm only	Voluntary	Individual Farmer	Management-based	Social licence/ market access	Market Access

NZ Global G.A.P. Equivalent (Good Agricultural Practices)	New Zealand	Fruit & Vegetable	Sustainability	Certification	Farm only	Voluntary	Independent Auditor	Management-based	Social licence/ market access	Market Access
Farm Sustainability Services (Ballance)	New Zealand	Multiple	Sustainability	Guideline	Farm only	Voluntary	Group behind the scheme	Various data sources	NRM/Navigating regulation	Social Licence
Indigo Carbon	US	Grains & Pulses	Carbon + Soil Health	Market mechanism	Farm only	Voluntary	Group behind the scheme	Various data sources	Environmental	Economic e.g. sale of credits
CLEAR30 ***(under development)***	US (limited states)	Multiple	Improving water quality	Government payments	Farm only	Voluntary	Group behind the scheme		Environmental	Economic e.g. sale of credits
Better Cotton Initiative	Worldwide	Cotton	Best practice	Standards	Farm only	Voluntary	Individual Farmer	Management-based	Social licence	Social Licence
Bonsucro	Worldwide	Sugar	Sustainability	Certification	Whole of supply chain	Voluntary	Independent Auditor	Management-based	Social licence	Social Licence
Forestry Stewardship Council	Worldwide	Forestry	Sustainability	Certification	Farm only	Voluntary	Independent Auditor	Management-based	Social licence	Social Licence
ISEAL Alliance	Worldwide	Multiple	Sustainability	Standards	Whole of supply chain	Voluntary	Group behind the scheme	Management-based	Social licence	Social Licence + market access
Roundtable on Sustainable Palm Oil	Worldwide	Palm Oil	Sustainability	Certification	Whole of supply chain	Voluntary	Independent Auditor	Management-based	Social licence	Social Licence
The Marine Stewardship Council (MSC) Fisheries Standards	Worldwide	Fisheries - marine & freshwater	Sustainability	Certification	Farm + chain of custody	Voluntary	Independent Auditor	Management & outcome-based	Social licence / price premium	Social Licence
UTZ and Rainforest Alliance (merged in Jan 2018)	Worldwide	Coffee, Cocoa, Tea, Hazelnuts	Sustainability	Certification	Farm only	Voluntary	Local field officers		Deteriorating environmental health	Social Licence
Roundtable on Responsible Soy (RTRS)	Worldwide - mainly Brazil & Argentina	Soy	Sustainability	Certification	Whole of supply chain	Voluntary	Independent Auditor	Management-based	Social licence /environmental	Economic - sale of credits
Common Code for the Coffee Community	Worldwide - mainly developing countries	Coffee	Sustainability	Certification	Farm only	Voluntary	Independent Auditor	Management-based	Social licence	Improving farm e.g. productivity
Fairtrade	Worldwide - mainly developing countries	Multiple	Sustainability	Certification	Farm only	Voluntary	Local field officers	Management-based	Improving small-holding farmers conditions	Minimum price/price premium

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