BANKLESS IRRIGATION

An assessment of environmental regulation and economic implications for bankless irrigation technologies

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A report prepared for the Cotton Research & Development Corporation by Ag Econ Australia Pty Ltd

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Executive Summary

Historically, the Australian agricultural sector has engaged with sustainability schemes and reporting on a voluntary basis. However, on 1 January 2025, the Australian Government introduced mandatory climate-related financial disclosure reporting, called the Australian Sustainability Reporting Standards (ASRS) AASB 2 (referred to as ASRS in this report for brevity). The ASRS are standards for assessing and disclosing information about an entity's climate and sustainability-related risks and opportunities. Only one of the ASRS standards is mandatory at this stage, ASRS AASB 2, and is the focus of this report.

The introduction of the ASRS means that many large companies and institutions, including farms, which meet certain criteria around revenue, gross assets, or number of employees are, or will be, required to report their greenhouse (GHG) emissions data under a new framework. This includes scope 1 and 2 emissions initially, followed by scope 3 emissions. Smaller entities that are not required to report directly may need to supply their GHG emissions data to third parties within their supply chain, so that their supply chain can meet their scope 3 emissions requirements. Supplying scope 3 emissions data to reporting entities is likely to have the largest effect on cotton farming businesses in the immediate future, especially in relation to banks (and potentially insurers), who have a direct line of sight to their clients. Limited and complex cotton supply chain traceability will likely result in, for example, brands and retailers relying on secondary data, such as industry averages, in the first instance rather than farm-specific primary data for their scope 3 emissions reporting. The development of a robust, Australian-specific cotton emissions intensity database in line with emerging guidance is needed to keep Australian cotton competitive in world markets.

A survey of the rural lenders and farm insurers revealed strong activity from the banking sector on engaging their farming clients in collecting farm-specific GHG emissions data. All the bankers and finance brokers surveyed reported discussions with farmers linked to ASRS compliance. In contrast, the insurance industry brokers, and farm underwriting representatives, had no awareness and were not conversant in understanding the ASRS reporting requirements. The bankers surveyed were also aware of voluntary Taskforce on Nature-related Financial Disclosures (TNFD) reporting and obligations, however respondents alluded to the recent "Trump effect" of railing against environmental regulation which inferred TNFD as regulatory overreach. Banks, when asked if ASRS reporting requirements were likely to create a "price on sustainability" in the future, a mixed response ensued with almost half of responses claiming, "it's already happening" to "the credit market is already too competitive to draft discounts and premiums among clients". A small survey sample of cotton brands and retailers suggested that scope 3 reporting in the cotton supply chain remains likely, although limitation and usefulness of industry data exists until a trusted traceability scheme can be implemented to track the source of fibre to farm. Large companies in this sector affected by ASRS were content to use secondary data to fulfil ASRS requirements. Demonstrating biodiversity stewardship was also mentioned as a key sustainability metric for brands and retailers. Supply chain requirements remain an area of more detailed future research.

As the irrigated cotton industry experiences a shift to more resilient systems, introducing bankless irrigation that can adapt to extreme weather conditions, reduce inputs without compromising yield, and produce higher output per labour unit there may result in small benefits for agriculture finance and ASRS strategy reporting. A minority group of banks had plans or finance products in place to offer more competitive credit for investing in more efficient irrigation infrastructure if environmental gains could be proven. Separately, bankless irrigation does satisfy the main criteria as a strategy for specifically dealing with several risks under the AASB S2 core topics.

A survey of specialist property valuers and irrigators found the flow on monetary gains to asset valuation following the installation of bankless systems can be in the range of $500 to $2,000 per hectare, with access to labour as the primary driver. An economic analysis using a Whole Farm Modelling (WFM) approach sensitivity tested these valuation uplift scenarios with two installation cost outcomes ($600/Ha and $4,200/Ha) each investigating 400 Ha and 782 Ha of development respectively. The overall equity position of the farm, considering a 20% water saving and $230/Ha labour saving under the new operating scenario, the WFM was a very resilient system with a strong asset and earning base. Only in the high cost ($4,200), low valuation (+$500/Ha uplift) and the whole-of-farm development did return on assets and return on equity erode considerably, owing in-part to the relatively conservative Debt/Equity ratio of 82%. Current day assets and earnings were applied to the WFM. These results are exploratory only and should be viewed as a snapshot at a particular location at a particular point in time. It may be inaccurate for farms with markedly different soil type, climate, and resources to those of the Lower Namoi Valley representative farm.

Introduction

Businesses are embedded within the natural environment and natural systems. Their supply chains, operations, and products fundamentally depend on and impact nature. They are therefore increasingly affected by the consequences of depletion and degradation of nature, for example, through reduced availability of natural resources, such as irrigation water, and essential ecosystem services, or via increased regulation and social concern about business impacts on the environment.

These potential effects on businesses are now starting to be described as nature-related risks, for example, by the Taskforce on Nature-related Financial Disclosures (TNFD). The TNFD defines nature as the interaction between Environmental assets and society, as shown in Figure 1. In addition, newly legislated mandatory climate reporting in Australia requires businesses to disclose against the Australian Sustainability Reporting Standards (ASRS) Climate Standard, AASB S2. Further, the top four global risks over the next 10 years, as identified by the World Economic Forum, are all nature-related: Climate action failure, failure of climate change adaption, extreme weather, and biodiversity loss and ecosystem collapse (with human environmental damage and natural resource crises also in the top 10).

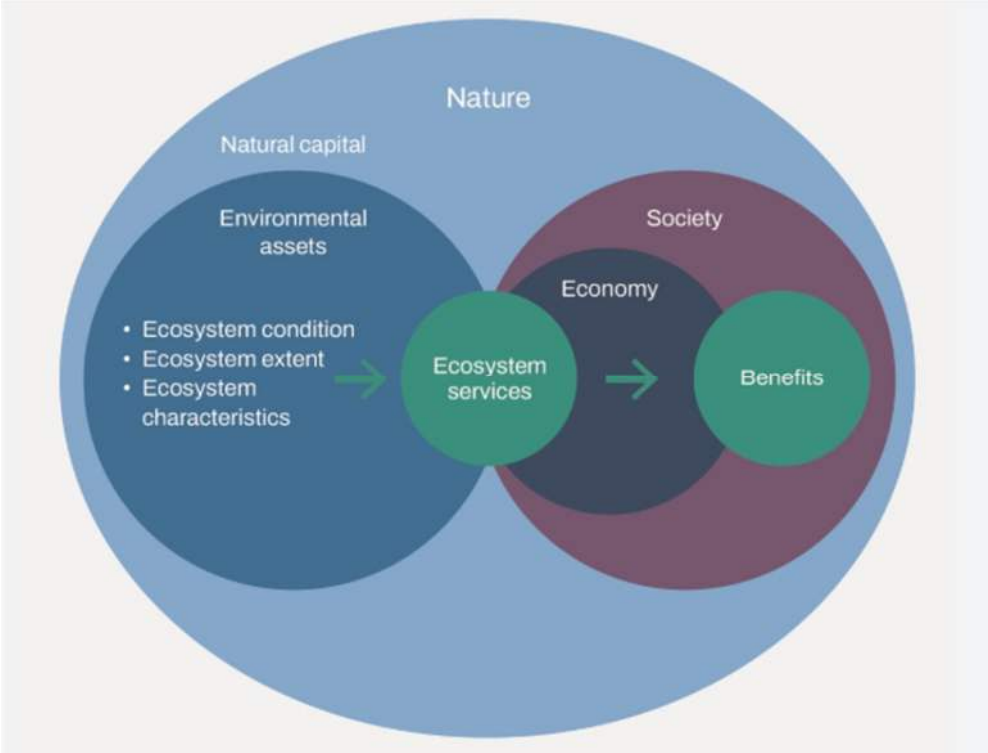

Figure 1: The interaction between nature and society, as defined by the TNFD

At the same time, risks can also create opportunities. For example, opportunities related to the improved management of climate and nature-related risks. This highlights the imperative for businesses to understand how climate and nature-related risks (and opportunities) translate into business risks (and opportunities), and for lenders and investors to understand the implications across their loan books and investment portfolios.

There are growing expectations of businesses to measure and report on nature-related risks to provide assurances to their key stakeholders that they are operating sustainably due to the impact of these risks on corporate strategy and social licence. A recent legal opinion has found that these risks are reasonably foreseeable and that directors of companies may be legally liable for failing to consider these risks in the discharge of their fiduciary duties (Smith et al., 2024). Despite this, the TNFD states that most businesses are currently not adequately assessing or disclosing their nature-related risks.

One consideration overlooked in the transition to reporting nature-related risks is the impact on land values and the financier's view of sustainable practice change, which is yet to be explored. With strong annual appreciation in land

values through the last two decades (Rural Bank, 2024), irrigators relationship with debt service providers is becoming increasingly important. Those wishing to expand operations or deal with family succession require support and endorsement of their banks to access debt capital to fund productivity. Equally, lenders have their own ASRS and TNFD disclosure requirements that their customers must adhere to. The intersection of both the finance industry and irrigators preparation for mandatory climate-related reporting and potentially TNFD reporting of adaptation measures, such as irrigation efficiencies, is therefore highly relevant.

Bankless Irrigation

Bankless irrigation systems remove the need for portable siphons, significantly reducing labour requirements. These systems can also result in machine efficiency in turning, converting to energy and higher machine hectares per hour. Other input efficiencies such as improved water and nitrogen use efficiency have been identified in sugar, cotton, cereals and rice studies; however, the quantum of improvement is highly dependent on the baseline efficiency of the existing system. Structural designs vary but generally involve high flow rates with all furrows in each bay irrigated at once (Figure 2). Bankless systems can remove storm water more quickly and efficiently during intense rainfall events, reducing denitrification events and production of nitrous oxide emissions. The business case for bankless has been the focus of irrigated industries over the last decade, with studies finding a trifecta of benefits in most cases: water, labour and improved nitrogen use efficiency (Welsh, 2024a, Welsh, 2024b). There is little doubt that farms with these systems are more resilient, often operating with lower inputs and manage their crops with greater precision through more nimble water management. For these reasons, the links between preparedness for a warming climate including more extreme events and best practice management in irrigation may have dual benefits as mandatory reporting requirements filter through various agricultural supply chains.

Figure 2: A small pipe through the bank, or bankless system used to irrigate cotton at "Waverley" Wee Waa

Research Questions

This study has two interlinked but separate topics of investigation.

1. What are the economic and financial implications of improving farm productivity in ways that enhance system and climate resilience?

2. Does installing bankless channel irrigation lead to a more robust farming business with a flow-on appreciation of farmland value?

Method

The study method consists of three parts: Literature review, survey, and whole of farm model. The method is illustrated in Figure 3 below.

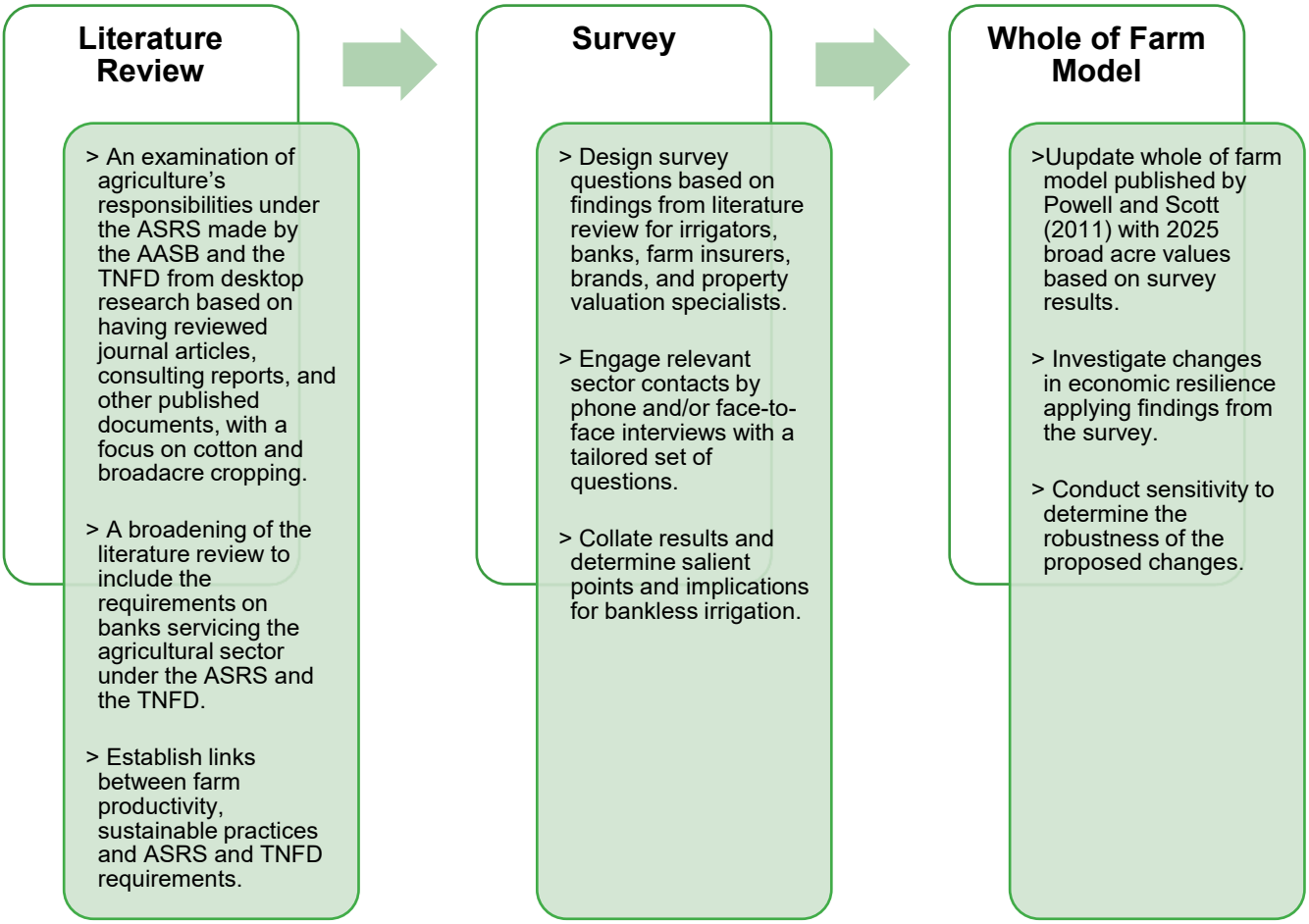

Figure 3: Study method schematic illustrating the three stages of the research

Literature Review

Agriculture's responsibilities under the ASRS

Historically, the Australian agricultural sector engaged with sustainability schemes and reporting on a voluntary basis. However, on 1 January 2025, the Australian Government introduced mandatory climate-related financial disclosure reporting. This means that many large companies and institutions, including farms, which meet certain criteria around revenue, gross assets, or number of employees are, or will be, required to report their GHG emissions under a new framework. This includes scope 1 and 2 emissions initially, followed by scope 3 emissions.

Beyond the newly introduced mandatory climate-related financial disclosure reporting, organisations can engage in voluntary sustainability frameworks such as for example the Global Reporting Initiative (GRI), CDP (formerly carbon disclosure project), the Taskforce on Nature-related Financial Disclosures (TNFD), Sustainable Development Goals (SDGs), Climate Active, B Corp Certification. The requirements relating to the TNFD are also examined as part of this study.

Overview of the ASRS

A new mandatory sustainability reporting regime started in Australia on 1 January 2025, called the Australian Sustainability Reporting Standards (ASRS). The ASRS are standards for assessing and disclosing information about an entity's climate and sustainability-related risks and opportunities (Lederman, 2024). Two standards have been issued by the AASB so far, AASB S1 and AASB S2. The AASB S1 General requirements for Disclosure of Sustainability-related Financial Information are a voluntary standard. The AASB S2 Climate Related Disclosures is a mandatory standard, and entities need to comply with this standard when preparing their sustainability reports under the Corporations Act 2001. AASB S2 requires entities to disclosure information about risks and opportunities related to climate which could reasonably be expected to affect cash flows, access to finance, or cost of capital over time. The ASRS was developed based on the International Financial Reporting Standards (IFRS) S1 and S2, issued by the International Sustainability Standards Board (ISSB). The IFRS sustainability standards are being implemented in many countries globally and build on the work of the Taskforce for Climate-related Financial Disclosures (TCFD).

Reporting under AASB S2 will be phased in over several years based on the size and emissions of an entity. Organisations may be captured if they are required to publish financial statements under the Corporations Act, including if they are a large proprietary company, a listed company that triggers size thresholds, an NGER reported, or a responsible Superannuation Entity or Managed Investment Scheme with 5 billion or more in assets under management. The relevant reporting groups are summarised in Table 1 below.

Table 1: Relevant reporting groups

Who and when		**Entities captured by Corps Act Ch 2M financial reporting obligations, and who are either:**				
Reporting period on or after:	First report due (FY reporting)	a) Large listed and unlisted entities and their controlled entities meeting 2 of 3 criteria			b) NGER reporter	c) Super finds & Investment Schemes
		Cons. revenue	Gross assets	FTE Employees		
Group 1 1 Jan 2025	After 30 June 2026	$500m	$1b	500	NGER publication threshold	
Group 2 1 Jul 2026	After 30 June 2027	$200m	$500m	250	All NGER reporters	$5b assets under management
Group 3 1 Jul 2027	After 30 June 2028	$50m	$25m	100	N/A	

The AASB S2 sets out the following main requirements (Australian Government, 2025):

ASSB S2 Climate-related Disclosures set out disclosure requirements for an entity to provide useful information to primary users of its general purpose financial report about climate-related risks and opportunities that could reasonably be expected to affect the entity's cash flows, access to finance or cost of capital over the short, medium or long term.

The main climate-related financial disclosure requirements relate to governance, strategy, risk management, and metrics and targets, including information about scenario analysis and Scope 1, Scope 2 and Scope 3 greenhouse gas emissions.

The risks and opportunities are collectively referred to as 'climate-related risks and opportunities that could be expected to affect the entity's prospects. The AASB S2 applies to both climate-related physical risks and to climate-related physical risks, as well as climate-related opportunities. Climate risks which could not reasonably be expected to affect an entity's prospects are outside scope. There is a one-year relief period for reporting scope 3 emissions, meaning Scope 3 emissions will need to be reported in the second reporting period. Scope 3 emissions are the indirect emissions that relate to the upstream and downstream value chain, as well as financing and investment activities. Therefore, even smaller entities that are not required to report under the ASRS, may need to supply their emissions data to third parties within their supply chain.

Most small and medium enterprises (SMEs) are excluded from complying with the ASRS based on their size (see Table 1). However, the legislation accommodates the lowering of these thresholds in the future, so SMEs may be required to comply in the future. The assurance requirements relating to the ASRS will be phased in for sustainability reporting, starting with limited assurance reporting and increasing to full assurance of climate disclosures from 1 July 2030.

Companies captured by AASB S2 need to prepare an annual sustainability report along with its financial statements. The sustainability report consists of the climate statements for the year, any accompanying notes to the climate statements, and a directors' declaration about the statements and notes. The climate statements will include information on governance and risk management, climate resilience assessments and scenario analysis, climate transition plans (CTP), climate-related targets, material climate-related risks and opportunities, and specific metrics and targets including scope 1, 2, and 3 emissions (Lederman, 2024).

In the first instance, the AASB S2 will impact companies that meet Group 1, 2, or 3 thresholds that are required to comply with the standards directly (see Table 1 above). The specific, real-world implications for small or medium entities that are not required to comply with the ASRS in the near term are not yet fully known. However, banks, insurers, suppliers and customers may need data from small and medium sized entities to meet their obligations under the standards, especially with regards to scope 3 emissions.

AASB S2 core topics and associated disclosures

Four core topics are established in AASB S2, which have the following climate-related financial disclosure objectives.

- Governance: To enable users to understand the governance processes, controls and procedures used to monitor, manage, and oversee climate-related risks and opportunities.
- Strategy: To enable users to understand an entity's strategy for managing climate-related risks and opportunities.
- Risk management: To enable users to understand an entity's processes to identify, assess, prioritise, and monitor climate-related risks and opportunities, including whether and how they are integrated into and inform an entity's overall risk management.

- Metrics and targets: To enable users to understand an entity's performance in relation to its climate-related risks and opportunities, including progress towards any climate-related targets set or required to be met by law or regulation. This includes scope 1, 2, and 3 emissions.

Disclosure of specific information is required under the topic to reach the topic objective. Of relevance in the context of this report is an entity's strategy for managing climate-related risks and opportunities. Specifically, an entity needs to disclose information related to:

- Climate-related risks and opportunities that could reasonably be expected to affect its prospects
- Current and anticipated effects of those risks on the entity's *business model* and *value chain*
- Effects on the entity's strategy and decision making, including its *climate-related transition plan (Schoff and Segorbe, 2024)*
- Effects on the entity's financial position, performance and cash-flows in the current reporting period and in the short, medium, and long term
- The *climate resilience* of the entity's strategy and its business model to climate-related changes, developments and uncertainties considering the identified climate-related risks and opportunities. This includes the use of climate-related scenario analysis to assess its climate resilience.

Reporting on climate resilience using climate scenario analysis includes at least two scenarios, including one low and one high warming scenario. The short, medium, and long term need to be considered, as well as the entire operations, assets, investments and value chain. The impacts of each scenario on strategy, business model, and ability to respond need to be assessed (Turner, 2025).

Scope 3 measurement framework

The AASB S2 requires an entity to disclose information about its scope 3 emissions (Australian Government, 2025). The entity needs to consider its entire value chain (upstream and downstream) and all 15 categories of scope 3 emissions (Greenhouse Gas Protocol, 2024). Small and medium sized entities that do not meet the requirements to disclosure their climate-related risks and opportunities for their own entity under AASB S2, may still need to report data about their emissions into their agricultural supply.

AASB S2 notes that the measurement of scope 3 emissions is likely to include estimation as well as direct measurement, and that a measurement approach, inputs, and assumptions should be used that result in a faithful representation of this measurement. The standard does not specify the inputs the entity is required to use to measure scope 3 emissions, but an entity does need to prioritise inputs and assumptions that use data based on direct measurement, data from specific activities within the value chain, time data that represents jurisdiction and technology use, and data that has been verified. Managerial judgement may be required in terms of trade-offs between different aspects of the measurement approach (e.g. newer data may have less detail).

Regarding data from specific activities within the entity's value chain, the AASB S2 notes that primary data (obtained directly from specific activities within the entity's value chain) is more likely to be representative of the emissions than secondary data, and that the use of primary data should be prioritised all else being equal. Secondary data may be supplied by third-party data providers and include industry-average data, and an entity using secondary data needs to consider if such data faithfully represents the entity's activities.

Impact on agriculture and cotton

The Bendigo Bank (2024) Australian Agricultural Outlook for 2025 elucidates the flow on effects from mandatory climate-related reporting of emissions data on smaller and medium agriculture entities as follows:

By the end of 2027 nearly all businesses will be annually reporting at least the emissions intensity of their products and their plan to reduce emissions. Financial institutions are clearly among those required to report directly to ASIC in a comprehensive sustainability document. They will be assessing their scope 3 emissions and reporting on them.

Not long after the emissions reporting starts, there will be decisions made about the emissions profile and emissions reduction plans of individual suppliers. The intent of this initiative is to reward those who reduce emissions, and disadvantage those who do not.

Disadvantages could include loss of market opportunity as preferred suppliers. Lower prices for products, and higher interest rates for producers whose emissions intensity is too high, are among some of the options on the table for discussion.

The Rabobank (2025) Agribusiness Outlook also notes that the mandatory climate-related financial disclosure requirements, and the current requirement to measure and report on scope 3 emissions from the second year of reporting, are expected to drive growing demand for emissions-related data at the farm level. The impact on small-scale farmers of Australia's mandatory climate-related financial disclosures was also discussed by Professor Richard Eckard in a recent presentation to the grains industry, where he noted that (Bidstrup, 2024):

"Farms, even those that are relatively small-scale, are part of this larger equation. When major agricultural supply chain companies like Unilever, Nestle and Mars are setting ambitious GHG reduction targets of up to 50% by 2030, that ambition filters down through their supply chains. It will be important for farmers to have a clear understanding of their GHG 'number' and how they can reduce it." Professor Rich Eckard.

The Australian Farm Institute, in a recent Occasional Paper on Agriculture and the Reach of Mandatory GHG Reporting, noted that the largest effect on the agriculture sector is the need to supply information for scope 3 reporting down the supply chain (Sevenster and Cowie, 2024). The development of a robust, Australian-specific cotton emissions intensity database in line with emerging guidance is needed to keep Australian cotton competitive in world markets. Specifically, it notes that:

The sector will need to navigate complexities, with emissions sources that are challenging to quantify and guidance yet to emerge, adding to the reporting burden. It will be important that locally relevant methods and emissions factors are applied to Australian produce, as use of international defaults can lead to overestimates of the carbon footprint of at least some Australian products.

The Australian government will develop voluntary standards for emissions reporting in agriculture (DCCEEW, 2024), however, this will not be available when the AASB S2 comes into force. This can help provide guidance, reduce the reporting burden and support the use of locally relevant methods and data. To date, a Voluntary Greenhouse Gas

Estimation and Reporting Standards Reference Group has been established. In the Australian grains sector, Sevenster (2024) found Australian grains is a low emitter of GHGs compared with other global producers, resulting in improved market access for Australian canola which is valued at A$1B per annum.

For Australian cotton, there is full traceability from the farm to the spinning mill. Australian cotton bales come with a unique barcode identifier, which means that the bale can be traced back to where it was ginned and the area in which it was grown. However, beyond the spinning mill the traceability is more complex as cotton fibres are often blended with cotton from other countries. Whilst new commercial, technology-based solutions for traceability of cotton are in development or already in the market(Australian Cotton, 2024):

> *[…] the reality is that for most brands, cotton traceability remains a largely manual process that relies on the provision of evidence by people in businesses at various stages of production.*

The limited transparency in cotton supply chains presents an immediate challenge for emissions and climate-related risk and opportunity reporting. However, new mandatory climate-related disclosure reporting will likely be a catalyst to create greater transparency and traceability in cotton supply chains going forward. One such supply chain strategy is carbon “insetting”. While offsetting refers to compensation for greenhouse gas reductions outside a company’s value chain, insetting in the agri-food value chain is a method of generating shared value across the value chain by incentivising climate action and adaptation on farm, while supporting farmer incomes. Insetting also differs from offsetting by internalising negative environmental externalities of a firm within its own value chain, rather than purchasing offsetting credits from outside its value chain (Banerjee et al., 2013).

Requirements on banks servicing the agricultural sector under the ASRS

Entities that finance activities face both risks and opportunities related to those activities. Borrowers, investees and other counterparties with high levels of emissions might be associated with risks due to technological changes, demand and supply shifts, and policy changes. Such risks are increasingly monitored and managed by measuring financed emissions, as an indicator to climate-related risk and opportunity exposure.

Under the ASRS, entities that engage in asset management, commercial banking, and insurance must disclose additional information associated with their investments (Australian Government, 2025). For commercial banking, this includes:

- Absolute gross financed emissions (disaggregated by scope 1, 2, 3 emissions) for each industry (using GICS industry level code) by asset class.
- Gross exposure to each industry by asset class.
- Percentages of the entity’s gross exposure included in the financed emissions calculation.
- The methodology the entity used to calculate its financed emissions.

Some commercial banks, such as NAB, set sector specific decarbonisation targets for their financed emissions. NAB lending to the sector was $40 billion as of 30 June 2022. However, a sector-specific target has not yet been set for the agriculture sector, due to imminent material improvements to data and methodologies. NAB is expecting to update on its approach to decarbonising its agriculture portfolio in 2025. For example, the Australian Government on the Agriculture and Land sectoral plan is expected to outline how to transition the agriculture sector to a net zero economy. National Australia Bank (2023) notes that accuracy and reliability of data is a challenge in this sector.

Agriculture’s responsibilities under the TNFD

The Taskforce for Nature-Related Disclosures (TNFD) is a market-driven global initiative to create a framework for reporting on and addressing risks and opportunities that relate to nature. The Department of Climate Change, Energy,

the Environment and Water (DCCEEW, 2023) summarised the TNFD as follows:

> *TNFD is a risk management and disclosure framework on nature-related risks to support the shift in global financial flows away from nature-negative outcomes and toward nature-positive outcomes.*

The DCCEEW also notes that the TNFD is voluntary (and not a standard), is closely aligned to the Taskforce for Climate-related Financial Disclosures (TCFD), allows for increasing levels of disclosure over time and is being developed to align with ISSB and other market tools and standards.

The final TNFD recommendations were launched in September 2023. They are technically voluntary for Australian businesses; however, a recent legal opinion suggests that there is potential for directors to be under legal duty to disclose material nature-related risks. Further, Australian business may be subject to EU-based nature-related reporting obligations (Miller et al., 2023).

Impact on agriculture and cotton

Agriculture, including cotton cultivation, can impact nature negatively if not managed well. It is dependent on ecosystem services such as healthy soil, water, and biodiversity. Intensive farming can reduce pollinators and the quality of soil and water. However, sustainable practices can positively impact nature and the environment as well.

DCCEEW (2023) undertook a pilot study in 2023 on tackling TNFD in domestic cotton cultivation for export, where pilot participants practically assessed the TNFD's nature-related risk and opportunity assessment approach, which is called the LEAP. The approach is voluntary guidance to support the assessment of nature-related risks and opportunities and involves five phases: Scoping, Locate, Evaluate, Assess, and Prepare.

The study gave several nature-related risks and opportunities (assessment) as examples for organisations operating in the domestic cotton cultivation for export value chain, specifically in cotton growing, ginning, and pressing. The study noted that the physical risks are chronic, and that changes to regulation and maintenance of ecosystem services such as soil health and timing of water may increase costs of natural inputs and/or to increase the cost for adaptation (e.g. more labour to suppress disease or reduced productivity). On the other hand, nature-related opportunities were also available, including increased brand value for nature-positive products and business models that benefit nature, especially biodiversity in terrestrial and freshwater ecosystems.

The study noted businesses that understand both the impacts and dependencies they have on and with nature will be better able to manage risk and implement mitigation measures for the benefit of their operations and supply chains, as well as take advantage of current and future opportunities.

Requirements on banks servicing the agricultural sector under the TNFD

For financial institutions, the above-mentioned DCCEEW study noted that financial incentives could be used to drive sustainability performance improvements and reduce nature impacts from clients, customers, and investees. However, the reduction in financial asset values, triggering write-offs or early exits may occur due to degraded ecosystem services such as soil fertility, water availability, and pollination.

As of October 2024, there was 23 Australian companies and financial institutions that have committed to getting started with voluntary reporting in line with the TNFD recommendations. Globally, there are over 440 companies and financial institutions which have made the same commitment (TNFD, 2024). Financial institutions are increasingly mentioning the TNFD in their reporting. For example, the ANZ (2024) Climate-related Financial Disclosures noted that they continue to draw on the TNFD framework to help inform their disclosures, but that the disclosures do not purport to be comprehensive or to satisfy all aspects of the TNFD's recommended disclosures. Similarly, NAB are a member of the TNFD Forum and has undertaken a range of activities to further their understanding of TNFD and its

implications on their business (National Australia Bank, 2024).

Links between farm productivity, sustainable practices and ASRS and TNFD requirements

ASRS reporting entities will be required to assess and report on climate-related risks and opportunities that could be expected to affect its prospects. They, therefore, will be asking smaller and medium entities in their value chain about their current and future emissions, and how climate-related risks and opportunities are being addressed.

It may be the case that, in the short term, ASRS reporting entities in the cotton supply chain use secondary data to estimate their emissions from the cotton farm, such as an average tonne/CO2-e per bale of cotton purchased. Preferably, the average emissions per cotton bale will be Australia specific for cotton that has originated in Australia (as opposed to an international benchmark). However, some reporting entities may request specific emissions at the farm level in the near term. As the mandatory reporting on climate-related risks matures and the future issuance of voluntary standards for emissions reporting in agriculture by the government is introduced, transparency in the cotton supply chain from its current situation is likely to improve. This, in turn, will increase requests for more granular and farm-specific information on emissions and sustainability initiatives going forward.

This is consistent with recent commentary from RaboResearch sustainability analyst Anna Drake (2025):

> *"If direct farm-specific primary data cannot be obtained without undue cost or effort, reporting entities are permitted to use indirect, secondary data, such as industry average, in order to fulfill their GHG measurement requirements," she said. "This will likely limit near-term the widespread impact on farmers." […] "Reporting companies are expected to increasingly look to source relevant activity data from their supply chains to improve the accuracy of their scope 3 measurement over time," Ms Drake said.*

On-farm productivity and sustainability initiatives, such as bankless irrigation, that address key climate-related risks such as drought, changing rainfall patterns, and/or increased pressure to reduce the use of nitrogen (either through regulation or market demand) are likely to become more important for ASRS reporting entities, and in turn their suppliers. Reporting entities or suppliers that do not address climate-related risks adequately may lose their place as preferred suppliers or face higher interest rates. On the flip side, suppliers that do report on and address such risks may be rewarded as preferred suppliers and/or lower interest rates.

Further, suppliers, lenders, and others in the cotton value chain that report to the TNFD framework may increasingly need to understand impacts and dependencies that individual farms have on nature. However, even for very large banks such as ANZ and NAB, TNFD-related disclosures are an evolving area.

Impact on agricultural financing

It is possible that the introduction of the ASRS (and voluntary reporting to the TNFD) will drive the offerings and uptake of sustainable finance, with banks required to consider both their own climate-related risks and opportunities and those of borrowers (through their financed emissions). Generally, financial activities that integrate environmental, social, and governance (ESG) considerations are considered "sustainable finance". There are several examples of sustainable finance in agriculture, including sustainability-linked loans from the Commonwealth Bank of Australia (CBA) and Agri Green Loans from the National Australia Bank (NAB). These types of loan products provide finance for activities on the farm that result in environmental benefits.

Improved farm sustainability may be rewarded with access to finance on better terms as initiatives such as the ASRS shine a light on the emissions and nature-related risks and opportunities of small and large farms. Financial institutions may consider, for example, higher interest rates for higher emitters to meet their own ambitious emissions targets. Similarly, they may consider better terms for lower emitters, or for loans which bring their organisation closer to

meeting their own climate-related targets.

In January 2025, the Clean Energy Finance Corporation (2025) announced its backing for a $300 million co-finance program with NAB to cut the borrowing costs for farmers (and others). The commitment included $100 million to support a 1.15 per cent interest rate discount for backing financing solutions for farmers to reduce the emissions of their operations, including enhanced fertilisers and changed land-use methodologies.

Going forward, it may be the case that financial institutions embed environmental, social, and governance data into the usual practices of commercial banks. The 2023 AgriFutures Banking on Sustainability – Environmental and Social Lending in Rural Industries report noted that this might result in an effective price on sustainability:

The integration of ESG data into credit risk and underwriting processes could effectively place a price on sustainability. In the future, the cost of accessing financial products at the farm gate may inherently be linked to a producer's ability to report their sustainability credentials to banks and insurers.

However, data gaps and challenges were considered a limitation for embedding, for example, environmental criteria in usual lending practices. These gaps may to some extent lessen with better mandatory and voluntary reporting frameworks such as the ARAS. The AgriFutures report noted that:

Nevertheless, shifting the fundamental processes underpinning rural lending will take significant resources, investment and, above all, time. […] To advance sustainable financing solutions, the sector will need to overcome a lack of fit-for-purpose data, bridge skill and capability gaps, and reduce the potential for additional administrative burden at the farm gate.

Impact on agricultural property valuation

It is possible that the introduction of the ASRS and other reporting schemes such as the TNFD will impact agricultural property valuation. There are several ways to value agricultural properties (Eves, 2004). This can include:

- Direct comparison: Involves a valuer making (usually subjective) adjustments around the relative pros and cons of properties relative to one another.
- Summation: Involves analysis of sales evidence to separate out levels for land class types, irrigation water entitlements, and/or structural improvements, which are applied to various components of property to be valued.
- Productivity: Commonly used for valuing extensive grazing properties and Involves analysis of sales evidence to show a rate per unit of livestock able to be carried. This is less relevant to cotton farms.
- Income: Involves an assessment of the likely future net return from a property and is rarely used to value agricultural properties.
- Discounted cash flow: Involves modelling the expected income and net profit from a farm and turning this into a purchase price, based on an expected rate of return. This is generally regarded as a check method, as it requires many assumptions to be made around revenues and costs.

Rural land valuer Beaumont (2023) notes that every piece of farmland has unique traits that can affect its value, and a valuer will consider recent sales data, similar properties, demand-supply dynamics and historical price trends for rural land in the area. Importantly, they will note improvements made, and potential uses of the property, as "this can greatly influence its market value", and that climate and water availability and how it is sourced are important considerations.

CBRE notes that, for cropping properties, analysis has often been undertaken on a 'dollar per wheat tonne equivalent' (WTE), which enables the productivity from a range of crops to be determined to a standard metric. However, analysis of rainfall and soil-type data is an alternative to this approach, and the use of DCF analysis is becoming increasingly popular. CBRE (2022) notes that DCF analysis has been used sparingly in the agricultural sector in the past, but the increasing scale of properties and portfolios justifies the move to such an approach.

The introduction of on-farm sustainability initiatives (such as bankless irrigation), and its resulting agronomic benefits and more efficient water and labour use, has the potential to flow through to the property valuation across a range of the above-mentioned valuation methods. This can include for example as a subjective strength of the property and/or a structural improvement in a summation approach. Climate-related risks and opportunities, including the ability to better weather drought or water scarcity, can also impact DCF valuations both in terms of projected cash-flows and the discount rate applied in the valuation. Higher risk typically leads to a higher discount rate, which lowers the modelled purchase price.

The introduction of mandatory climate-related risk and opportunities reporting, and the increasing use of the TNFD framework, may result in an increase in the information requested and required by potential buyers relating to climate- and nature-related risks and opportunities, especially from potential buyers that report under the ASRS. A preference for properties that fit within internal climate targets and climate-related transition plans (CTPs) may emerge for certain potential buyers, which may in turn be reflected in the purchase price.

Impact on the cotton supply chain

The textile industry supply chain involves raw material extraction, raw material processing, material production, finished product assembly, and office/retail and distribution centers. Materials production is often a substantial source of emissions and requires significant amounts of water and chemistry. Retailers who are and will be reporting under the ASRS will be looking across their supply chain for opportunities to reduce emissions and improve sustainability (Fashion For Good, 2025). For the fashion supply chain, transparency and traceability are challenges, and brands and retailers may not be able identify the individual farms that for example their cotton has originated from. Scope 3 emissions will likely make up a very significant proportion of total emissions, and retailers will need to work to understand their scope 3 emissions and the climate risks and opportunities associated with these emissions across their supply chain (Jackson and Saldias, 2024).

There may be risks and opportunities for cotton relating to demand from merchants and retailers following the introduction of ASRS (and/or other reporting requirements in their respective home countries, including in the EU). Australian cotton may become more attractive than cotton sourced from other parts of the world due to innovative water and soil management practices and lower overall emissions footprints. However, Australian cotton also competes with other materials with sustainability credentials, such as organic cotton (free from pesticides and synthetic fertilisers), hemp (naturally pest-resistant and requiring minimal water and inputs), and recycled PET (which diverts plastic waste from landfills). Retailers will be selecting materials that align with their goals, including their emissions and sustainability goals. That is, Australian cotton farms will not only be compared with one another in terms of their emissions footprint and sustainability, but retailers will also be comparing the emissions footprint and sustainability of the entire value chains of potential different material compositions they can use to create their final products (DTS, 2025).

Survey

Survey Question Design

Survey questions were developed considering findings from the literature review, and specific to each of irrigators, banks, farm insurers, brands, and property valuation specialists. While a comprehensive list of survey questions has been collated in Appendix 1, only salient findings from interviews are presented in this section.

Survey Responses

This section provides an overview of survey participant feedback, collated from documented one-on-one conversations undertaken by telephone and face-to-face discussions during the research period. Following the review of literature a list of questions pertaining to the project scope were drafted to cover five sub-groups: Irrigators, valuation specialists, agribusiness regional bankers, bank executives, farm insurers, and brands and retailers. Due to the commercially sensitive nature of the survey questions and topics involved, all responses have been anonymised.

TNFD, ASRS, and Farmer Impacts

During the phone survey, we interviewed irrigators, banks, insurance companies, valuation specialists as well as brands and retailers.

At a high level, land valuers had some knowledge of the compliance and regulation requirements associated with mandatory climate-related reporting but commented that it was just too early to impact sales valuation in any meaningful way. Several field representatives for insurers and brokers surveyed had no knowledge of capturing data from farming and irrigator clients and lacked even a basic understanding of ASRS. Banks on the other hand were very conversant with both ASRS and TNFD from sustainability from the rural branch staff to the corporate sustainability executives surveyed. Rural finance brokers representing a few top and second-tier banks were in discussions around collecting farm production data to convert to sustainability metrics for their banking customers. Challenges with surveying the brands and retail sector were overcome by an intermediary in cotton working with cotton apparel brands on a weekly basis.

The following section provides a summary of survey responses and has been grouped for ease of presentation and readability. Illustrative quotes are provided to highlight core themes that emerged from the survey data collection.

Table 2: TNF, ASRS and Farmer impacts – survey responses (all except irrigators)

Question	Banks N=7	Valuer N=5	Insurer N=4	Brands & Retailer N=3
How has and will the Taskforce on Nature-related Financial Disclosures, impact on commercial loans/insurance/farm values for farmers that have, or will, introduce sustainability and productivity initiatives such as bankless irrigation that improve system and climate resilience?	Unsure (43%) Positive benefits (28%) It won't (29%)	Too soon (100%)	No awareness	Not Applicable
Are you likely to be enquiring about total emissions and/or climate-related risks and opportunities on the farm level because of the introduction of the ASRS?	Yes (86%) No (14%)	Not Applicable	No awareness	Yes (100%)
Are you likely to be enquiring about total emissions and/or climate-related risks and opportunities on the farm level because of the Taskforce on Nature-related Financial Disclosures?	No (100%)	Not Applicable	No awareness	No (100%)
Do you agree with the following statement: "*In the future, the cost of accessing financial products at the farm gate may inherently be linked to a producer's ability to report their sustainability credentials to banks and insurers".*	Yes (43%) No (57%)	Not Applicable	No awareness	N/A
Do you have a preference for a carbon calculator? If yes, please share which one.	Yes (86%) No (14%)	Rumanati, Agtuary, CAF, AIA		

The impact of ASRS policies have had flow-on effects in the supply chain. With the exception of insurers as supply chain laggards, brands, financiers and irrigators have had discussions with third parties relating to ASRS and TNFD policies (Figure 4).

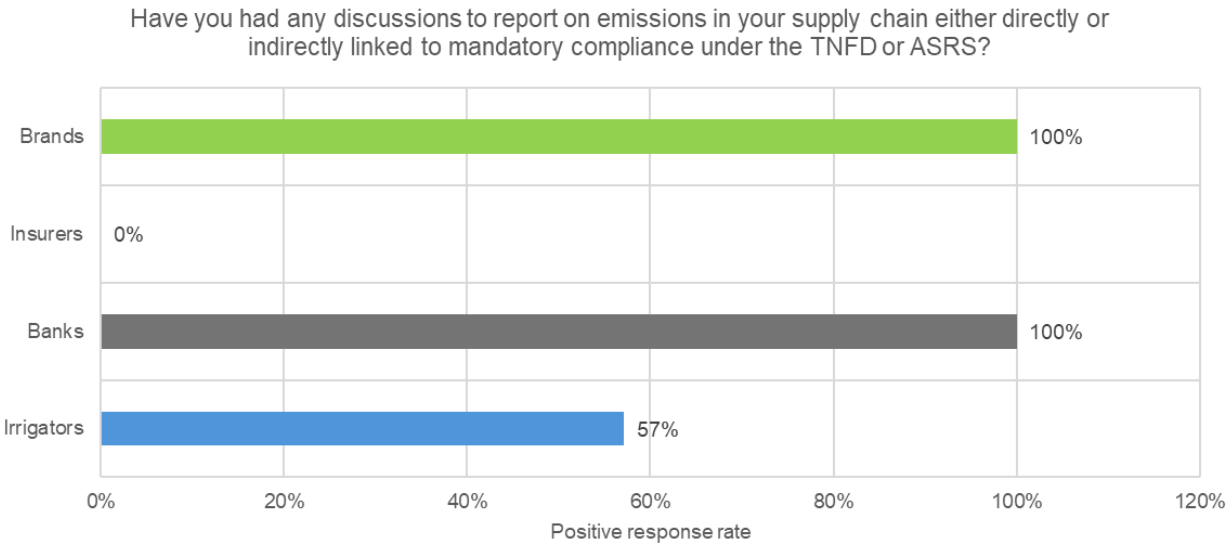

Figure 4: Survey responses to TNFD and ASRS links

The TNFD is now virtually off the table in terms of priorities owing to the "Donald Trump effect" being that there has been a swing to the right and pushing back on green compliance

"Absolutely there will be a sustainability metric woven into financial products for the farming sector in the future. It's happening already in the commercial real estate market: Is the building designed for energy efficiency? Does the building have solar panels? These things impact tenancy and client profitability"

Bank Executive

"We won't be giving premiums for loans for those irrigators that are more sustainable. The banking sector is highly competitive and with regulation coming in, businesses are going to be heading that way anyway, where this is the new normal."

Regional Bank Manager

"I've never heard of that policy (ASRS and TNFD) and it's not been brought up in any meetings regarding policy and compliance I've attended with any insurers in the last 10 years anyway."

Rural Insurance Broker

"We are working with a CSIRO platform and fertiliser companies to calculate our emissions data for ASRS compliance. As a bank, we are concerned about the amount of green tape that is overlayed on our rural customers. We need them to be running their businesses and making money."

Bank Executive

"It's unlikely ASRS or TNFD will impact land values. The asset is valued bare and any bells and whistles that the occupying holding has generally leaves with the owner when the farm is sold."

Valuer

"As a broker, we are hearing more conversations about helping a farmer through this portal or that website to gather primary data for on-farm emissions. It's not really our remit, but the banks need it and it's a heck of a time-consuming task. They will have to pay us properly. This topic is like the tardis: only a small door but can be never ending once your inside"

Rural Finance Broker

"Our bank has been at the data collection / farmer capacity building engagement for years, as that's been our policy. The biggest constraint is gathering the required data, not inputting the data. You would be surprised how analogue farmer input recording still is on some of the most advanced, well-run farms. It's very difficult to engage and push too hard, but we are getting there, and it is time consuming. The bank has targets so we have to get on with it."

Regional Bank Manager

"We know we need farm emissions data in the coming years. Without a traceability system in place, it's a useless exercise as the cotton could be a blend of ten farms. We have no choice but to use industry proxies until the traceability issue is sorted out."

Cotton Brand & Retailer

Implementing Bankless Irrigation

Of the relevant sub-groups surveyed, four of the five valuers and four out of seven irrigators agreed that implementing bankless irrigation improved the farm valuation (Figure 5).

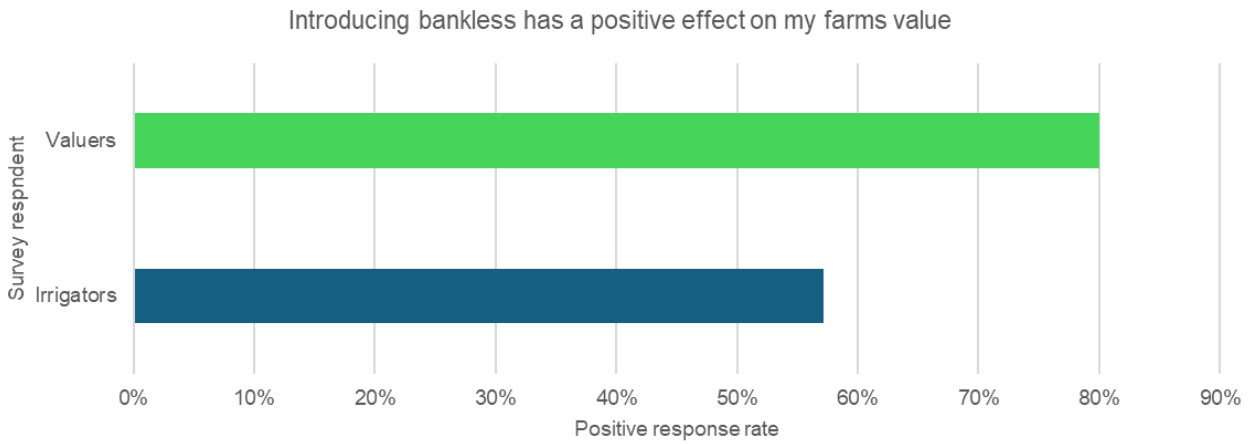

Figure 5: Survey responses of improved valuation from implementing bankless irrigation

Some notable responses from the survey relating to the effect of bankless irrigation on farm valuations included the following quotes:

"The exact amount of the increase is very hard to quantify from sales data. Categorically, side-by-side if there were two farms in the same area, one had bankless and one didn't, the bankless one would make more money"

Valuer

"The more remote the farm is, the more likely the farm is to achieve a bankless premium on the upper end of values over siphon irrigation due to the scarcity of labour and other input efficiencies associated with this method"

Valuer

"I've had the discussion with my bank and valuation consultant and they both reckon it won't change my farm value"

Irrigator

Among those survey irrigator and valuer respondents (n=8) that agreed a land valuation would occur, the premium attached to the bankless favored a range between $500 and $2,000 / Ha. The results are shown in Figure 6.

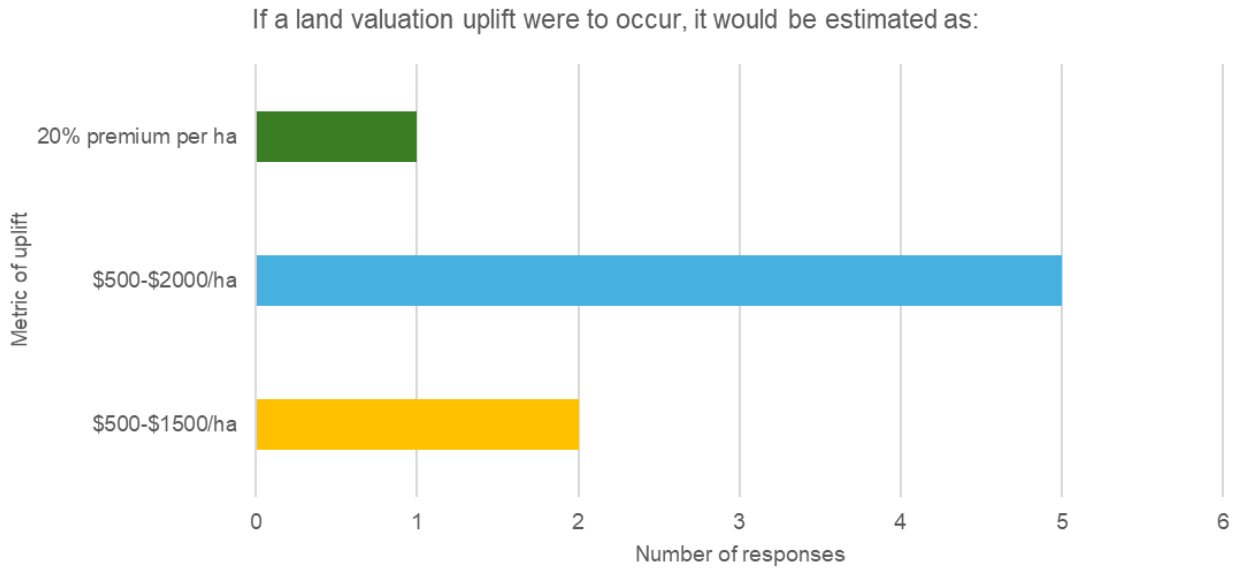

Figure 6: Estimated uplift installing bankless over siphon irrigation (n=8)

Some notable responses from the survey relating to the potential for a land valuation uplift from bankless irrigation included the following quotes:

"There are too many moving parts in a transaction e.g. water values which can be moved around to minimise stamp duty, to properly isolate the bankless proportion and measure it."

Valuer

"I've had banks and valuers look at these issues and 20 per cent above a traditional siphon system is about the mark. As an irrigator, if you can make

the conversion work without having to outlay big amounts to upgrade pumps, it's a great financial decision. I can move water off my fields in a downpour much easier now as well which helps the crop yield immensely."

Irrigator

Converting siphon irrigation systems to bankless can be a capital-intensive exercise. Banks were asked "if they were aware of the benefits of bankless irrigation in terms of water savings, energy savings, better nitrogen use efficiency and lower nitrous oxide emissions from faster applications of water". Those on-ground bankers with cotton clients were aware of bankless, although some of the sustainability experts in higher management were not.

We asked both irrigators and banks if specialist loans with more favourable terms were offered, with the aforementioned sustainability benefits in mind. No irrigator contacted for the phone survey (n=7) had received preferential loan terms for bankless installation. However, one major listed bank was particularly enthusiastic about a credit discount for farm improvements that offered sustainability benefits, such as those attributed to bankless. The scale of benefit in the variable loan discount was "commensurate to those obtained from the CEFC", which can be around 0.1-1.5% reduction (Clean Energy Finance Corporation, 2025).

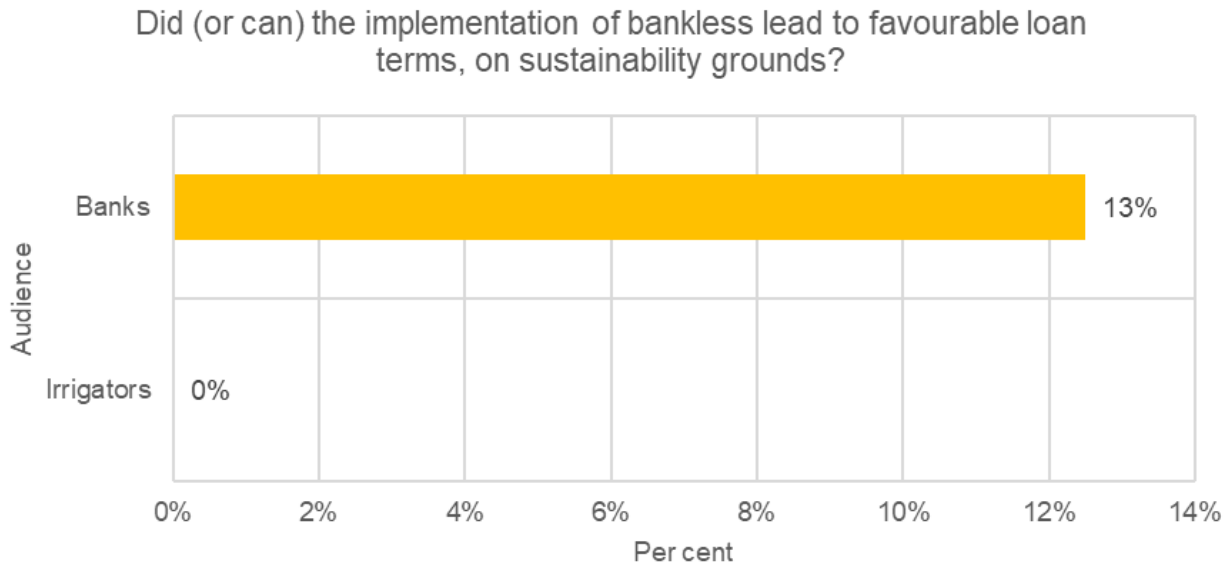

Figure 7: Per cent of banks offering, or irrigators receiving favourable loan terms

Some notable responses relating to potential favourable loan terms on sustainability grounds from installing bankless included the following quotes:

"Irrigators normally have a strong asset base by which to lend. The credit markets are very competitive, so no, we don't offer special discounts on loan terms (reduced interest rates) for improving farm irrigation infrastructure."

Regional Bank Manager

“No, I’ve never really asked the question to the bank about if bankless qualifies for better loan terms on environmental grounds. I certainly will though using benefits from industry studies, on the next stage of development.”

Irrigator

“Yes. We have environmental loan terms where bankless improvements satisfy the criteria for an interest discount on those works, similar to the CEFC loan terms. Water and energy savings on farm are a priority.”

Bank Executive

Whole of Farm Model Results

It is important to understand the farm level impacts of cotton industry research and new technologies. The objective in this section is to describe how farmers in cotton growing valleys typically have multiple enterprises in a whole farm context and to assess the change in financial performance of such farming systems. This is achieved by the development of a Whole-Farm Model (WFM) for a representative farm identified by Powell and Scott (2011).

The WFM provides a snapshot at a particular point in time of a farm with a particular set of resources. Hence while this report may give a broad indication of what is happening on many farms in the northern cropping region of NSW and Qld, it may be inaccurate for farms with markedly different soil type, climate and resources to those of the representative farm.

The WFM used for the purposes of measuring the change in irrigation system from siphon to bankless contains information gathered from available data, local consensus groups and assumptions regarding the size of a typical farm and other resources, such as labour, overhead costs, assets and liabilities and the nature of the cropping rotation used. The breakdown of land use, water resources and values are shown in Table 3.

Table 3: Characteristics of the Lower Namoi representative farm

Category	Metric	Size(s)
Total farm area	Hectares	1203
Irrigable land	Hectares	782
Minimum area irrigated annually	Hectares	250
Planned bankless development	Hectares	400/782
Cost of bankless	Dollars/ha	
Area farmed – dryland	Hectares	180
Area grazed	Hectares	120
Water resources		
Groundwater	ML	2500
Namoi River allocation	ML	1600
Water storage capacity	ML	90
Land and water asset value	Dollars	28,744,195
Debt facility	Dollars	5,250,000

Within the context of the farming system, the WFM was used to sensitivity test and measure impacts of the following:

- Does the estimated flow-on land value appreciation from converting areas of bankless channel irrigation from siphons change the farm's financial position?
- Test the model's robustness under a range of basic conversion costs and land appreciation benefits.

The investment analysis was conducted within a farm with the following assumptions (Table 4). The low/high cost development scenarios ($600/Ha and $4,200/Ha) were numbers derived from recent CottonInfo Bankless case studies (Welsh, 2024b, Welsh, 2024a).

Table 4: On-farm assumptions used in the WFM investment sensitivity analysis

Cotton yield = 12 bales/ha	Current water use = 10 ML/Ha	Bankless water use = 8 ML/Ha
	Current irrigation labour = $330/ha	Bankless labour = $100/ha
Bankless installation scenario 1	400 ha, cost scenarios $600/ha and $4,200 ha	Valuation uplift = $500/ha and $2,000/ha
Bankless installation scenario 2	782 ha, cost scenarios $600/ha and $4,200 ha	Valuation uplift = $500/ha and $2,000/ha

The first scenario explored a staged approach with 400 hectares of the available 782 hectares of irrigable land developed. It is assumed that the development can be carried out without the loss of a cotton or wheat crop. The results showed a resilient system under both high and low installation costs in combination with a flow-through

valuation sensitivity tested with a low ($500/Ha) and high ($2,000/Ha) valuation uplift (Figure Table 5).

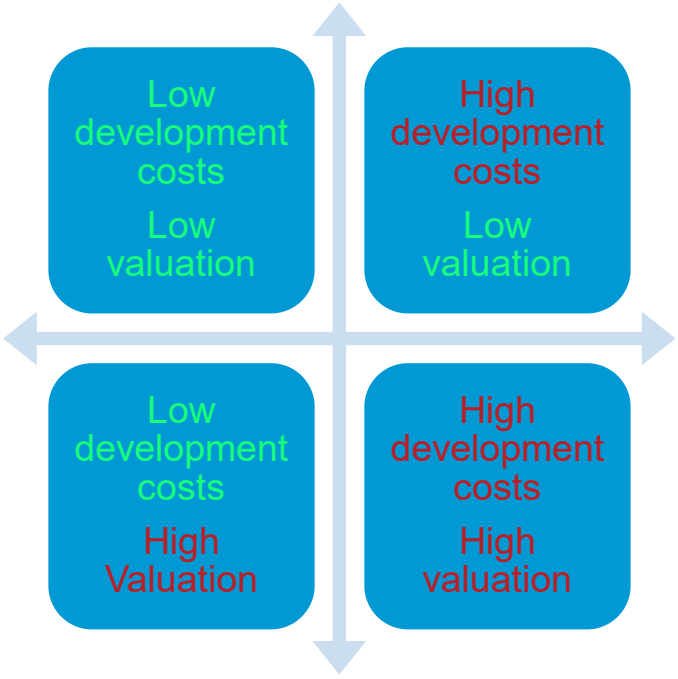

Figure 8 a schematic of the sensitivity testing of various scenarios of installing bankless channel irrigation and its financial impact on the Whole Farm Model

Table 5: Scenario 1 – developing 400 of 782 Ha to bankless under two cost and two flow-on valuation outcomes

400 Ha	Development Costs $/Ha and $500/ha assuming (low) valuation uplift		
Economic metric	Base	$600	$4,200
Farm Equity	82%	82%	77%
Return on equity	0.60%	0.40%	0.1

400 Ha	Development Costs $/Ha and $2,000/ha (high) valuation uplift		
Economic metric	Base	600	4200
Farm Equity	82%	82%	77%
Return on equity	0.60%	0.50%	0.1%

The second scenario investigates the economic impact on a whole farm level of developing both a high and low-cost transition from siphons to bankless. On this occasion, the entire 782 Ha of irrigable land is developed. The increase in farm debt from the development had little impact on the farm equity position and the return on equity remained close to base case levels. However, the higher cost scenario of $4,200/Ha resulted in a significant drop in farm equity (from 82% to 72%) and return on equity dipped below zero to -0.5%. The higher installation costs accrued additional interest costs on a larger scale owing to the development of the whole area (Table 6).

Table 6: Scenario 2 – developing all 782 Ha to bankless under two cost and valuation outcomes

782 Ha	Development Costs $/Ha and $500/ha (low) valuation uplift		
Economic metric	Base	600	4200
Farm Equity	82%	81%	71%
Return on equity	0.6%	0.5%	-0.5%

782 Ha	Development Costs $/Ha and $2,000/ha (high) valuation uplift		
Economic metric	Base	600	4200
Farm Equity	82%	82%	72%
Return on equity	0.6%	0.5%	-0.5%

Conclusion

The introduction of mandatory climate-related reporting means that many large companies and institutions, including farms, which meet certain criteria around revenue, gross assets, or number of employees are, or will be, required to report on their emissions. This includes scopes 1 and 2 emissions in the first instance, followed by scope 3 emissions. Smaller entities that are not required to report directly may need to supply their emissions data to third parties within their supply chain, so that their supply chain can meet scope 3 emissions requirements. However, if it is unduly difficult or expensive to obtain direct farm-specific primary data on emissions, reporting entities are permitted to use secondary data including industry averages. In the case of cotton, traceability thorough the supply chain is complex, and reporting entities within the supply chain such as brands and retailers may use secondary and averaged farm data initially for this reason. This will likely limit the widespread impact on farmers in the near term from within the supply chain. However, banks and insurers are not directly affected by cotton supply chain opaqueness (in the way brands and retailers are, for example), and may request sustainability data directly from their clients.

A survey of rural lending and farm insurers revealed strong activity from the banking sector on engaging their farmer clients in collecting on-farm emissions data. One hundred per cent of all banks and finance brokers surveyed reported having had discussions with farmers linked to ASRS compliance. In contrast, the insurance industry brokers and representatives in farm underwriting surveyed had no awareness and were not conversant in understanding reporting requirements. Bankers surveyed were also aware of voluntary TNFD reporting and obligations, however respondents alluded to the recent “Trump effect” of railing against environmental regulation. TNFD seems to have fallen into that category and has slipped off the radar of banks at present. A broad cross-section of attitudes existed towards the data required and the approach to data collection from cotton and farming businesses. Most banks have opted to choose a user-friendly data portal and encourage adoption through information days and subsidising access to generate reports. Those in the minority had chosen to use proxy industry values or estimates from input suppliers to collect data for their ASRS requirements.

Banks, when asked if accessing ASRS reporting requirements from farmers were likely to create a “price on sustainability for credit” in the future, a mixed response ensued with almost half of responses claiming, “it’s already happening” to “the credit market is already too competitive to drafting discounts and premiums among clients”.

While the study did not engage brands and retailers directly, the survey responses suggested that scope 3 reporting remains purely academic until a rigorous traceability scheme can be implemented to track the source of fibre to farm. Large companies in this sector that are required to report are noted to be content with using secondary data to fulfil ASRS requirements. One potential impact of the ASRS from the perspective of brands and retailers may be that it becomes more accessible to compare different materials such as organic cotton, hemp, or recycled PET (or material compositions) against each other based on emissions footprint, even if this relies on secondary data. With greater climate-related reporting, emissions intensity may play an increasing role as one of several pieces of information that brands and retailers assess when deciding what materials or material compositions to use. In this context, it will be important to have locally relevant methods and emissions factors for cotton in line with emergence guidance to ensure that the emissions footprint of Australian cotton is not overestimated by for example using international defaults.

As the irrigated cotton industry experiences a shift to more resilient systems that can adapt to extreme weather conditions, reduce inputs without compromising yield, and produce higher output per labour unit there may be small benefits for agri-finance and ASRS strategy reporting. A minority group of banks surveyed had plans or finance products in place to offer more competitive credit for investing in more efficient irrigation infrastructure if environmental gains could be proven. Separately, bankless irrigation does satisfy the main criteria as a strategy for specifically dealing with several risks under the AASB S2 core topics*: “the climate resilience of the entity’s strategy and its business model to climate-related changes, developments and uncertainties considering the identified climate-related risks and opportunities”.* The time when such information may be useful for small businesses to satisfy more detailed strategy documentation above scope 3 emissions reporting requirements is unclear.

A survey of specialist property valuers and irrigators found the flow on monetary gains to asset valuation following the installation of bankless systems can be in the range of $500 to $2,000 per hectare, with the access to labour as the primary driver. An economic analysis using a WFM approach sensitivity tested these valuation uplift scenarios with two installation cost outcomes ($600/Ha and $4,200/Ha) each investigating 400 Ha and 782 Ha of development respectively. The overall equity position of the farm, considering a 20 per cent water saving and $230/Ha labour saving under the new operating scenario, the WFM was a very resilient system with a strong asset and earning base.

Only in the high cost ($4,200), low valuation (+$500/Ha uplift) and the whole-of-farm development did return on assets and return on equity erode considerably, owing in part to the relatively conservative Debt/Equity ratio of 82 per cent. Present day assets and earnings are applied to the WFM. These results are exploratory only and should be viewed as a snapshot at a particular location at a particular point in time. It may be inaccurate for farms with markedly different soil types, climate and resources to those of the Lower Namoi Valley representative farm.

Avenues for future research include a second round of engagement with insurers (why?), brands and retailers (because of above) to better understand the future needs of Scope 3 emissions reporting and potential biodiversity measurements for market access. A suite of online tools, like carbon emissions reporting tools, can produce a biodiversity “score” that can be measured and tracked over time. Each global customer can have a preferred measurement that may create market trade opportunities from one farm over another. The true benefits of bankless irrigation developments through an uplift in value has not been explored in economic case studies to date, only project costs and operational savings/benefits. Studies in remote areas will likely have a stronger business case capturing asset appreciation. Further analysis is also required to test the model on staging developments carefully for a high-debt situation to better understand the rollout of developments under a range of future water availability scenarios.

Appendix 1

Survey Questions

Irrigators:

- When did you introduce bankless irrigation?
- Has the introduction of bankless improved productivity (i.e. labour/water/fertiliser) on your farm?
- Have you had any interactions with banks and/or property valuation specialists pre- or post- the introduction of bankless irrigation where the role of bankless irrigation was discussed and/or explicitly considered?
- If yes, how did the introduction of bankless irrigation impact the loan terms (interest rate, duration, other) and/or property valuation?
- What, if there are any, discussions have you had with entities within your supply chain (for example suppliers or buyers) where the benefits of bankless irrigation have featured?
- Have you had any discussions or requests from within your supply chain to report on your total emissions or sustainability initiatives, either directly linked to the introduction of mandatory reporting on climate-related risks and opportunities, the Taskforce on Nature-related Financial Disclosures, or separately?

Banks:

- Are you aware of the benefits of bankless irrigation in terms of water savings, energy savings, better nitrogen use efficiency and lower emissions from faster and more uniform applications of water?
- Have you issued any commercial loans to properties where bankless irrigation has been introduced?
- If yes, how did bankless irrigation impact the terms of the loan offered and why, compared to traditional irrigation? (interest rates, duration etc)
- If no, how do you expect bankless irrigation to impact commercial loan terms going forward?
- Are “sustainable finance” loans likely to be offered for bankless irrigation finance?
- How will the introduction of the mandatory reporting on climate-related risks and opportunities, including reporting requirements around financed emissions, impact on commercial loans for farmers that have, or will, introduce sustainability and productivity initiatives such as bankless irrigation that improve system and climate resilience?
- How has and will the Taskforce on Nature-related Financial Disclosures, impact on commercial loans for farmers that have, or will, introduce sustainability and productivity initiatives such as bankless irrigation that improve system and climate resilience?
- Are you likely to be enquiring about total emissions and/or climate-related risks and opportunities on the farm level because of the introduction of the ASRS?
- Are you likely to be enquiring about total emissions and/or climate-related risks and opportunities on the farm level because of the Taskforce on Nature-related Financial Disclosures?

Property valuation specialists:

- Are you aware of the benefits of bankless irrigation in terms of water savings, energy savings, better nitrogen use efficiency and lower emissions from faster and more uniform application of water?

- Have you conducted any property valuations where bankless irrigation has been introduced?
- If yes, how did this impact your property valuation? What valuation methodologies did you use where bankless irrigation was a factor, and how did this flow through to the valuation?
- If no; how do you expect bankless irrigation to impact property valuations going forward?
- Do you expect the introduction of mandatory reporting of climate-related risks and opportunities to affect the value of farms that undertake productivity and sustainability initiatives that improve system and climate-resilience such as bankless irrigation going forward?
- Do you expect the Taskforce on Nature-related Financial Disclosures to affect the value of farms that undertake productivity and sustainability initiatives that improve system and climate-resilience such as bankless irrigation going forward?

Insurers:

- How will the introduction of the mandatory reporting on climate-related risks and opportunities, including reporting requirements around financed emissions, impact on insurance premiums for farmers that have, or will, introduce sustainability and productivity initiatives that improve system and climate resilience?
- How has and will the Taskforce on Nature-related Financial Disclosures, impact on insurance premiums for farmers that have, or will, introduce sustainability and productivity initiatives that improve system and climate resilience?
- Are you likely to be enquiring about total emissions and/or climate-related risks and opportunities on the farm level because of the introduction of the ASRS?
- Are you likely to be enquiring about total emissions and/or climate-related risks and opportunities on the farm level because of the Taskforce on Nature-related Financial Disclosures?

Brands and retailers:

- How will the introduction of the mandatory reporting on climate-related risks and opportunities, including reporting requirements around financed emissions, impact on cotton sold by farmers that have, or will, introduce sustainability and productivity initiatives that improve system and climate resilience?
- How has and will the Taskforce on Nature-related Financial Disclosures, impact on cotton premiums for farmers that have, or will, introduce sustainability and productivity initiatives that improve system and climate resilience?
- Are you likely to be enquiring about total emissions and/or climate-related risks and opportunities on the farm level because of the introduction of the ASRS?
- Are you likely to be enquiring about total emissions and/or climate-related risks and opportunities on the farm level because of the Taskforce on Nature-related Financial Disclosures?

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