

Australian Cotton Emissions Knowledge Gap Analysis



18/12/2025

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Context

Responding to evolving market and policy expectations

- Expectations on greenhouse gas emissions, traceability and broader sustainability outcomes are increasing rapidly across agricultural supply chains, driven by changes in regulation, finance and international market settings rather than direct consumer demand.
- Cotton growers are increasingly exposed to these expectations through banks, buyers and brands, yet the information, tools and signals required to respond remain fragmented, inconsistent and difficult to interpret.
- While Australian cotton is comparatively well positioned due to its existing sustainability credentials and industry investments, there is a clear risk that poorly aligned frameworks and methodologies could disadvantage cotton if not actively shaped.
- This gap analysis was undertaken to identify where current emissions-related knowledge, systems and delivery approaches fall short, and to provide practical, evidence-based recommendations to support growers, maintain market access and position the industry for emerging requirements.



Method

What we did

This gap analysis was based on information gathered directly from a wide range of stakeholders across the cotton industry and its value chain. Insights from growers, advisers, banks, brands and government were combined with targeted desktop analysis to ensure findings reflect both on-farm experience and emerging market and regulatory expectations.

Grower engagement

Approach:

Surveys, regional workshops, CottonInfo events and carbon tour sessions across cotton-growing regions.

Purpose:

To assess baseline knowledge, identify priority information gaps, understand preferred delivery channels and test how growers interpret emissions, traceability and sustainability signals in practice.

Value chain and market engagement

Approach:

Semi-structured interviews and facilitated discussions with banks, brands, buyers and supply-chain stakeholders.

Purpose:

To understand current and emerging expectations around emissions reporting, traceability, Scope 3 data, natural capital and biodiversity, and to identify how these requirements relate to growers.

Investment review RDC collaboration

Approach:

Review of emissions-related investments across CRDC and GRDC, complemented by horizontal collaboration with other RDCs and participation in the Cotton Sustainability Roundtable.

Purpose:

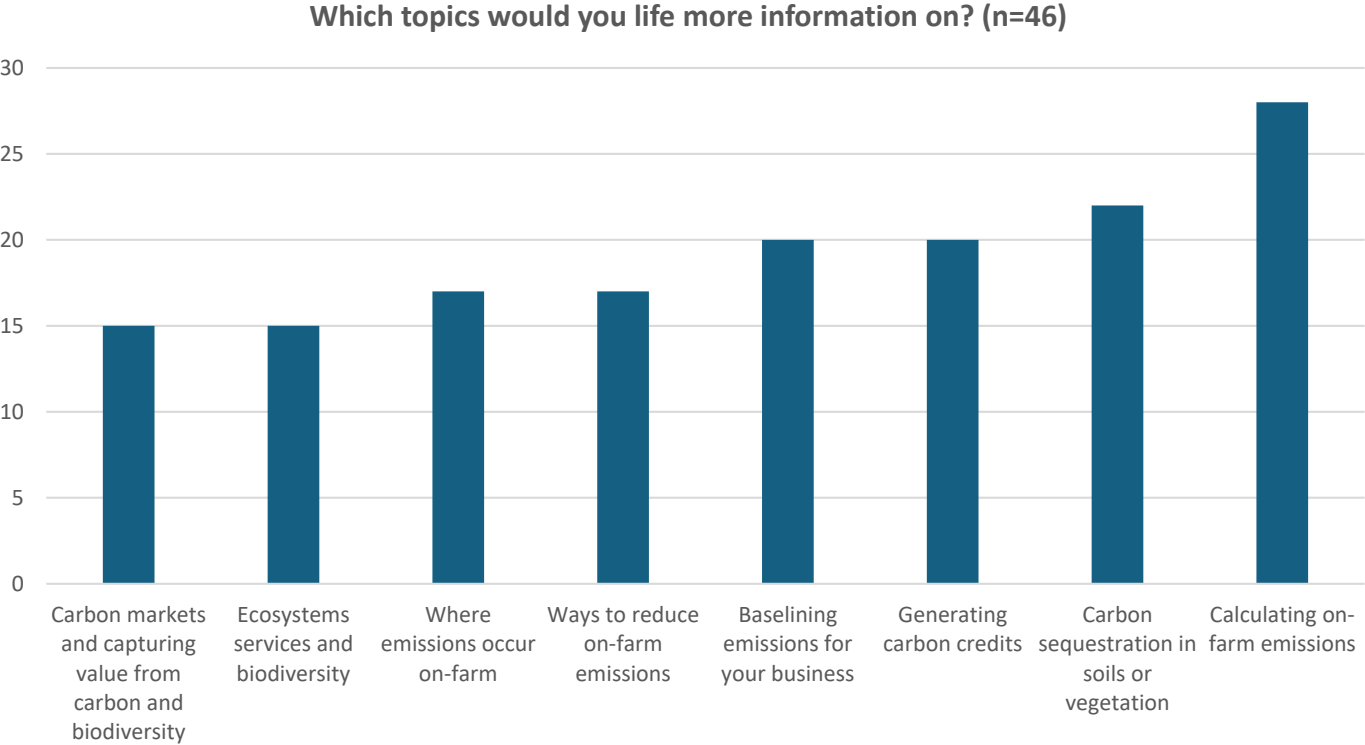
To identify gaps in existing information, avoid duplication, test consistency across commodities, and identify opportunities for coordinated approaches to measurement, knowledge development and delivery.



Findings

Knowledge is low, but engagement is higher

- Grower workshops showed that baseline understanding of on-farm emissions is generally low across regions. Some regions had high levels of knowledge driven by a higher proportion of corporate growers.
- Despite this, growers showed strong appetite for learning, particularly when information is practical, regionally relevant, and linked to business outcomes.
- The topics in highest demand are calculating on-farm emissions, understanding where emissions occur, and practical ways to reduce emissions.



The biggest knowledge gap across the value chain is in measurement

- The most consistently identified knowledge gap relates to calculating on-farm emissions, including establishing a baseline, understanding the contribution of key inputs and interpreting the resulting emissions figures.
- Grower surveys showed the largest unmet demand for information on emissions calculation, a finding reinforced through workshop polling, facilitated discussions and repeated “how-to” questions during carbon tour sessions.
- Growers expressed a strong desire to first understand “their number” before engaging with mitigation options, carbon markets or sustainability schemes, indicating that measurement is a prerequisite to action.
- Without clearer and more accessible guidance on emissions calculation, uptake of more advanced emissions reduction practices is likely to remain limited.

Measurement tools are inconsistent and creating confusion

- The current landscape of emissions calculators, methodologies and traceability approaches is highly fragmented, with different tools producing different results due to varying assumptions, boundaries, emissions factors and data requirements.
- Growers reported confusion and mistrust arising from these inconsistencies, particularly concerns about being locked into an emissions or traceability system that may not align with future buyer, bank or regulatory requirements.
- Similar issues were raised by banks, brands and buyers during interviews and sustainability roundtable discussions, who emphasised that traceability requirements are rapidly converging with emissions reporting, increasing the need for consistent, verifiable and auditable data.
- The absence of a coordinated approach to both emissions measurement and traceability increases costs, creates duplication and risks undermining confidence in sustainability claims across the cotton value chain.
- There is strong consensus across growers, financiers and brands on the need for a single, trusted and fit-for-purpose approach that integrates emissions measurement with traceability requirements.

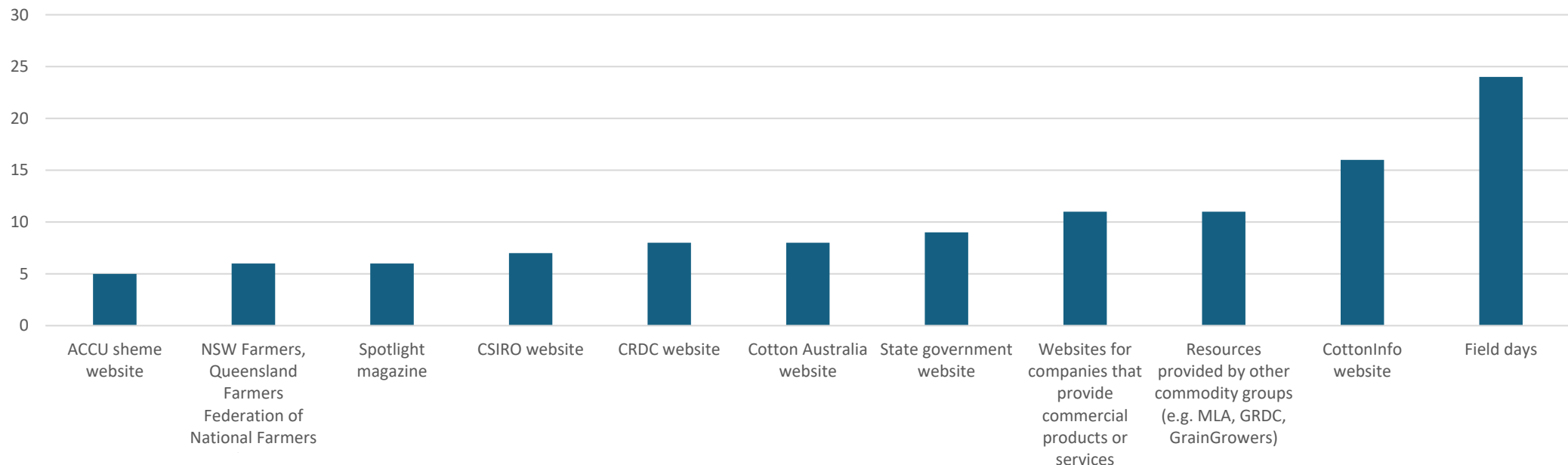
Market and finance signals are unclear and poorly translated

- Price premiums for low-emissions cotton are currently rare and inconsistent, while the dominant commercial signal relates to market access, reputational risk and future compliance requirements rather than immediate financial upside.
- Interviews with banks and buyers, along with sustainability roundtable discussions, highlighted that expectations around emissions reporting are evolving rapidly but are not always clearly communicated to growers, particularly in relation to Scope 3 emissions.
- Signals relating to natural capital and biodiversity are even less clear, with growers reporting uncertainty about whether these issues will remain voluntary, become mandatory, or be rewarded through markets, finance or procurement requirements.
- Banks and corporates acknowledged that biodiversity and natural capital are increasingly viewed as risk and value factors, but currently lack clear, practical pathways to translate these expectations into on-farm guidance.
- This widening translation gap between downstream expectations and on-farm decision-making risks confusion, disengagement and inefficient investment if not addressed in a coordinated way.

Delivery channels are just as important as content

- Growers consistently expressed a strong preference for in-person, place-based delivery of emissions information through workshops, field days and on-farm demonstrations, as reflected in survey responses and workshop attendance patterns.
- Online tools and resources are valued primarily as reference material or follow-up support, rather than as a substitute for face-to-face engagement.
- Trusted advisers, including agronomists and established industry networks such as CottonInfo, play a critical role in building confidence and supporting adoption of new practices.
- Emissions knowledge and tools are therefore most effective when embedded within existing extension channels rather than delivered through standalone platforms.

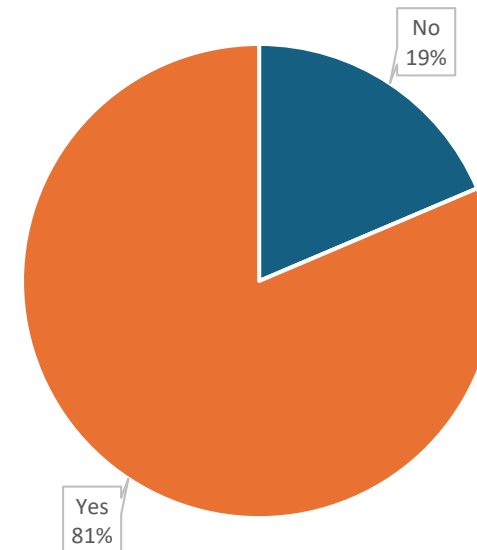
Where do you go to find information about the topics related to GHG emissions and carbon? (n=46)



Growers want a whole-of-farming system perspective

- Growers expressed a strong preference for emissions information that applies to their broader farming system rather than cotton in isolation, particularly in mixed-enterprise regions.
- Survey responses and workshop discussions highlighted concern that cotton-only tools fail to capture interactions between crops, livestock, rotations and land use.
- Banks and buyers reinforced this view, noting the need to aggregate emissions data across entire farm businesses for Scope 3 reporting purposes.
- This finding underscores the importance of cross-commodity collaboration and systems-based approaches to emissions measurement and extension.

Would you like information on GHG emissions and carbon to be applicable to your broader farming system? (n=46)



Biodiversity and natural capital are emerging but immature

- Biodiversity and ecosystem services are currently lower priorities for most cotton growers compared with emissions measurement and reduction, based on grower surveys, workshops and regional discussions.
- However, interest in natural capital is increasing as banks, corporates and regulators begin to incorporate nature-related risks and disclosures into decision-making, as highlighted during sustainability roundtable discussions.
- Frameworks such as the Taskforce on Nature-related Financial Disclosures (TNFD) are expected to follow a similar pathway to climate disclosure, moving from voluntary adoption toward mainstream use over time.
- The emergence of the Nature Repair Market introduces a potential future mechanism for recognising and valuing biodiversity outcomes, but its practical relevance, additionality requirements and demand-side signals remain unclear to growers.
- At present, biodiversity and natural capital are best viewed as a “space to watch”, with CRDC’s existing investments providing a strong foundation should clearer signals and incentives emerge.



Recommendations

1. Establish a single, fit-for-purpose emissions measurement pathway for cotton

CRDC should prioritise development of, or alignment with, a single emissions calculator that accounts for the whole farming system, recognising that cotton is rarely produced in isolation. This will require collaboration with other RDCs to ensure mixed enterprises, rotations and shared inputs are appropriately captured and duplication across commodities is avoided.

2. Continue to focus RD&E on productivity-led emissions outcomes

Emissions reduction should continue to be pursued as a co-benefit of productivity, profitability and risk-management gains, rather than as a stand-alone objective. This framing aligns with CRDC's existing investment portfolio, the Zero Net Emissions CRC, and GRDC's work on nitrogen-use efficiency, and is more credible to growers and more likely to drive adoption.

3. Adopt a blend of online and in-person regional extension model

Extension should combine practical digital resources that address key information gaps with in-person workshops, field days and demonstrations to build confidence and regional relevance. Survey and workshop evidence shows growers access information online but value face-to-face engagement for interpretation, trust and decision-making.

4. Strengthen coordinated advocacy across the supply chain and policy settings

CRDC should work with industry bodies and government to engage upstream in international policy, standards and methodology development to ensure Australian cotton is not disadvantaged by poorly fitted frameworks. While some advocacy has begun, particularly around LCA methodologies that favour synthetic fibres, stronger and more coordinated action is required as international settings increasingly shape outcomes for cotton.

5. Align industry messaging and marketing around credibility and continuous improvement

Industry messaging should emphasise transparency, defensible claims and progress over time to reduce greenwashing risk and maintain trust with brands, financiers, regulators and the community. This should leverage CRDC's existing investments in engagement channels and social licence, ensuring emissions messaging aligns with broader sustainability communications.

6. Invest in adviser capability as a multiplier of impact

Training and supporting advisers and extension personnel will enable them to confidently interpret emissions information and guide growers through a complex and evolving landscape. Strengthening adviser capability acts as a multiplier of extension effort and helps reduce confusion caused by inconsistent or poorly explained information.

7. Tailor extension to regional emissions literacy while developing foundational emissions knowledge

Extension should be targeted to regional differences in emissions literacy and production systems, rather than delivered uniformly across the industry. A common GHG 101 foundation is needed across all regions, but grower engagement indicates that more advanced content is appropriate in areas such as Narrabri, Moree and Goondiwindi, while introductory material is better suited to regions such as Central Queensland and Kunurra.

8. Support practical engagement with biodiversity and natural capital as part of whole-farm sustainability

CRDC should build on its broader investments in natural capital and environmental stewardship to support early, practical engagement with biodiversity and natural capital. While interest is growing due to finance and policy signals, high measurement costs, evolving frameworks such as TNFD and the Nature Repair Market, and uncertainty about future requirements mean this is an area to prepare for rather than push prematurely.

9. Strengthen strategic engagement with banks and buyers to translate evolving requirements

CRDC should establish more structured and proactive engagement with banks, buyers and downstream stakeholders to clarify evolving emissions, traceability and sustainability expectations. This translation role will be increasingly important to avoid misalignment, reduce unnecessary burden on growers, and align value-chain expectations as disclosure and natural capital requirements expand.