GREENHOUSE GAS EMISSIONS REDUCTION RESEARCH STRATEGY

AUSTRALIAN COTTON SUSTAINABILITY FRAMEWORK
PLANET. PEOPLE. PADDOCK.

COTTON AUSTRALIA

CRDC
COTTON RESEARCH AND DEVELOPMENT CORPORATION

CURRENT STATE → RISKS AND OPPORTUNITIES → CURRENT ACTIONS AND GAPS → EXTENT OF INFLUENCE → COLLABORATION OPPORTUNITIES → YEARS → END STATE

DRAFT SUMMARY

This draft is a summary of a more detailed strategy.

This is a research, development and extension strategy for the cotton industry. It will deliver a clear, credible and achievable pathway for cotton growers to reduce their emissions for maintaining market access and improving productivity.

It describes where we are now (current state), where we want to be (end state), and fills in the gaps needed to get from the current state to the end state.

Risks and opportunities have been mapped according to Climate-Related Financial Disclosure physical, transition and systemic categories.

Current actions to address risks and opportunities are in normal font, gaps are in bold font. The extent to which the industry can influence these actions are rated high, medium or low.

Some actions are solely for the cotton industry to execute, but there are many opportunities for collaboration with the grains industry, whole-of-agriculture, and other stakeholders like government, banks, and the Cooperative Research Centre for Net Agriculture Zero Emissions (ZNE-Ag CRC),

CONTEXT

Australian cotton growers have been improving their sustainability performance for decades, underpinned by the *my*BMP program. This GHG emissions reduction research strategy will identify immediate actions for on-farm GHG emissions reductions, and give long-term certainty needed for the industry to plan with confidence.

Growing, ginning and transporting cotton to port is estimated to account for about 0.2 per cent of Australia's GHG emissions.

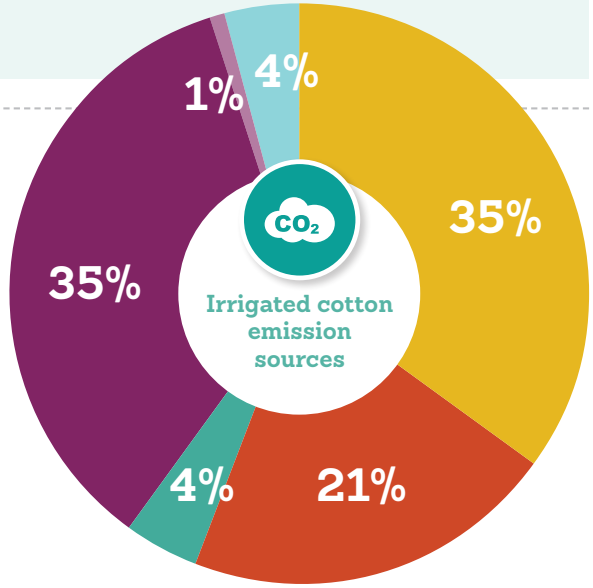
Nitrogen (N) accounts for most irrigated cotton GHG emissions to farm gate. Diesel fuel for machinery and irrigation pumps contributes about 35 per cent of cotton GHGs.

This context explains why the focus of the cotton industry to reduce emissions is to:

1. Reduce reliance on fossil fuels on-farm and created during manufacture of inputs like fertiliser
2. Reduce on-farm emissions from nitrogen fertilisers
3. Improve soil health to improve productivity and resilience and to reduce inputs.

When considering the extent of emission reductions, the starting point must be acknowledging cropping always has and always will produce GHG emissions from natural processes like decomposing crop residues, and microbial activity in the soil.

The Australian cotton industry's current view is an appropriate science-based ambition is to reduce emissions as much as technically possible through the three pathways listed above. A net zero ambition for Australian cotton does not appear to be feasible, as eliminating emissions from natural processes like soil nitrogen cycling and the breakdown of biomass is not possible.



Irrigated cotton emission sources, 2022/23. Source: Ekonomou A., Eckard R.J. (2024), University of Melbourne C-GAF based on the Australian National Greenhouse Gas Inventory methodology.

NEXT STEPS

When refined and agreed by industry, the priorities for 2024/25 per this draft strategy are:

1. **Consider an industry GHG emissions reduction target with credible pathways to achieve it**
2. **Create a single source of truth for knowledge and information on emissions, sequestration, and carbon markets. This includes alignment to a nationally consistent approach to GHG accounting**
3. **Take more action this year, and plan for future actions needed to achieve reductions to 2030 and beyond.**

Priorities 2 and 3 will involve some cotton-specific actions, but it is essential most of this work is done in collaboration with governments and other industries to provide a coordinated, coherent approach to impact that eliminates the confusion and duplication currently weighing down meaningful on-farm action.

GHG EMISSIONS REDUCTION RESEARCH STRATEGY

Current State	Risks & opportunities	Current actions & gaps	Extent of influence	Collaboration Opportunities	24/25	25/26	26/27	27/28	28/29	End State
Credible action is needed: Increasing pressure for data and action to keep markets.	Loss of customers without action Gain of customers with action	• GHG emissions reductions priorities and credible reduction pathways identified	H	Merchants, customers	○	○	○	●	●	Australian cotton maintains markets and avoids "high carbon" discounts by 2030, and increases premium markets by 2040.
		• Australian Cotton Strategic Roadmap for managing traceable, verifiable and high-quality industry data along the supply chain	H	Australian Cotton Shippers Association	○	●	●	●	●	
	Publicise GHG difference between cotton and polyester	• **Report $ investment in climate-related risks and opportunities**	H		●	●	●	●	●	
	Proactively court international capital with a 'come and invest in our transition' message and roadshow	• **Coordinated global natural fibre campaign**	M	Cotton and wool peak bodies	○	●	●	●	●	
		• **Develop pitch for global investors, eg via Principles for Responsible Investment, with support of Australian Sustainable Finance Institute**	H	Cotton & grains peak bodies, ZNE-Ag CRC, Federal Govt.	○	○	●	●	●	
Better data is needed: Data primarily from surveys – needs to improve in quality to improve confidence for growers to act, and for markets to trust industry actions.	Loss of customers with poor data Gain of customers with compliant data	• IMMEDIATE: More accurate existing data to inform GHG reduction target & pathways[1]	H	CSD growers & consultants, Federal & State Govt.	○	●	●	●	●	"Investment grade" data is collected from every field by 2028 and accurate emission factors are in government accounts.
		• LONGER TERM: Cotton Data Platform – "investment grade" data from every field	H	Growers & Consultants	○	○	○	●	●	
		• Establishing Emission Factors (EF) for enhanced efficiency fertilisers in cotton systems	H	ZNE-Ag CRC, fertiliser suppliers	○	○	○	●	●	
		• **Refining models for calculating emissions factors to allow growers to more accurately report GHG emissions e.g. replacing N fertiliser EFs with curvilinear algorithm to incentivise reduction of high N rates**	M	ZNE-Ag CRC	○	○	○	●	●	
		• Share information and insights to ensure that policy discussions are science-based and risk-aligned	M	RDC's, peak industry bodies	○	○	○	○	○	

ACRONYMS

- CSD: Cotton Seed Distributors. Australia's sole provider of cotton planting seed that also delivers grower-facing research, development and extension.
- CCA: Crop Consultants Australia. The peak body for agronomists and advisers to cropping farmers.
- ZNE-Ag CRC: Zero Net Emissions in Agriculture Cooperative Research Centre. A multi-stakeholder approach committed to advancing lower-emissions agriculture.
- GHG: Greenhouse gas. A gas generated in cotton production systems that is captured under the Paris Agreement 2015.
- NRM Regions: A network of Natural Resource Management organisations partnering to regenerate and sustain Australia's biodiversity and productive landscapes.
- RDCs: Research and Development Corporations that allow the Australian government and primary producers to co-invest in research and development.

Risk and opportunities are derived from climate related financial disclosures guidance on source and timeframe of risks and opportunities.

Unbolded actions = what are we doing now.
Bolded actions = identified gaps.

Extent of influence rates the extent to which CRDC and the broader Australian cotton industry can influence change. High influence means an action is completely in our control; low influence means we are dependent on others to deliver this action.

Deadline for actions to be delivered are in solid block colours, and years for actions to be in development are shaded.

● Deadline for actions to be delivered

○ Years for actions to be in development

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Clarity on the carbon opportunity is a major barrier to action: Growers frustrated by complexity & independence of messaging.	Lack of climate action erodes trust, especially in dry climate extreme periods	• GHG target and credible pathways give growers clarity on what to do	H		○ ○ ● ● ●	By 2028/29, Australian cotton growers are recognised as having high GHG literacy and action.
	Credible emission reduction target and pathways builds trust and acceptance	• **Create single source for establishing low carbon cotton systems including cotton-specific information, tools, how to capture value (i.e. productivity, profitability, accessing markets & capital, new revenue streams)**	H		○ ● ● ● ●	
		• **Create a cross-sector single source of cross-sector harmonised information, tools and practicable actions**	M	Federal Govt., RDCs, ZNE-Ag CRC	○ ○ ● ● ●	
		• **Coordinated and collaborative extension and adoption to reduce emissions across cotton farming systems**	M	State Govt., RDCs, ZNE-Ag CRC	○ ○ ○ ● ●	
		• **Progress cotton-NRM regional natural capital hub model to coordinate region-specific climate action; investigate behavioural science application**	M	NRM Regions State Govt., ZNE-Ag CRC	○ ○ ○ ● ●	
	Physical cotton production climate risk: more hot days, less green / blue water, wet and dry season extremes	• **Quantify and value long-term impacts: likelihood, % production impacted, $ of impact on quality and yield** (per climate-related financial disclosures)	H	CCA, CSD, growers & consultants	○ ● ● ● ●	
		• **Update myBMP module to reflect GHG pathways and target**	H		○ ○ ● ● ●	
Cotton-specific ACTION to reduce emissions by source. Will be determined by target and pathway, but expected actions include:						
Growers can not easily manage carbon across their cotton farming system: Growers are not able to easily access and implement GHG emissions reductions tactics on farm.	Support practices that reduce fossil fuel emissions and input costs	• **FERTILISER PRE-FARM: accelerate green N commercialisation, "community co-operatives" for fertiliser**	L	ZNE-Ag CRC, investors, fertiliser industry, RDCs	○ ○ ○ ○ ○	By 2028/29, Australian cotton growers have clarity on how to reduce their GHG emissions and have options to respond to a changing climate and market demands.
		• **FUEL & ELECTRICITY: accelerate transition to renewable electricity, capturing value from generated electricity and asset replacement strategies.**	M	ZNE-Ag CRC, investors, RDCs, banks	○ ○ ○ ● ●	
		• **FUEL & PESTICIDES: eliminate pre-farm transport emissions, novel incentives e.g. feasibility for GHG reduction capex reduced finance cost**	L	Transport & pesticide industries, Federal Govt.	○ ○ ○ ○ ○	
	Support practices that reduce N emissions and maximise impact of inputs	• **FERTILISER ON-FARM: accelerate EEF adoption, including evidence of EEF reduced costs and increased margins**	M	ZNE-Ag CRC, fertiliser industry, RDCs	○ ○ ○ ○ ●	
		• **FERTILISER ON-FARM: accelerate improved nitrogen use efficiency, including novel mechanisms to reduce nitrogen fertiliser rates**	M	ZNE-Ag CRC, RDCs	○ ○ ○ ● ●	
		• **FERTILISER ON-FARM, CROP RESIDUES, PESTICIDES: accelerate improved nutrient use efficiency, residue management, pest suppression**	M	ZNE-Ag CRC, RDCs	○ ○ ○ ○ ●	
	Adopt climate-resilient soil health practices to improve water holding capacity and improve climate resilience.	• **FERTILISER ON-FARM, CROP RESIDUES, PESTICIDES: accelerate adoption of practices that build climate resilient soils and capture value from soil security**	M	RDCs	○ ○ ○ ● ●	