



CRDC

**PERFORMANCE
REPORT
2022-23**



About CRDC & the Australian cotton industry

The Cotton Research and Development Corporation (CRDC) delivers outcomes in cotton research, development and extension (RD&E) for the Australian cotton industry.

A partnership between the Australian Government and cotton growers, CRDC invests in world-leading RD&E to benefit Australia's dynamic cotton industry and the wider community. We invest in innovation and transformative technologies to deliver impact, and as an organisation we are ambitious, agile, and adaptive.

Cotton is a major contributor to the economic, environmental and social fabric of rural Australia. The industry's national exports generate an average of \$1.9 billion in annual revenue, and the industry is a major employer in rural and regional communities.

Australia's cotton production is closely tied to water availability, making cotton growers naturally adaptive to Australia's seasonal conditions. In 2019–20, the industry grew the smallest cotton crop in 37 years. Just two years later, with a return to more favourable conditions and greater water availability, the 2021–22 crop was the second-largest on record.

Geographically, the industry continues to go through a period of growth, continuing its expansion from its predominant growing base in New South Wales (NSW) and southern and central Queensland (Qld) to northern Victoria (VIC), far north Qld, the Northern Territory (NT) and northern Western Australia (WA).

RD&E and its resulting innovations are a key driving force behind our industry's continued success – and CRDC's purpose is to power the success of Australian cotton through world-leading RD&E.

Vision

Powering the success of Australian cotton through world-leading RD&E.

Mission

Investing in world-leading RD&E to benefit Australia's dynamic cotton industry.

Purpose

Outcome statement: Increased economic, social and environmental benefits for the Australian cotton industry and the wider community, by investing in knowledge, innovation and its adoption.



Our performance report: overview

We have five strategic outcomes under our 2018–23 Strategic RD&E Plan – these in turn are the key focus areas in which we invested during 2022-23:

GOAL 1: Increasing productivity and profitability on Australian cotton farms

.....

GOAL 2: Improving cotton farming sustainability and value chain competitiveness

.....

GOAL 3: Building the adaptive capacity of the Australian cotton industry

.....

ENABLING STRATEGY 1: Strengthening partnerships and adoption

.....

ENABLING STRATEGY 2: Driving RD&E impact

.....

Our achievements against these outcomes have been monitored, evaluated and reported annually in the Portfolio Budget Statement and the Annual Report.

This Performance Report is a companion document to the CRDC 2022–23 Annual Report. This report is by no means exhaustive, but rather provides a snapshot of the performance of CRDC against these five strategic outcomes during the course of 2022–23. Further details regarding our performance, our significant initiatives, our collaborations and our corporate governance are found in the full Annual Report, available at our website: www.crdc.com.au/publications/crdc-annual-report.

In addition, our website and publications, including our CRDC Spotlight magazine and electronic newsletters, and the Australian cotton industry’s extension program, CottonInfo, provide further information on CRDC’s research portfolio and its associated impact.



PROGRESS AGAINST CRDC STRATEGIC R&D PLAN 2018–23

Our Annual Performance Statement

2022–23 marked the fifth and final year under the CRDC Strategic RD&E Plan 2018–23, which provided an ambitious roadmap for our 2018–23 investments. Through this plan, we aimed to contribute to creating \$2 billion in additional gross value of cotton production for the benefit of Australian cotton growers and the wider community.

Progress towards this goal was tempered by dry conditions during the first half of the strategic plan period, and the challenges associated with COVID-19 in the second, but a return to positive seasonal conditions at the end of this period brought renewed optimism.

The strategic RD&E investments that CRDC made in 2022–23 are helping to drive the Australian cotton industry towards a future of innovation, increased commercialisation and digital transformation.

In 2022–23, Australian cotton growers and the Australian Government co-invested \$17.7 million through CRDC into cotton RD&E, across 189 projects, and in collaboration with 86 research partners.

The investments were made in the five key areas identified in the Strategic RD&E Plan:

- Increasing productivity and profitability on Australian cotton farms
- Improving cotton farming sustainability and value chain competitiveness
- Building the adaptive capacity of the Australian cotton industry
- Strengthening partnerships and adoption
- Driving RD&E impact.

This Annual Report outlines progress against these areas in the 2022–23 year.

Our progress is measured and performance is analysed through evaluation techniques outlined in the CRDC Monitoring and Evaluation Framework and targets set in the Strategic Plan. The green, blue and red traffic light system is used to track overall performance against the CRDC Strategic Plan.



The specific measure has been achieved.



On target to deliver against the measure.



Not on target to deliver against the measure.

The following table provides a snapshot of CRDC's performance against the Strategic Plan measures. Further details about how our performance aligned with the Strategic Plan and our key focus areas are outlined the full Annual Report.

It is important to note that while this Performance Report focuses on the final year of the Strategic Plan, some metrics for the 2022–23 year are not yet available, so some measures will still show as 'on target'. A full report of CRDC's achievements for the 2018–23 Strategic Plan period, including our performance against the \$2 billion in additional gross value target, will be published in 2023–24.





GOAL ONE: Increasing productivity and profitability on Australian cotton farms

Increasing the productivity and profitability of Australian cotton farms was CRDC’s aim within this goal under the 2018–23 Strategic RD&E Plan. The five years of the plan have been marked by pandemics, mouse plagues, drought, floods and historically high fertiliser prices across the industry, and the theme of off-farm challenges, variability and extremes continued in the plan’s final year. As a result, total production fluctuated more than nine-fold. In 2022–23, labour and fertiliser shortages, heavy rains, flooding and cool conditions marked the start of the cotton season in many regions, while the end of the season was marked by mostly warmer and drier weather. The result was a mix of record-breaking irrigated yields, but also some very low yields in both irrigated and dryland crops: impacting the achievement of this goal’s targets.

Outcomes	Performance Indicator	Measures	2018 benchmark	2023 target	2022-23 progress
KEY FOCUS AREA: Optimised farming systems					
Improved yield and quality	Increase in yield over 5 years	Assessment of average bales/ha	9.86 bales/ha (irrigated) 4.0 bales/ha (dryland)	11.6 bales/ha (irrigated) 4.7 bales/ha (dryland)	
Improved input efficiencies	Positive input/output ratios resulting from adoption of new practices	Assessment of bales per unit input for irrigated cotton (water productivity and nitrogen use)	1.1 bales/ML (GPWUI)	1.32 bales/ML (GPWUI)	
			10 kg of lint/kg of nitrogen	11.5 kg of lint/kg of nitrogen	
On-farm sustainable development is supported	New farming systems are sustainable and productive	Number of bales produced on new farming systems	—	2 million bales	
KEY FOCUS AREA: Transformative technologies and myBMP					
Improved reliability of production	Increase in five-yearly average production	Rolling annual average production (number of bales)	3.4 million bales/year (5-year average)	3.9 million bales/year (5-year average)	
New technologies are adapted for use in cotton	Increased number of technologies are available for cotton growers	Number of new technologies entering commercial use	1	5	
Cotton farms are digitally enabled	Increase in on-farm use of digital technology	Percentage of farms using digital technologies	100% connected to internet. 46% devices linked to office	85% devices linked to office	
KEY FOCUS AREA: Protection from biotic threats					
Increased understanding of the impact of pests, diseases and weeds, and environmental stresses	Impact information is available to inform improved management practices for growers and industry	R&D investments reflect the potential impact of biotic and environmental stresses to inform management practices	60%	85%	
Improved identification, surveillance & management systems	New management practices and systems are available for growers, consultants and industry	Economic impact of pests, weeds and diseases reduced by 40 per cent	—	40%	
Industry is prepared for a biosecurity incursion	Delivery of effective biosecurity preparedness scenarios/exercises (undertaken by cotton industry)	Number of biosecurity preparedness activities undertaken	—	2	
		Percentage of participants reporting increased preparedness	—	85%	


The specific measure has been achieved. On target to deliver against the measure. Not on target to deliver against the measure.














GOAL TWO: Improve cotton farming sustainability and value chain competitiveness

Improving value chain competitiveness and sustainability to derive greater value for Australian cotton growers was CRDC’s aim within this goal under the 2018–23 Strategic RD&E Plan. In 2022–23, the importance of being able to provide high-quality metrics to the supply chain to meet anticipated regulatory and general market requirements has increased dramatically, and current CRDC investments in both understanding and addressing these requirements provide a solid foundation for being able to report on the impact of cotton production. Looking forward to the next Strategic RD&E Plan 2023–28, the development of a data platform will be key to collating and reporting this information down the supply chain.

Outcomes	Performance Indicator	Measures	2018 benchmark	2023 target	2022-23 progress
KEY FOCUS AREA: Sustainability of cotton farming					
Improved environmental footprint for cotton farms	Increase in sustainability metrics and improved carbon footprint	Percentage of farm native vegetation managed for conservation	6%	6.6%	
		Carbon footprint (kg/CO ₂ e)	383 kg of CO ₂ e per bale	325 kg of CO ₂ e per bale	
KEY FOCUS AREA: Create higher value uses for cotton					
Increased value for Australian cotton	Increase in the number of new commercialised products	Number of new commercialised products	—	2	
Increased understanding of market requirements & opportunities throughout the value chain	Information is publicly available on market requirements and value chain opportunities	CRDC research identifies opportunity to increase the value of cotton by 25 per cent	—	25%	
KEY FOCUS AREA: Measurement and reporting throughout the value chain					
CRDC collaborates in global leadership: sustainability initiatives	Evidence of involvement in global initiatives	Number of global initiatives participated in	4	6	
The value chain is transparent and understood by participants to improve market opportunities	Economic and sustainability implications of transparency throughout the value chain are published and understood	Reports and sustainability information published	1	3	
The specific measure has been achieved. On target to deliver against the measure. Not on target to deliver against the measure.					


GOAL THREE: Build adaptive capacity of the cotton industry

Building the adaptive capacity of the Australian cotton industry and enabling the industry to achieve its future vision was CRDC's aim within this goal under the 2018–23 Strategic RD&E Plan. The removal of travel restrictions following COVID-19 has allowed for an increase in scientific exchanges, while a confluence of challenges during this Strategic Plan have tested grower resilience.

Outcomes	Performance Indicator	Measures	2018 benchmark	2023 target	2022-23 progress
KEY FOCUS AREA: Science and innovation capability and new knowledge					
Science and innovation capacity is strengthened & strategically fit for a digital future	Increase in the number of researchers supported through strategic career pathways	Number of PhD, post-doctoral and early career researchers supported	30	50	
	Increase in the number of scientific exchanges	Number of scientific exchanges	10	20	
Increased understanding of & participation from diverse human capital	Information is available on the diversity of social and business networks (age, gender, roles, culture, range of service providers, occupations and skills)	Report released	—	1	
Increased opportunities for innovation skills development	Degree to which innovation is supported by CRDC	Number of participants in innovation initiatives	100	600	
		Number and details of new ideas generated that provide benefit for the cotton industry	1	5	
KEY FOCUS AREA: Futures thinking					
Australian cotton growers are able to adapt to change	Growers report improved capacity to manage unknown or unexpected events (resilience)	Percentage of growers that report improved general resilience	—	60%	
Increased opportunities for strategic foresighting	Futures workshops lead to recommendations for future opportunities	Number of futures workshops	1	2	
		Number and details of future opportunities to be followed up	18	40	
 The specific measure has been achieved.  On target to deliver against the measure.  Not on target to deliver against the measure.					



ENABLING STRATEGY ONE: Strengthening partnerships and adoption









Further strengthening our collaboration and relationships with our partners and working together to ensure the effective adoption pathway for research outcomes were CRDC's aims within this enabling strategy. CRDC's partnerships remain strong, as reflected in the 2022 Partner Relationship Review, which found partner satisfaction in CRDC as an organisation to trust was 8.9 out of 10, and overall partner satisfaction remained on par with the 2018 benchmark of 8.2 out of 10. The review found that CRDC is widely considered an industry custodian. In addition, CRDC's co-investment in CottonInfo and its regionally based extension officers continue to support direct engagement with cotton growers and crop consultants to great effect, with 2022–23 data showing that 94 per cent of growers and 88 per cent of consultants agree CottonInfo is a trusted information source. In addition, dedicated support for commercialisation activities has been developed over the course of the Strategic RD&E Plan.

Outcomes	Performance Indicator	Measures	2018 benchmark	2023 target	2022-23 progress
KEY FOCUS AREA: Partnerships & collaboration					
Growers/consultants value CRDC farming systems research outcomes	Maintain or increase the number of growers/consultants that value CRDC research outcomes	Percentage of growers/consultants that report valuing CRDC outcomes	Growers: 77% Consultants: 72%	85%	
CottonInfo partnership is maintained and practice change improved	R&D outcomes are demonstrated through extension and adoption activities	Number of demonstration sessions	150	200	
		Percentage of participants that report increased knowledge, skills and intention to change behaviour as a result	70%	85%	
Partnerships are strengthened to engage multi-disciplinary & multi-institutional resources	Evidence of effective collaborative projects	Percentage of investments that include cross-sectoral partnerships	25%	40%	
		Number of new international and national partnerships	2	5	
		Partner satisfaction ranking	8.2 out of 10	8.5 out of 10	
KEY FOCUS AREA: Best practices (myBMP)					
Best practice is based on science and measured impact	myBMP practice modules reflect latest R&D outcomes	Percentage of topics within myBMP modules (that CRDC contributes to) that have been updated with CRDC R&D outcomes	95%	100%	
KEY FOCUS AREA: Innovation & commercialisation					
Improved R&D innovation & commercialisation	CRDC supports researchers to innovate & become more commercially focused	Number of projects with commercialisation potential	3	5	
	Research partners are supported through the commercialisation process (to ensure successful knowledge transfer)	Researchers report satisfaction with CRDC commercialisation support	—	85%	
	Commercialisation & knowledge transfer is accelerated	Percentage improvement in duration from conception to market entry (per product category)	—	20%	

The specific measure has been achieved. On target to deliver against the measure. Not on target to deliver against the measure.

 **ENABLING STRATEGY TWO:
Driving RD&E impact**

Ensuring CRDC’s investments deliver impact and effectiveness, therefore creating value for our stakeholders, was CRDC’s aim within this enabling strategy. To work towards this, CRDC aimed to ensure our RD&E investments met grower, industry and government needs and our projects aligned with stakeholder priorities. In 2022–23, 90 per cent of growers and consultants provided positive feedback on the relevance and value of CRDC’s investments, and stakeholders ranked satisfaction with CRDC’s communications as 8 out of 10. While these scores have not reached the ambitious 2023 targets, they do reflect strong results and stakeholder satisfaction with CRDC’s impact and effectiveness, as demonstrated by additional results from 2022–23 that show 90 per cent of cotton growers believe CRDC invests in innovative RD&E, and 89 per cent believe CRDC provides thought leadership for the cotton industry. In addition, the draft CRDC Independent Performance Review, conducted by Forest Hill Consulting in 2022–23, says: “CRDC is well engaged with and highly supported by the cotton industry and has delivered demonstrable benefits to its stakeholders.”

Outcomes	Performance Indicator	Measures	2018 benchmark	2023 target	2022-23 progress
KEY FOCUS AREA: Impact and effectiveness					
CRDC’s RD&E investments meet grower, industry and government needs	Funded projects align with identified research priorities	Percentage of aligned projects	100%	100%	
	Positive stakeholder feedback on the relevance and value of CRDC investments	Percentage of positive responses	Growers: 88% Consultants: 92%	95%	
CRDC monitors and evaluates RD&E impact	Monitoring and evaluation evidence demonstrates RD&E impact	RD&E impact reports	5	5	
CRDC-funded projects demonstrate value and return on investment	Positive return on investment	Investments demonstrate a minimum ratio of benefit/cost	5:1 ROI	> 5:1 ROI	
Growers, the cotton industry & government are informed and aware of RD&E outcomes	Stakeholders report that CRDC communications meet their needs	Communications satisfaction ranking	8.3 out of 10	8.5 out of 10	
 The specific measure has been achieved.  On target to deliver against the measure.  Not on target to deliver against the measure.					

NB: A dash indicates that no benchmark exists for 2018.

Our investments in RD&E

We use the CRDC Strategic RD&E Plan 2018–23 to guide our investments. Through this Strategic Plan, in 2022–23, we invested to help increase productivity and profitability on Australian cotton farms; improve cotton farming sustainability and value chain competitiveness; build the adaptive capacity of the Australian cotton industry; strengthen partnerships and adoption; and drive RD&E impact.

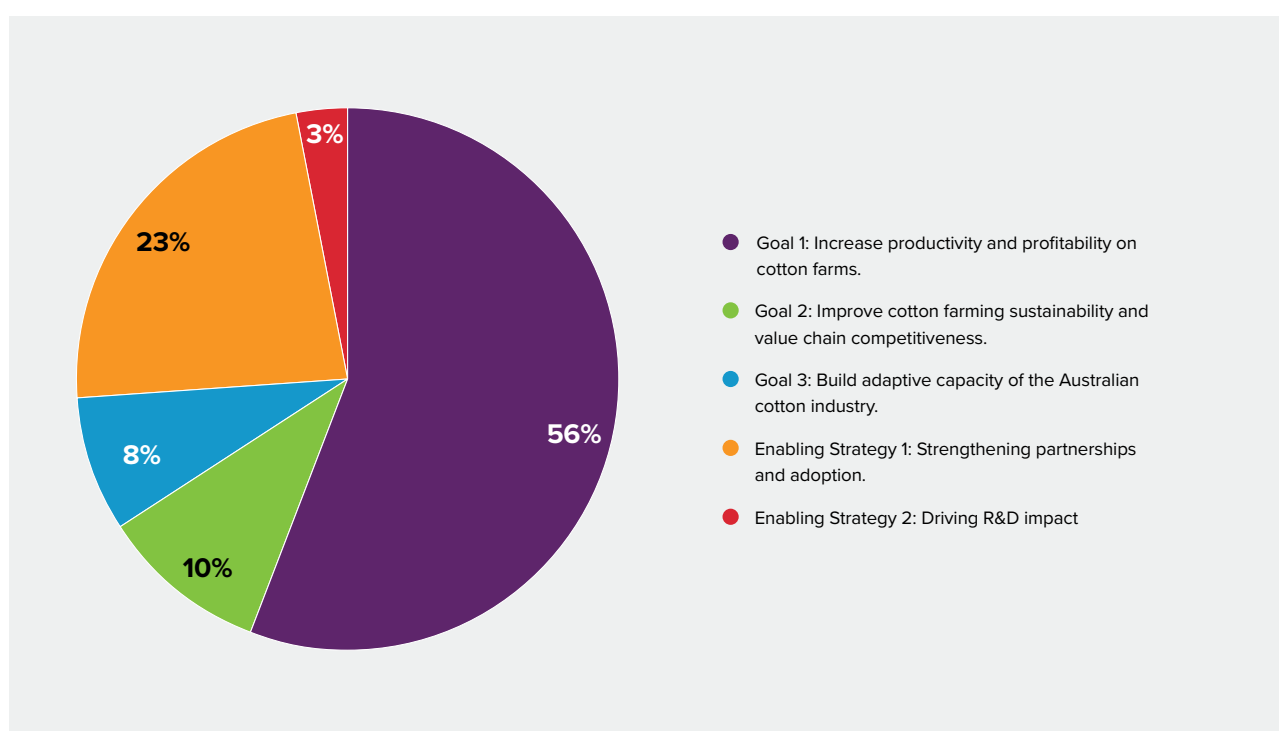
In 2022–23, we invested \$12.85 million in RD&E. Of this, \$6.56 million was invested in new research commencing in 2022–23.

Projects by CRDC program area

CRDC program	Goal 1	Goal 2	Goal 3	Enabling strategy 1	Enabling strategy 2	TOTAL
Number of projects	63	31	55	26	14	189
Program expenditure (\$m)*	\$7.24	\$1.23	\$1.03	\$3.00	\$0.35	\$12.85
Program percentage (of expenditure)	56%	10%	8%	23%	3%	100%

* Refer to Note 1.1C in the CRDC Annual Report 2022-23 financial statements.

Investment by program



Case study

CRDC's largest single investment delivers on-farm solution to help solve spray drift

A major milestone has been reached in the effort to help minimise spray drift, with a hazardous weather warning system now live for Queensland and NSW grain and cotton growers.

The system – named Weather and Networked Data, or WAND – is the result of six years of collaborative research by the Grains Research and Development Corporation (GRDC) and CRDC into meteorological conditions and the spray application of crop protection products.

In early 2022, GRDC and CRDC announced a \$5.5 million five-year partnership with Goanna Ag to deliver this new technology to growers and spray applicators: the largest single investment in CRDC's 33-year history. By March 2023, all 100 WAND towers were live across the grain and cotton regions of Queensland and NSW.

The technology provides real-time weather data about the presence and absence of hazardous temperature inversions. For growers and spray contractors, the ability to accurately identify the presence of hazardous temperature inversions will reduce their spray drift risk.

The technology builds on breakthrough research, conducted and published by Drs Graeme Tepper and Warwick Grace with support from GRDC and CRDC, and is delivering on-the-ground benefit to growers via improved information and decision-making.

Pictured front cover: Goanna Ag Chief Operating Officer Tom Dowling, CRDC Senior Innovation Broker Susan Maas, and GRDC Manager Chemical Regulation, Gordon Cumming.



2022–23 investment and impact

The Australian cotton industry in 2022–23



CRDC's investment in 2022–23



\$17.7 million

CRDC's investment in cotton RD&E on behalf of cotton growers and the Australian Government



189 RD&E projects



86 research partners

5 – KEY PROGRAM AREAS



Increasing productivity and profitability on Australian cotton farms



Improving cotton farming sustainability and value chain competitiveness



Building the adaptive capacity of the Australian cotton industry



Strengthening partnerships and adoption



Driving RD&E impact.

CRDC impact



100 per cent

of CRDC's investments delivered in partnership with the cotton industry.



28 per cent

of CRDC's investments in cross-sectoral collaborative projects.

91 per cent

reduction in hazard of pesticide to bees since 2004, as reported in the *2022 Australian Cotton Sustainability Update*, published by CRDC and Cotton Australia.



4

independent environmental assessments commissioned by CRDC since 1991: one per decade.

9 priority areas

for the cotton industry under the industry's sustainability targets: water, carbon, biodiversity, pesticides, soil health, quality of work life, wellbeing and social capital, efficiency, and profitability.



\$5.5 million

the collective investment from CRDC and GRDC in Weather and Networked Data or WAND: a five-year partnership with **Goanna Ag** to help minimise spray drift.

CRDC impact



\$12.54 to \$1

the benefit-cost ratio of WAND: a \$12.54 benefit to cotton growers for every dollar invested.



\$7.4 to \$1

the benefit-cost ratio of CRDC's investment in canopy temperature sensors to help growers with irrigation scheduling.

8

CRDC projects with commercialisation potential that have a commercial partner on board or a commercialisation process underway.



\$1 million

CRDC's contribution into the Cooperative Research Centre for Developing Northern Australia (CRCNA)'s Cotton Grain and Cattle project. GRDC is also contributing \$1 million.



46

cotton leaders supported by the industry to participate in the Australian Rural Leadership Program since it was founded 30 years ago.



Nearly 100 per cent

improvement in water productivity that Australian cotton growers have achieved between 1997 and 2021.

11

major cotton & grain projects CRDC delivered in partnership with GRDC during 2022–23.



5

major collaborative projects that CRDC led or actively participated in during 2022–23 under two government initiatives: Rural R&D for Profit, and the National Landcare Program Smart Farming Partnership.

10 years

since CottonInfo was founded by CRDC, Cotton Australia and CSD.

12

impactful innovations and companies showcased by CRDC and grow^{AG} to almost 2,500 attendees via Innovation Alley at the 2022 Australian Cotton Conference.



8.9 out of 10

the rating of partners re satisfaction in CRDC as an organisation to trust.

15

PhD students CRDC has supported in 2022–23. CRDC also supported eight post-doctoral researchers, and six CSIRO summer scholars.



2.97 million

collective views amassed by the 257 CRDC-supported best practice videos on the CottonInfo YouTube channel as at June 2023.



94 per cent

of growers believe CRDC and CottonInfo to be trusted information sources.



4.4 OUT OF 5

the average rating for effectiveness of CottonInfo activities across 4,700 participants at events in 2022–23.

RD&E highlights

Spray hazard warning system now live

CRDC, GRDC and Goanna Ag's five-year collaboration to help minimise spray drift reached a major milestone in 2022–23, with all 100 Weather and Networked Data (WAND) towers going live across Queensland and NSW. The hazardous weather warning system provides real-time weather data and alerts to growers and spray operators about the presence of hazardous temperature inversions. The warning system builds on breakthrough research supported by GRDC and CRDC and is delivering on-the-ground benefit to growers via improved information and decision-making. In its first six months of operation, over 1,800 cotton and grain growers and spray contractors signed up to access the system. A CRDC study found that WAND could help the cotton industry avoid \$40 million in losses and costs associated with drift over five years.

Major northern Australia research collaboration underway

A major four-year \$27 million collaboration to boost agricultural production in Northern Australia was announced in 2022–23, bringing together CRDC, GRDC and the Cooperative Research Centre for Developing Northern Australia (CRCNA). Comprising six interlinked projects across the three focus industries of cotton, grain and cattle, the program is designed to address pressing research gaps in the emerging broadacre regions of Northern Australia, while also boosting the value delivered to the cattle industry, creating a robust and sustainable sector that will benefit the local economy. It involves around 30 partners, including universities, state/territory governments and industry stakeholders across Western Australia (WA), the Northern Territory (NT), and Queensland.

CRDC RD&E delivering return on investment for growers

CRDC commissioned an impact assessment of projects completed under the current Strategic RD&E Plan in 2022–23. Impact assessments were completed for 10 project clusters, comprising 24 individual RD&E projects, with a combined CRDC investment of \$10.7 million (38 per cent of CRDC's investment from 2018–22). The project clusters included smart sensing and automation for irrigation, canopy temperature sensors for irrigation, integrated pest management, community resilience, Bt resistance, integrated weed management, sustainability, the WAND spray hazard tower network, the silverleaf whitefly decision support tool, and nitrogen management. WAND was estimated to have a benefit-cost ratio of \$12.54 for every dollar invested over the period 2023–2030, while the overall benefit-cost ratio was estimated at \$5.98 to \$1 – \$5.98 in benefit returned to cotton growers and the wider industry for every \$1 invested.

Update on cotton's sustainability progress released

CRDC and Cotton Australia released the second annual progress update against cotton's key sustainability indicators, outlined in the PLANET. PEOPLE. PADDOCK. Sustainability Framework in 2022–2023. The annual update, which looks at the year ending June 2022, provides a snapshot of cotton's performance against the nine indicators – PLANET: water, greenhouse gases, biodiversity, pesticides and soil health; PEOPLE: wellbeing and workplace; and PADDOCK: productivity and profitability. The annual updates are designed to fit between cotton's comprehensive five-yearly sustainability reports, giving important insights into progress, so the industry can keep track of areas performing well, and those that need more emphasis. The Sustainability Update 2022 shows that improvements have been made in water-use efficiency, the reduction in the hazard of pesticides to bees and algae, and the proportion of female and First Nations workers in the cotton industry.

CottonInfo celebrates 10 years of connecting growers with research

CottonInfo, the Australian cotton industry's joint extension program, celebrated 10 years of delivering outcomes for the Australian cotton industry in 2022–23. Officially established at the 2012 Australian Cotton Conference by CRDC, Cotton Australia and CSD, CottonInfo is a unique industry partnership that communicates the outcomes of research, encourages grower adoption of technology and innovation, and improves industry practices. The team comprises Regional Extension Officers, Technical Leads and myBMP experts and works across issues including biosecurity, climate, crop nutrition, disease management, energy-use efficiency, fibre quality, integrated pest management, natural resource management, pesticide-application efficiency, soil health, stewardship, water management and weed control. The CottonInfo team are a highly trusted source of information for 94 per cent of growers.

New mode of action for insect control

A new plant-based compound for combating common insect pests in cotton, horticulture and broadacre crops has been developed by the University of Western Sydney (WSU), with support from CRDC. Researchers have uncovered a plant extract that shows tremendous promise in lab tests and in early field trials in controlling common crop insect pests. Code-named N68, the commercially cultivable native plant compound shows excellent insecticidal activity in controlling cotton aphids as well as good activity on whitefly, thrips, two-spotted mites, olive lace bug, diamondback moth, and Queensland fruit fly. The compound also has favourable off-target traits – low phytotoxicity, low impact on non-target organisms and a low eco-toxicological profile. Current testing suggests N68 is a new mode of action for insect control and potentially an entirely new tool in the challenge of resistance. A patent has been lodged, and a commercial partner contracted to further develop this novel biopesticide.

Collaboration to tackle major cross-sectoral challenges

All of CRDC's 2022–23 investments were delivered in partnership with the cotton industry, and 28 per cent involved cross-commodity collaborative projects with fellow RDCs. CRDC led three major collaborations during the year: Smarter Irrigation for Profit Phase 2 under the Australian Government's Rural R&D for Profit Program; Cotton Landcare Tech Innovations, under the National Landcare Program Smart Farming Partnership; and Better Information and Better Decisions, under the National Agriculture Traceability Grants Program. CRDC has also partnered in two other projects under Rural R&D for Profit, addressing cross-sectoral issues in weeds and biosecurity. In addition, CRDC is a partner in major RDC initiative grow^{AG}, and partnered with GRDC on 11 research projects in 2022–23, totalling \$21 million in collective investment.

Progress towards commercialisation: R&D on path towards commercial release

In 2022–23, several CRDC-supported R&D innovations continued their progress towards commercial release: Pest Detect, the artificial intelligence smartphone app to help identify silverleaf whitefly; BioClay™, the non-toxic, clay-based biodegradable product for crop pests and pathogens; AquaTill Injeticide, the ultra high-pressure water-cutting technology for crop termination in dryland crops; VARIwise, the software that combines in-season imagery with crop production models to provide yield predictions throughout the season; and the CRDC-GRDC-Goanna Ag spray drift hazardous weather warning system, WAND. These innovations were among 12 technologies and companies showcased by CRDC in partnership with grow^{AG} to over 2,500 attendees at the 2022 Australian Cotton Conference's Innovation Alley.

Developing a Strategic Roadmap for Australian Cotton

A collaboration to develop a strategic roadmap for the Australian cotton industry commenced in 2022–23 via Cotton Australia, CRDC and the Australian Cotton Shippers Association (ACSA). The roadmap is focused on helping Australian cotton remain competitive in changing international markets. Five key topic areas are being addressed via broad consultation with growers and the industry: traceability; industry data; sustainably-certified cotton/the myBMP program; human rights; and Australian cotton marketing. The need for the roadmap has emerged from new requirements in global markets, including legislative changes, global frameworks, and social and environmental reporting requirements. The roadmap's development is supported via an Australian Government Agricultural Trade and Market Access Cooperation (ATMAC) grant.

Developing standardised carbon accounting across commodities

CRDC is a partner in a new initiative, announced in 2022–23, to enable Australian farmers to understand their enterprise's carbon footprint and to make better informed decisions to reduce emissions and capture new opportunities. The discovery phase of the project is being led by Agricultural Innovation Australia in partnership with 12 RDCs. Carbon accounting is an important aspect of natural capital along with biodiversity and native vegetation, so the move to develop a cross-sectoral standardised on-farm carbon accounting system aligns with CRDC and the Australian cotton industry's cross-sectoral approach to setting biodiversity and native vegetation targets based on standardised definitions and calculations. The initiative has already garnered interest from the private sector, including supply chain organisations and commercial providers.



Cotton Research and Development Corporation

2 Lloyd Street (PO Box 282)

Narrabri NSW 2390

Phone: 02 6792 4088

Email: crdc@crdc.com.au

Website: www.crdc.com.au

ABN: 71 054 238 316

© Cotton Research and Development Corporation 2023

This work is copyright. Apart from any use as permitted under the *Copyright Act 1968*, no part may be reproduced by any process without written permission from the Cotton Research and Development Corporation (CRDC). Enquiries concerning reproduction and publishing rights should be addressed to the CRDC Executive Director.

If you are interested in learning more about CRDC and our investments, visit our website www.crdc.com.au or subscribe to our quarterly magazine, *Spotlight*.

All photos and images in this report were sourced principally from CRDC, project researchers or research institutions. Image front cover: Melanie Jenson.



**COTTON RESEARCH AND
DEVELOPMENT CORPORATION**