



**ANNUAL OPERATIONAL PLAN
2023-24**



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Acknowledgement of country

CRDC acknowledges Australia's Indigenous people as the traditional custodians of our country, and recognises their continuing connection to lands, waters and culture. We pay our respect to Elders past, present and emerging, and extend that respect to all Indigenous people.





About CRDC & Australian Cotton

CRDC exists to grow the sustainable future of cotton through innovation with impact. We deliver world-class research, development and extension (RD&E) outcomes for the cotton industry through thought leadership, innovation, adoption and collaboration.

Cotton growers are at the heart of what we do: they determine our RD&E priorities and co-fund our research through a grower levy, matched by Commonwealth contributions.

Our growers, and the cotton they produce, are a major contributor to the nation's economic, environmental and social fabric.

According to the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), the value of cotton exports will be close to \$7 billion from 2022–23, making cotton Australia's third-ranking agricultural export commodity.

Australian cotton is considered to be one of the most sustainable in the world, thanks in part to the RD&E that underpins it. Compared to 1992, Australian cotton growers use 97 per cent less pesticides, 52 per cent less water, and 34 per cent less land to grow one bale of cotton.

Cotton employs more than 12,000 people across 150 rural and regional communities, many of which rely heavily on cotton for their economic prosperity and viability. Each year, Australia grows enough of this high-quality natural fibre to clothe 500 million people.

Innovative and adaptive growers, supported by RD&E and world-leading researchers, have driven Australian cotton's success. CRDC's role is to continue driving this success through RD&E.





Our purpose

Grow the sustainable future of cotton through innovation with impact.

Our mission

Deliver world-class RD&E outcomes for the cotton industry through thought leadership, innovation and adoption through collaboration and partnership.

Our responsible Minister

Senator the Hon. Murray Watt,
Minister for Agriculture, Fisheries and Forestry

Our enabling legislation

The Primary Industries Research and Development (PIRD) Act 1989.





Our people

CRDC Board

Chair	Richard Haire
Deputy Chair	Rosemary Richards
Non-executive Directors	Emeritus Professor Les Copeland AM
	Ross Burnett
	Dr Gary Fitt
	Dr Danielle Kennedy
	Peta Slack-Smith
Executive Director	Dr Ian Taylor

Our values

Bold, collaborative, future-focused and trusted.

Team

Executive Director	Dr Ian Taylor
General Manager, Innovation	Allan Williams
General Manager, Business and Finance	Graeme Tolson
Executive Manager, Communications	Ruth Redfern
Senior Innovation Broker	Susan Maas
Innovation Broker	Elsie Hudson
Innovation Broker (part-time)	Dr Meredith Conaty
Innovation Broker (part-time)	Nicola Cottee
Innovation Broker (contractor)	Stacey Vogel
Innovation Broker (contractor)	Rachel Holloway
Innovation Process Advisor (contractor)	Warwick Waters
Sustainability Advisor (contractor)	Chris Cosgrove
Commercialisation Advisor (contractor)	Evan Wilcox
CottonInfo Communication Lead	Megan Woodward
Project Administrator	Megan Baker
Project Administrator	Lynda George
Project Administrator/Reception	Callie Hudson
Senior Accountant (part-time)	Emily Luff
Accountant	Paula Ryan
Accounts Officer (part-time)	Jeevi Arjunan
Executive Assistant (part-time)	Delece Hartnett

Introduction

Annual Operational Plan

The CRDC Annual Operational Plan outlines the RD&E investments we will make in the 2023–24 year.

Our investments are governed by a five-year strategic plan, and 2023–24 marks the first year under CRDC's new Strategic RD&E Plan 2023–28:

Clever Cotton.

Clever Cotton sets out CRDC's vision for a sophisticated, prosperous and sustainable Australian cotton industry that is strongly connected to its value chain.

Clever Cotton is bold and unashamedly ambitious. It commits CRDC to invest in RD&E to address and capitalise on challenges and opportunities for the benefit of levy payers, the cotton industry and the wider community.

The strategic RD&E investments that CRDC will make in 2023–24 under Clever Cotton will help the industry increase its productivity and profitability, sustainably address the impacts of climate change, and improve decision making using data and digital technologies. CRDC's goal is to add an additional \$1 billion in economic value to the Australian cotton industry over the next five to ten years.

In 2023–24, Australian cotton growers and the Commonwealth Government will co-invest \$25.3 million through CRDC into Clever Cotton, in collaboration with research partners.

The investments will be made via three pillars of investment – Paddock, People, Planet – aligned with the Australian Cotton Industry's Sustainability Framework. Each of these pillars contains three themes, creating nine key investment areas:

Paddock: our future fields

- + Data-driven decisions
- + Adaptive systems
- + Connected market intelligence

People: central to our success

- + Design and innovation
- + Leadership and capacity
- + Adoption and impact

Planet: our shared future

- + Natural capital
- + Carbon
- + Circular economy





Clever Cotton

Our plan to deliver \$1 billion in additional value to the Australian cotton industry

Clever Cotton commits CRDC to investing across nine themes to achieve our vision and to deliver the greatest impact and best outcomes for growers (our levy payers), our industry and the wider community.

The three pillars and nine themes are distinct and interconnected. Each supports the other while directly targeting bold strategic priorities and outcomes to meet the ambitions of the cotton industry and our communities.



Snapshot of the 2023–28 CRDC Strategic RD&E Plan

Paddock

Our future fields

People

Central to our success

Planet

Our shared future



Data-driven decisions

Objective

Improve productivity, profitability, and sustainability by accurately monitoring and measuring every field on every cotton farm.

Impact

In 2028, a transparent and trusted data platform will deliver increased profitability and productivity through better decision-making, facilitating innovative research, and building trusted engagement.



Design and innovation

Objective

Embed collaboration in RD&E prioritisation, design, development, and adoption.

Impact

In 2028, growers can see RD&E addressing their problems and creating practical solutions to be adapted and adopted into their production systems.



Natural capital

Objective

Implement resilient natural capital practices that support productivity, help maintain biodiverse ecosystems, strengthen capacity for adaptation to climate change, and progressively improve regional water, land and soil quality.

Impact

In 2028, cotton farms have maintained and enhanced natural capital and are more resilient to shocks.



Adaptive systems

Objective

Grow the profitability and resilience of Australian cotton-farming systems through innovative solutions, technologies and practices.

Impact

In 2028, Australian cotton-farming systems are resilient, biosecure, and able to thrive in an increasingly variable climate with enhanced resource efficiency.



Leadership and capacity

Objective

Develop people and skills to support industry RD&E.

Impact

In 2028, the development of world-class research capability supports industry goals.



Carbon

Objective

Establish a sustainable low-carbon cotton production system for a changing future.

Impact

In 2028, the cotton industry meets market, community and government expectations for carbon.



Connected market intelligence

Objective

Enhance the sustainability, market access and diversity, and value of Australian cotton.

Impact

In 2028, Australian cotton growers are preferred suppliers of sustainable cotton.



Adoption and impact

Objective

Adopt knowledge and technology through dedicated development and delivery pathways.

Impact

In 2028, adoption has increased its rate, reach and effectiveness.



Circular economy

Objective

Develop the circular economy for Australian cotton.

Impact




In 2028, the cotton industry can participate in the circular economy, providing lasting end-of-life solutions for cotton textiles.








Our RD&E investment priorities & measures of success




The Clever Cotton Strategic RD&E Plan targets are outlined in this table. Achievement against the objectives and targets will be monitored, evaluated and reported annually in the CRDC Annual Report and Performance Report.

	Objective	Measure/s	2023-24 target	2028 target
PILLAR 1: Paddock Our future fields	The Paddock pillar focuses on the on-farm cotton system, uniting data and insights to support thriving cotton farms producing a premium product being demanded by the market.	CRDC will measure its success in this pillar by the economic value the three themes add to the industry.	An economic assessment of key drivers of profitability for Australian cotton is undertaken to demonstrate a production increase of \$0.2 billion.	CRDC's 2028 target for added value is \$1 billion.
 Data-driven decisions	Improve productivity, profitability, and sustainability by accurately monitoring and measuring every field on every cotton farm.	<ul style="list-style-type: none"> + Yield per hectare + The value of data analysis and insights created from the management and production data captured in the industry database. 	+ A digital strategy for the industry is in place.	In 2028, a transparent and trusted data platform will deliver increased profitability and productivity through better decision-making, facilitating innovative research, and building trusted engagement.
 Adaptive systems	Grow the profitability and resilience of Australian cotton-farming systems through innovative solutions, technologies, and practices.	+ The value of the systems solutions created to address the challenges of disease, sustainable industry expansion, adaptation to climate change, biosecurity threats and reduced availability of inputs.	<ul style="list-style-type: none"> + The baseline economic impact of disease is established. + Research has commenced to identify sustainable integrated farming systems for northern Australia. 	In 2028, Australian cotton-farming systems are resilient, biosecure, and able to thrive in an increasingly variable climate with enhanced resource efficiency.
 Connected market intelligence	Enhance the sustainability, market access and diversity, and value of Australian cotton.	+ Percentage of Australian cotton sold as more sustainable (as defined by the market).	+ A baseline percentage is established.	In 2028, Australian cotton growers are preferred suppliers of sustainable cotton.



	Objective	Measure/s	2023-24 target	2028 target
PILLAR 2: People Central to our success	The ‘People’ pillar aims to ensure that in developing our world-class research capability, we are providing practical RD&E solutions and increasing the reach and impact of adoption.	CRDC will measure its success in this pillar by the level of satisfaction in CRDC by growers and research partners.	Surveys demonstrate growers and research partners are satisfied with CRDC’s performance.	In 2028, growers and research partners are satisfied with CRDC. CRDC is nationally recognised for developing world-leading RD&E talent.
 Design and innovation	Embed collaboration in RD&E prioritisation, design, development, and adoption.	<ul style="list-style-type: none"> + Growers acknowledge the utility of solutions and technologies developed through CRDC investment + Progression of innovations through Technology Readiness Levels (TRLs) tracked. 	<ul style="list-style-type: none"> + A baseline of grower utility is established. + TRLs for CRDC’s current investments are established and mapped. 	In 2028, growers can see RD&E addressing their problems and creating practical solutions to be adapted and adopted into their production systems.
 Leadership and capacity	Develop people and skills to support industry RD&E.	<ul style="list-style-type: none"> + Research capacity is assessed and integrated into CRDC’s new research programs + Industry capacity to lead change and contribute to the future of cotton. 	<ul style="list-style-type: none"> + Cotton’s research capacity needs are mapped in collaboration with research partners. + A review of leadership programs is undertaken. 	In 2028, the development of world-class research capability supports industry goals.
 Adoption and impact	Adopt knowledge and technology through dedicated development and delivery pathways.	<ul style="list-style-type: none"> + Percentage of growers actively contributing to RD&E adaptation through regional trials and data collection + Percentage of growers actively engaged with RD&E programs + Percentage of growers recognise that CRDC and CottonInfo have contributed to improving their productivity and sustainability. 	<ul style="list-style-type: none"> + A baseline for each measure is established. 	In 2028, adoption has increased its rate, reach and effectiveness.



	Objective	Measure/s	2023-24 target	2028 target
PILLAR 3: Planet Our shared future	The ‘Planet’ pillar aims to ensure that the cotton industry contributes positively to the environment, meeting community, government and market expectations.	CRDC will measure its success in this pillar by the level of trust the industry has from the community, the market and government about how it manages and reports on its environmental and social impacts.	Surveys demonstrate trust from community, the market and government about cotton’s management and reporting of environmental and social impacts.	The community, market and government demonstrate trust in cotton’s management and reporting of environmental and social impacts.
 Natural capital	Implement resilient natural capital practices that support productivity, help maintain biodiverse ecosystems, strengthen capacity for adaptation to climate change, and progressively improve regional water, land and soil quality.	<ul style="list-style-type: none"> + Condition and value of natural capital on cotton farms as measured by sustainability framework metrics. + Higher community and stakeholder trust in the cotton industry as a responsible steward of natural capital. 	<ul style="list-style-type: none"> + A baseline for each measure is established. 	In 2028, cotton farms have maintained and enhanced natural capital and are more resilient to shocks.
 Carbon	Establish a sustainable low-carbon cotton production system for a changing future.	<ul style="list-style-type: none"> + Development of a clear pathway to carbon neutrality available to support industry targets. + Improvement in nitrogen (N)-use efficiency, with N inputs matching plant demand across the rotation cycle. + Development of regionally specific guidelines for on-farm carbon sequestration in soils or native vegetation. 	<ul style="list-style-type: none"> + At least one cross-sectoral partnership is developed regarding a pathway to carbon neutrality and regionally specific guidelines. + Investigations into novel solutions to improve nitrogen use efficiency underway. 	In 2028, the cotton industry meets market, community and government expectations for carbon.
 Circular economy	Develop the circular economy for Australian cotton.	<ul style="list-style-type: none"> + The ‘added value’ developed through interventions to create a circular economy for cotton. 	<ul style="list-style-type: none"> + Options for adding value identified. 	In 2028, the cotton industry can participate in the circular economy, providing lasting end-of-life solutions for cotton textiles.



Setting the priorities

CRDC works with the Australian cotton industry to determine the sector’s key RD&E priorities; with Government to determine its overarching agricultural RD&E priorities; and with both the industry and Government to determine the Cotton Sector RD&E Strategy.

In turn, these priorities help to shape CRDC’s strategic RD&E priorities, which are formalised under the 2023–28 Strategic RD&E Plan, Clever Cotton.

Industry accountability

CRDC is accountable to the cotton industry through its representative organisation, Cotton Australia. As the industry peak body, Cotton Australia is responsible for providing advice on industry research priorities.

CRDC engages with Cotton Australia in a formal process of consultation around strategic priorities and RD&E investments. Through this consultation, industry research priorities are regularly reviewed, emerging issues are actively considered, and research outcomes are adopted in the form of best practices.

Government accountability

CRDC is accountable to the Australian Government through the Minister for Agriculture, Fisheries and Forestry. Government communicates its expectations of CRDC through Ministerial direction, enunciation of policy, administration of the *Primary Industries Research and Development (PIRD) Act 1989*, and priorities (Science and Research Priorities and National Agricultural Innovation Priorities). CRDC responds to government expectations through regular communication, compliance with the Funding Agreement, policy and legislated requirements, and the development of Strategic RD&E Plans, Annual Operational Plans, Annual Reports and Performance Reports.

The Australian Government describes Science and Research Priorities and National Agricultural Innovation Priorities.

The Science and Research Priorities are:

- + Food
- + Soil and water
- + Transport
- + Cybersecurity
- + Energy
- + Resources
- + Advanced manufacturing
- + Environmental change
- + Health

The National Agricultural Innovation Priorities are:

- + Australia is a trusted exporter of premium food and agricultural products.
- + Australia will champion climate resilience to increase the productivity, profitability and sustainability of the agricultural sector.
- + Australia is a world leader in preventing and rapidly responding to significant pests and diseases through futureproofing our disease system.
- + Australia is a mature adopter, developer and exporter of digital agriculture.

National Primary Industries RD&E Framework and the Cotton Sector RD&E Strategy

The Australian, state and territory governments, rural research and development corporations (RDCs), CSIRO, and universities have jointly developed the National Primary Industries Research, Development and Extension Framework to encourage greater collaboration and promote continuous improvement in the investment of RD&E resources nationally.

Under this framework, CRDC, research organisations, industry and government have developed the Cotton Sector RD&E Strategy and are committed to the implementation of its five research priorities: better plant varieties, improved farming systems, people business and community, product and market development, and development & delivery.

CRDC provides the secretariat for the Cotton Innovation Network which is responsible for implementing the Cotton Sector RD&E Strategy. CRDC is also committed to supporting the implementation of the cross sectoral strategies including climate change, soils, plant biosecurity and water use. CRDC is a member of Agricultural Innovation Australia Pty Ltd, established to facilitate joint investment and collaboration in cross-industry issues of national importance. Cross sectorial collaboration is a key focus for CRDC.



Our structure: CRDC governance

CRDC Board

CRDC is managed by a Board consisting of up to nine Directors. The Chair and our current six Non-Executive Directors are appointed by the Minister for Agriculture, Fisheries and Forestry. The Executive Director is appointed by the Board. The CRDC Board sets the Corporation's strategic direction and delegates responsibility of day-to-day management to the Executive Director.

The Board is committed to high standards of corporate governance that ensure CRDC meets its obligations to government and industry stakeholders, and appropriately manages resources to achieve its outcome and strategic plan goals.

The Board has established a governance framework and systems that enhance performance and ensures that CRDC is operating according to accountability provisions of the PIRD Act and the *Public Governance, Performance and Accountability (PGPA) Act 2013*.

The Board's functions include:

- + Establishing goals and setting strategic direction.
- + Developing and approving a five-year RD&E Plan, Annual Operational Plan, Statements of Intent, and producing an Annual Report.
- + Establishing policies and instructions for the operation of CRDC.
- + Ensuring that risk assessment and management frameworks are in place to minimise business and financial risk.

Remuneration of Directors

The Chairperson and Non-Executive Directors are remunerated under the PIRD Act in accordance with such remuneration as is determined by the Remuneration Tribunal established under the *Remuneration Tribunal Act 1973*. Under the PIRD Act, the Executive Director's remuneration is determined by the Board through the recommendation of the Remuneration Committee.

The total budgeted remuneration for the Chair, Executive Director and six Non-executive Directors in 2023–24, including superannuation, is \$586,009.

Payment to representative bodies

The Corporation's industry representative body in 2023–24 is Cotton Australia. The role of the industry representative body involves:

- + Participation in the development and review of the five-year Strategic RD&E Plan. This ensures CRDC's strategic planning continues to address evolving industry RD&E needs.
- + A meeting to receive and discuss the CRDC Annual Report for the preceding year. This enables the industry representative body to assess whether CRDC's activities for that year have met its strategic objectives, and to question senior staff on any matters of interest and concern.
- + Other RD&E related activities which vary from year to year.

While CRDC does not pay a fee-for-service to the industry representative body it may fund discrete RD&E projects and contribute to the expenses incurred as authorised under the PIRD Act.

In 2023–24, CRDC has budgeted to pay Cotton Australia \$40,000 for the direct meeting costs incurred in consultation activities involving its research and development advisory panels which consist of voluntary members (cotton growers and ginners). The advice received from Cotton Australia's R&D advisory panels is used by CRDC in considering changes to its research strategy, priorities and in making research investment decisions.



CRDC Corporate standards

In carrying out the functions of the Corporation, Directors and staff members are required to:

- + Commit to excellence and productivity.
- + Be accountable to stakeholders.
- + Act legally, ethically, professionally and responsibly in the performance of duties.
- + Strive to maximise return on investment of industry and public funds invested through CRDC.
- + Strive to make a difference in improving the knowledge base for sustainable cotton production in Australia.
- + Value strategic, collaborative partnerships with research providers, other research and development bodies, industry organisations, stakeholders and clients, for mutual industry and public benefits; including cooperation with kindred organisations to address matters of national priority.
- + Value the contribution, knowledge and expertise of the people within our organisation and that of our contractual consultants, external program coordinators and research providers.
- + Promote active, honest and effective communication.
- + Commit to the future of rural and regional Australia.
- + Comply with and promote best practice in corporate governance.
- + Commit to meeting all statutory obligations and accountability requirements in a comprehensive and timely manner.

CRDC revenue sources

CRDC's revenue is drawn from two main sources:

1. Cotton farmers pay a levy based on production. The main source of levies is from cotton ginned in Australia based on \$2.21 for each 227-kilogram bale of cotton. A secondary levy is drawn from exported seed cotton at a rate of \$4.06 per tonne. Australian ginning and the export of seed cotton occurs from March to September of each calendar year. Therefore, cotton levy revenue in any financial year is drawn from two consecutive cotton crops.
2. The Australian Government matches expenditure of levies on eligible R&D, capped at 0.5 per cent of the three-year average gross value of production or the cumulative levy receipts, whichever is the lesser. The setting and collection of the industry levy is enabled by the *Primary Industries Levies and Charges Collection Act 1991* and the *Primary Industries (Excise) Levies Act 1999*.

The Australian Government general matching of industry contributions is expected to be limited by either the value of levies collected or 0.5 per cent of the cotton industry's three-year average Gross Value of Production (GVP). The trigger that will apply depends on the price of cotton, timing of the harvest and ginning, and the variability of the crop size.

Royalties from intellectual property licences, interest on investments, external grant revenue and research project refunds make up the balance of CRDC's income.

Ensuring efficiency

Ensuring continuous improvement in organisational efficiency and productivity is a key focus for CRDC. CRDC is charged with investing in RD&E on behalf of cotton growers and the Government, so ensuring these funds are used to best effect is critically important. CRDC has invested in improved systems and infrastructure to ensure continuous improvement in the organisation's productivity.

Additionally, in order to achieve both industry and national RD&E efficiency, CRDC works in collaboration with other cotton industry organisations, the Cotton Innovation Network and other rural RDCs to achieve greater strategic outcomes for the cotton and other rural industries. CRDC's collaborative approach underpins our investment strategy: we partner in approximately 80 per cent of RD&E projects conducted in the cotton sector. In 2023–24, 31 per cent of all CRDC investments will be made in cross-sectoral RD&E.

The year ahead: 2023–24 industry and financial outlook

Industry

As at June 2023, the 2022–23 cotton season is drawing to a close. Approximately 584,000 hectares were planted to irrigated and dryland cotton this season, a slight increase on the 550,000 hectares the season before. The season was marked by climate variability, with widespread flooding across cotton catchments causing farm and crop damage in November 2022. This was followed by a cool, dry summer, then a return to what is considered ideal cotton conditions in March 2023.

Cotton harvest is still underway, so the full results of the season are not yet known. However, it is estimated that total production will reach 5.4 million bales.

The irrigated average yield is expected to reach 11.7 bales per hectare, and the dryland yield 3.51 bales per hectare.

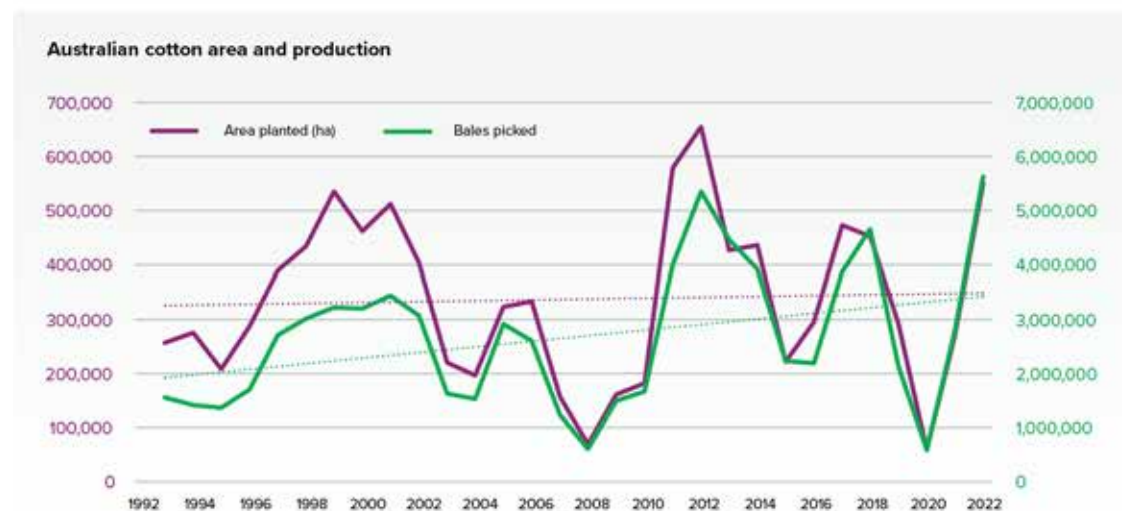
Looking forward to the 2023–24 cotton season, the current industry estimate is for 491,000 hectares to be planted to cotton, achieving 4.7 million bales. This reflects the variable seasonal forecasts given the predicted return to El Nino conditions, balanced with stored irrigation water levels and the predicted growth of cotton production and infrastructure in newer production areas – particularly northern Australia, where the crop increased in size from 1,000 hectares in 2016–17 to 22,000 hectares in 2021–22.

Financial

In 2023–24, CRDC has budgeted for a surplus of \$4.642 million, based on revenues of \$29.958 million and expenditure of \$25.316 million, which includes RD&E expenditure of \$20.982 million. CRDC will use this surplus to rebuild reserves which are strategically held for the purpose of ensuring RD&E investment can continue during difficult times.

Wherever possible, CRDC aims to use its reserves to maintain research investment at a consistent level despite years where crop levels are below average due to climatic conditions.

The use of CRDC’s reserves complies with the organisation’s Financial Reserves Policy which ensures the organisation maintains sufficient financial reserves to ensure the efficient and effective performance of its business, the achievement of its strategic RD&E outcomes, and capacity to meet its fiduciary responsibilities.





Our 2023–24 investment portfolio

For 2023–24, CRDC's RD&E investment is \$20.98 million. Of this expenditure, \$6.56 million is to be invested in new research commencing in 2023–24 as part of the total RD&E portfolio.

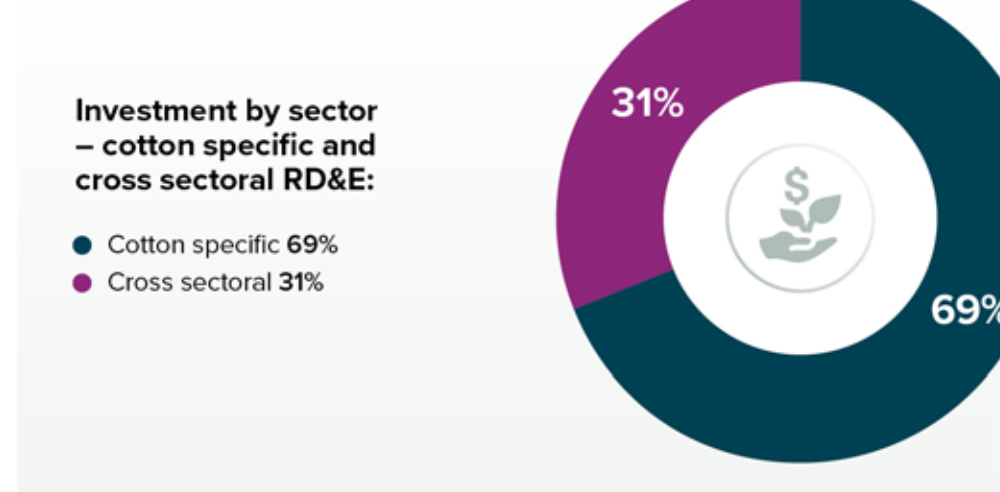
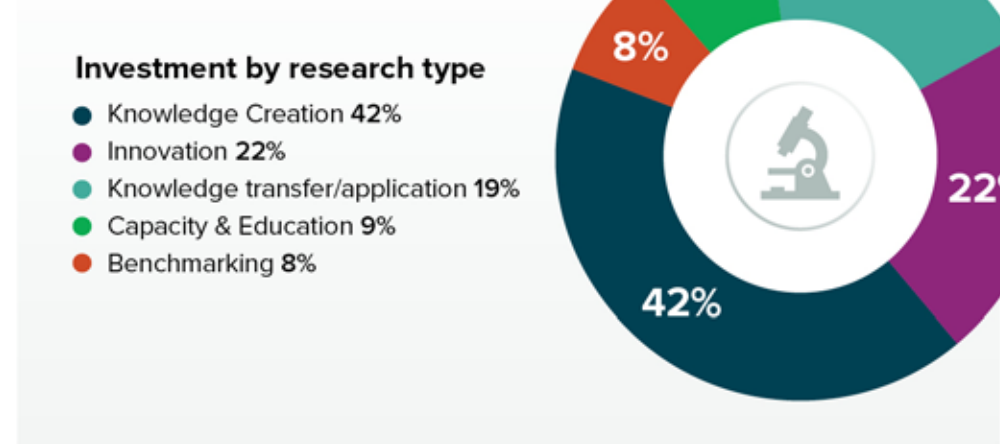
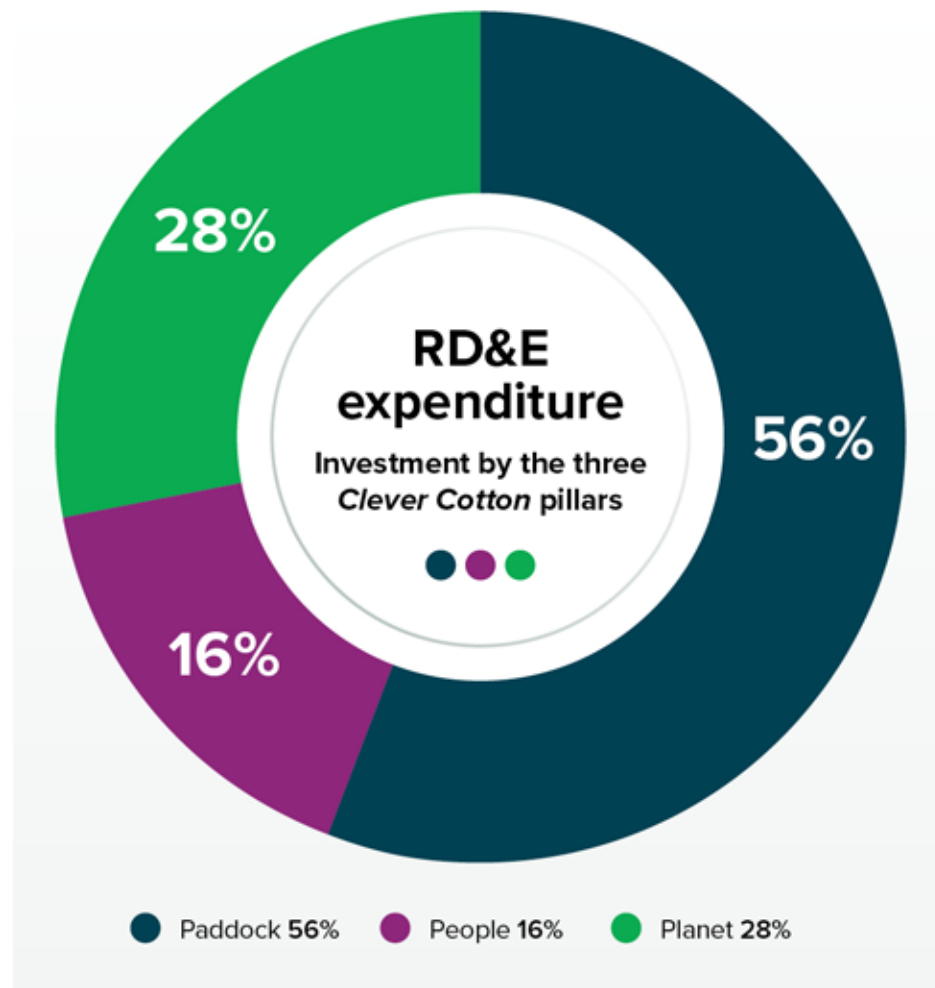
Over the life of Clever Cotton, CRDC plans to invest a total of \$125 million. CRDC's objective is to achieve a balanced RD&E portfolio that considers distribution of investment across:

- + The RD&E strategies.
- + The type of research including knowledge creation, knowledge transfer/application, innovation, benchmarking, and capacity and education.
- + In-project risks.
- + Researcher experience, capability and capacity.
- + Research providers.
- + Timeframe to outcomes.
- + The likely return on investment for projects and programs.
- + Expenditure on RD&E management.



CRDC 2023–24 portfolio overview

Each year CRDC reviews the portfolio balance together with the measures of success for each program to inform decisions on any adjustments to research priorities and the allocation of resources.





Our investment process

The process of deciding where to invest CRDC's annual RD&E funding is a collaborative one, involving all major stakeholders.

CRDC works closely with the industry's peak representative body, Cotton Australia, and the Australian Government on an annual basis to identify and evaluate the cotton industry's requirements for RD&E. Cotton Australia and new theme-level advisory committees will provide advice to CRDC on research projects and where research dollars should be invested, guided by the priorities established in the 2023–28 Strategic RD&E Plan, Clever Cotton.

In line with Clever Cotton, CRDC will continue to hold an annual research priority forum, bringing together the Cotton Australia research and development advisory panels to identify the gaps in the existing research portfolio and opportunities for new research. CRDC will also establish advisory committees and hold discipline forums with research partners to identify emerging research issues.

From here, CRDC determines the investment priorities. As part of determining which proposals are successful, CRDC again undertakes a process of consultation with growers prior to making the final investment decision. The final decision-making authority rests with the CRDC Board.

Successful proposals become contracted projects with CRDC and are delivered by our research partners. Critically, CRDC's success in delivering RD&E outcomes to growers and the industry is contingent upon strong relationships with our research partners, who deliver projects on our behalf.

Importantly, Clever Cotton will utilise a new program and investment plan framework for RD&E investments. This will enable CRDC to focus on delivering large-scale desired outcomes that provide better solutions for complex problems and have a greater impact for the industry. Greater emphasis and support will also be given to ensure that researchers can collaborate and share their results with each other and the broader industry.

2023–24 R&D priorities

The 2023–24 priorities forum, held in May 2022, identified a range of broad areas of focus for future RD&E investment. These were incorporated into the development of the investment plans for Clever Cotton and its new strategic RD&E priorities.

These key areas included:



- + The management of disease (in particular Verticillium wilt, Fusarium wilt and Black root rot) and the impact of compaction and different rotation crops
- + The impact and management of resistant weeds (especially Fleabane, Feathertop Rhodes grass and Barnyard grass)
- + The management of pests (especially Silverleaf Whitefly, mirids and mealy bugs), integrated pest management, the use of beneficial insects and how to better inform decision making
- + The management of water, including automation, optimisation, improved scheduling technology, and strategies to reduce evaporation from storages
- + The management of input costs, including fertilisers (with a focus on better understanding nutritional requirements, nitrogen and reducing greenhouse gas emissions) and human capacity (including how to attract and retain skilled staff)
- + The measurement and management of biodiversity, including habitat provision in riparian areas and weed management in remnant vegetation.

Through Clever Cotton and the 2023–24 investment plans, CRDC is investing in projects to address these key needs.



Our 2023–24 investments

PILLAR 1 Paddock: Our future fields

Objective	R&D Investments 2023-24	Collaborative Partners*
 <p>Data-driven decisions</p> <p>Improve productivity, profitability, and sustainability by accurately monitoring and measuring every field on every cotton farm.</p>	<ul style="list-style-type: none"> • Establishing a data platform • Collecting industry data • Mapping fibre quality via data analytics 	<ul style="list-style-type: none"> • DataGene • CCA • USYD
 <p>Adaptive systems</p> <p>Grow the profitability and resilience of Australian cotton-farming systems through innovative solutions, technologies, and practices.</p>	<p>Solving farming system constraints (water, agronomy, climate change):</p> <ul style="list-style-type: none"> • Optimising irrigation performance in bankless channel cotton layouts • Support for making decisions with limited water • Supporting southern cotton production systems • Understanding the key drivers of profitability • Advancing field sensing for improved cotton management • Enhancing modern systems agronomy for resilient cotton production • Developing region-specific cover cropping guidelines • Integrating irrigation technology • Climate-proofing Australia’s cotton industry through improving crop water use and photosynthetic carbon assimilation • Developing innovative solutions for dryland/limited water cotton to enhance resilience & reliability of cotton growing 	<ul style="list-style-type: none"> • Deakin • NSW DPI • CSD • USQ • CSIRO • USYD • WSU
	<p>Disease:</p> <ul style="list-style-type: none"> • Researching disease management in cotton farming systems • Investigating tactical management and surveillance of Alternaria and Black root rot • Developing the ‘Australian Cotton Disease Collaboration’ 	<ul style="list-style-type: none"> • NSW DPI • QLD DAF • CSD



PILLAR 1 Paddock: Our future fields



Adaptive systems

Biosecurity:

- | | |
|---|--|
| <ul style="list-style-type: none"> • Demonstrating integrated weed tactics across farming systems (regionally) • Supporting the ARC Research Hub for Sustainable Crop Protection • Developing proactive approaches to integrated pest management (IPM) in cotton production systems • Improving insecticide resistance monitoring for key pests, including silverleaf whitefly, to support sustainable insect management • Supporting the Plant Biosecurity Research Initiative • Supporting the WAND spray drift hazard alert and warning system | <ul style="list-style-type: none"> • NSW DPI • HIA • UQ • CSIRO • QLD DAF • GRDC • Goanna Ag (Discovery Ag) |
|---|--|

Northern Australia:

- | | |
|---|--|
| <ul style="list-style-type: none"> • Supporting a sustainable cotton, grain and cattle system for Northern Australia • Investigating innovation in crop destruction • Researching sustainable management of soils and pesticides • Improving surveillance systems and understanding for endemic and exotic threats to northern production systems | <ul style="list-style-type: none"> • CRCNA • GRDC • CSD • NT DITT • WA DPIRD • QLD DAF |
|---|--|



Connected market intelligence

Enhance the sustainability, market access and diversity, and value of Australian cotton.

- | | |
|---|---|
| <ul style="list-style-type: none"> • Assessing the methodology and implementation of a 'product environmental footprint' from an agricultural perspective • Assessing the performance of Australian cotton in light of current trends • Supporting the development of the Australian Cotton Strategic Roadmap • Supporting the cross-sectoral community trust in rural industries project • Supporting various memberships and partnerships including Sustainable Apparel Coalition, Better Cotton Initiative and the Sustainable Agriculture Initiative | <ul style="list-style-type: none"> • Leeds University • CSIRO • Cotton Australia • ACSA • AgriFutures • SAC • SAI • BCI |
|---|---|







PILLAR 2 People: Central to our success

Objective	R&D Investments 2023-24	Collaborative Partners*
 <p>Design and innovation</p> <p>Drive prioritisation, design, development, and adoption through collaboration.</p>	<ul style="list-style-type: none"> • Linking on-field experimentation to research and development prioritisation • Supporting process innovation and advisory committees 	<ul style="list-style-type: none"> • In development
 <p>Leadership and capacity</p> <p>Develop people and skills to support industry RD&E.</p>	<ul style="list-style-type: none"> • Supporting PhDs, scholarship programs and science forums • Supporting participation in leadership and development programs such as the Australian Rural Leadership Program, Nuffield Farming Scholarships, and AgriFutures Australia Horizons Scholarships. • Research into attracting and retaining staff on cotton farms 	<ul style="list-style-type: none"> • CSIRO • Universities • AgriFutures • ARLF • Nuffield • CQU • GRDC
 <p>Adoption and impact</p> <p>Adopt knowledge and technology through dedicated development and delivery pathways.</p>	<ul style="list-style-type: none"> • Supporting CottonInfo Technical Leads for natural resource management, climate and energy, fibre quality, soil health, IPM, biosecurity, and nutrition • Supporting on-farm demonstration trials • Conducting impact assessments of RD&E projects. 	<ul style="list-style-type: none"> • CSD • CottonInfo

PILLAR 3 Planet: Our shared future

**Additional partners will be confirmed during 2023–24*

	Objective	R&D Investments 2023-24	Collaborative Partners*
	National capital	<p>Biodiversity and soils:</p> <ul style="list-style-type: none"> • Researching riparian zone revegetation • Establishing biodiversity targets and metrics • Investigating industry-level natural and social capital accounts <hr/> <p>Water:</p> <ul style="list-style-type: none"> • Understanding the environmental co-benefits of irrigation water in the northern Murray-Darling Basin • Evaluating the economic and environmental return on investment of modern fish screens <hr/> <p>Pesticides and nitrogen:</p> <ul style="list-style-type: none"> • Scoping of requirements for monitoring water quality 	<ul style="list-style-type: none"> • Landcare • NRM groups <hr/> <ul style="list-style-type: none"> • Griffith University • NSW DPI <hr/> <ul style="list-style-type: none"> • In development
	Carbon	<ul style="list-style-type: none"> • Assessing the critical nitrogen and phosphorus values of cotton cultivars for improved yield and fertiliser efficiency • Benchmarking soil carbon, soil properties and management between long term experimental sites and on-farm cotton industry sites • Benchmarking carbon and biodiversity in native vegetation on cotton farms • Developing greenhouse gas baselines and mitigations for cotton • Understanding nitrogen cycling in cotton soils • Quantifying the temporary climate mitigation impacts of biogenic carbon • Determining the timing of nitrogen availability and forms of nitrogen supply to cotton from arbuscular mycorrhiza fungi • De-risking nitrogen decision making: insuring against yield loss through nitrogen fertiliser reduction 	<ul style="list-style-type: none"> • UQ • NSW DPI • UNE • CSIRO • NCSU • UNE
	Circular Economy	<ul style="list-style-type: none"> • Investigating textile waste composting for improving cotton’s carbon footprint and sustainability • Piloting a study to evaluate the potential for gins to be used as a waste processing facility • Understanding the greenhouse gas emissions from textile waste in landfill, used as on-farm compost or in pelletisation • Identifying opportunities for adding value to cotton through the circular economy: scoping study 	<ul style="list-style-type: none"> • Cotton Australia • UNE • UoN

Our 2023–24 budgets

Table 3.1: Comprehensive income statement (showing net cost of services)
(for the period ended 30 June)

	2022–23 Estimated actual \$'000	2023–24 Budget \$'000	2024–25 Forward estimate \$'000	2025–26 Forward estimate \$'000	2026–27 Forward estimate \$'000
Expenses					
Employee benefits	2,494	2,659	2,818	2,998	3,177
Suppliers	1,505	1,474	1,507	1,547	1,710
Grants	25,224	50,982	24,278	22,499	19,057
Depreciation and amortisation	196	201	201	240	190
Total expenses	29,419	55,316	28,804	27,284	24,134
Less: Own-source income					
Own-source revenue					
Interest	750	750	500	400	300
Grants	485	463	92	8	-
Royalties	285	50	50	50	50
Other	1,000	250	250	250	250
Total own-source revenue	2,520	1,513	892	708	600
Net cost of (contribution by) services	26,899	53,803	27,912	26,576	23,534
Revenue from Government^(a)					
Commonwealth contribution	11,930	13,390	12,155	12,100	9,282
Industry contributions	13,265	12,055	12,155	12,100	9,282
Payment from related entities	713	-	-	-	-
Other grants	10,000	33,000	5,000	5,000	5,000
Total revenue from Government	35,908	58,445	29,310	29,200	23,564
Surplus/(deficit) attributable to the Australian Government	9,009	4,642	1,398	2,624	30
Total comprehensive income/(loss) attributable to the Australian Government	9,009	4,642	1,398	2,624	30

(a) Revenue from Government includes a Commonwealth contribution under the PIRD Act and levies collected from industry by DAFF for R&D activities.

Prepared on Australian Accounting Standards basis.

Our 2023–24 budgets

Table 3.2: Budgeted departmental balance sheet (as at 30 June)

	2022–23 Estimated actual \$'000	2023–24 Budget \$'000	2024–25 Forward estimate \$'000	2025–26 Forward estimate \$'000	2026–27 Forward estimate \$'000
Assets					
Financial assets					
Cash and cash equivalents	9,545	8,970	6,078	5,684	4,677
Trade and other receivables	6,163	4,307	4,588	4,512	3,594
Investments in Shares	93	93	93	93	93
Investments	18,000	25,000	29,000	32,000	34,000
Total financial assets	33,801	38,370	39,759	42,289	42,364
Non-financial assets					
Land and buildings					
Property, plant and equipment	416	385	369	488	468
Intangibles	115	150	135	120	105
Total non-financial assets	1,406	1,520	1,569	1,703	1,698
Total assets	35,207	39,890	41,328	43,992	44,062
Liabilities					
Payables					
Suppliers	115	116	116	116	116
Grants	3,000	3,000	3,000	3,000	3,000
Total payables	3,115	3,116	3,116	3,116	3,116
Provisions					
Employee provisions	623	663	703	743	783
Total provisions	623	663	703	743	783
Total liabilities	3,738	3,779	3,819	3,859	3,899
Net assets	31,469	36,111	37,509	40,133	40,163
Equity <i>'Equity' is the residual interest in assets after deduction of liabilities.</i>					
Parent entity interest					
Reserves	330	330	330	330	330
Retained surplus/(accumulated deficit)	31,139	35,781	37,179	39,803	39,833
Total parent entity interest	31,469	36,111	37,509	40,133	40,163
Total Equity	31,469	36,111	37,509	40,133	40,163

Prepared on an Australian Accounting Standards basis.

Our 2023–24 budgets

Table 3.4: Budgeted departmental statement of cash flows (for the period ended 30 June)

	2022–23 Estimated actual \$'000	2023–24 Budget \$'000	2024–25 Forward estimate \$'000	2025–26 Forward estimate \$'000	2026–27 Forward estimate \$'000
Operating Activities					
Cash received					
Revenue from Government	9,445	15,056	11,990	12,138	9,741
Industry contributions	12,426	12,076	11,990	12,138	9,741
Other Government Grants	10,713	33,000	5,000	5,000	5,000
Other Industry Grants	485	463	92	8	-
Interest	751	750	500	400	300
Net GST received	822	1,017	1,072	-	-
Other	1,180	469	349	300	300
Total cash received	35,822	62,831	30,993	29,984	25,082
Cash used					
Employees	2,454	2,619	2,778	2,958	3,137
Suppliers	1,649	1,473	1,507	1,547	1,710
Grants	26,971	51,999	25,350	22,499	19,057
Total cash used	31,074	56,091	29,635	27,004	23,904
Net cash from (used by) operating activities	4,748	6,740	1,358	2,980	1,178
Investing Activities					
Cash received					
Proceeds from sale of property, plant and equipment	113	-	-	161	-
Investments	30,000	20,000	20,000	20,000	20,000
Total cash received	30,113	20,000	20,000	20,161	20,000
Cash used					
Purchase of property, plant and equipment and intangibles	720	315	250	535	185
Investments	40,000	27,000	24,000	23,000	22,000
Total cash used	40,720	27,315	24,250	23,535	22,185
Net cash from (used by) investing activities	(10,607)	(7,315)	(4,250)	(3,374)	(2,185)
Net increase (decrease) in cash held	(5,859)	(575)	(2,892)	(394)	(1,007)
Cash and cash equivalents at the beginning of the reporting period	15,404	9,545	8,970	6,078	5,684
Cash and cash equivalents at the end of the reporting period	9,545	8,970	6,078	5,684	4,677

Prepared on Australian Accounting Standards basis.

Attachment A: CRDC expenditure across the Government priorities

Note: These tables exclude budgeted employee and supplier expenditure, and corporate research activities which support RD&E planning and adoption.

Table A: Research and development expenditure estimates 2023–24 across the Science and Research Priorities

Food (\$'000)						Soil and Water (\$'000)			Transport (\$'000)			Cybersecurity (\$'000)			
1.1	1.2	1.3.1	1.3.2	1.3.3	1.3.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	4.4
\$479	\$3,537	\$3,645	\$1,363	\$6,364	\$242	\$783	\$1,096	\$506	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Energy (\$'000)			Resources (\$'000)				Advanced Manufacturing (\$'000)			Environmental Change (\$'000)			Health (\$'000)				Total (\$'000)
5.1	5.2	5.3	6.1	6.2	6.3	6.4	7.1	7.2	7.3	8.1	8.2	8.3	9.1	9.2	9.3	9.4	
\$0	\$75	\$0	\$0	\$0	\$0	\$0	\$0	\$113	\$0	\$1,660	\$0	\$232	\$0	\$0	\$0	\$0	\$20,095

Science and Research Priorities

1. Priority 1: Food (and Fibre)

- 1.1 Knowledge of global and domestic demand, supply chains and the identification of country specific preferences for food (and fibre)
- 1.2 Knowledge of the social, economic and other barriers to achieving access to healthy Australian food (and fibre).
- 1.3 Enhanced food production through:
 - 1.1.1 novel technologies, such as sensors, robotics, real-time data systems and traceability, all integrated into the production chain.
 - 1.1.2 enhanced food production through better management and use of waste and water; increased food (and fibre) quality, safety, stability and shelf life.
 - 1.1.3 enhanced food production through protection of food (and fibre) sources through enhanced biosecurity
 - 1.1.4 enhanced food production through genetic composition of food (and fibre) sources appropriate for present and emerging Australian conditions.

2. Priority 2: Soil and Water

- 2.1 New and integrated national observing systems, technologies and modelling frameworks across the soil-atmosphere-water-marine systems.
- 2.2 Better understanding of sustainable limits for productive use of soil, freshwater, river flows and water rights, terrestrial and marine ecosystems.
- 2.3 Minimising damage to, and developing solutions for restoration and remediation of, soil, fresh and potable water, urban catchments and marine systems.

3. Priority 3: Transport

- 3.1 Low emission fuels and technologies for domestic and global markets.
- 3.2 Improved logistics, modelling and regulation: urban design, autonomous vehicles, electrified transport, sensor technologies, real time data and spatial analysis.
- 3.3 Effective pricing, operation, and resource allocation.

4. Priority 4: Cybersecurity

- 4.1 Highly-secure and resilient communications and data acquisition, storage, retention and analysis for government, defence, business, transport systems, emergency and health services.
- 4.2 Secure, trustworthy and fault-tolerant technologies for software applications, mobile devices, cloud computing and critical infrastructure.
- 4.3 New technologies and approaches to support the nation's cybersecurity: discovery and understanding of vulnerabilities, threats and their impacts, enabling improved risk-based decision making, resilience and effective responses to cyber intrusions and attacks.
- 4.4 Understanding the scale of the cyber security challenge for Australia, including the social factors informing individual, organisational, and national attitudes towards cyber security.

5. Priority 5: Energy

- 5.1 Low emission energy production from fossil fuels and other sources.
- 5.2 New clean energy sources and storage technologies that are efficient, cost-effective and reliable.
- 5.3 Australian electricity grids that can readily integrate and more efficiently transmit energy from all sources including low- and zero-carbon sources.

6. Priority 6: Resources

- 6.1 A fundamental understanding of the physical state of the Australian crust, its resource endowment and recovery.
- 6.2 Knowledge of environmental issues associated with resource extraction.

- 6.3 Lowering the risk to sedimentary basins and marine environments due to resource extraction.
- 6.4 Technologies to optimise yield through effective and efficient resource extraction, processing and waste management.

7. Priority 7: Advanced Manufacturing

- 7.1 Knowledge of Australia's comparative advantages, constraints and capacity to meet current and emerging global and domestic demand.
- 7.2 Cross-cutting technologies that will de-risk, scale up, and add value to Australian manufactured products.
- 7.3 Specialised, high value-add areas such as high-performance materials, composites, alloys and polymers.

8. Priority 8: Environmental Change

- 8.1 Improved accuracy and precision in predicting and measuring the impact of environmental changes caused by climate and local factors.
- 8.2 Resilient urban, rural and regional infrastructure.
- 8.3 Options for responding and adapting to the impacts of environmental change on biological systems, urban and rural communities and industry.

9. Priority 9: Health

- 9.1 Better models of health care and services that improve outcomes, reduce disparities for disadvantaged and vulnerable groups, increase efficiency and provide greater value for a given expenditure.
- 9.2 Improved prediction, identification, tracking, prevention and management of emerging local and regional health threats.
- 9.3 Better health outcomes for Indigenous people, with strategies for both urban and regional communities.
- 9.4 Effective technologies for individuals to manage their own health care, for example, using mobile apps, remote monitoring and online access to therapies.



Table B: Research and development expenditure estimates 2023–24 across the National Agricultural Innovation Priorities.

	Trusted exporter of premium food and agricultural products (\$'000)	Australia will champion climate resilience to increase the productivity, profitability and sustainability of the agricultural sector (\$'000)	Australia is a world leader in preventing and rapidly responding to significant pests and diseases through future-proofing our biosecurity system (\$'000)	Australia is a mature adopter, developer and exporter of digital agriculture (\$'000)	Total (\$'000)
Expenditure	\$2,482	\$7,250	\$6,881	\$3,482	\$20,095
Percentage of total	13%	36%	34%	17%	100%





Attachment B: Research partner acronyms

ACSA	Australian Cotton Shippers Association	NCSU	North Carolina State University
AgriFutures	AgriFutures Australia	NSW DPI	NSW Department of Primary Industries
ARLF	Australian Rural Leadership Foundation	NT DITT	Department of Industry, Tourism and Trade
BCI	Better Cotton Initiative	QLD DAF	Queensland Department of Agriculture and Fisheries
CCA	Crop Consultants Australia	SAC	Sustainable Apparel Coalition
CQU	Central Queensland University	SAI	Sustainable Agriculture Initiative
CRCNA	Cooperative Research Centre for Northern Australia	UNE	University of New England
CRDC	Cotton Research and Development Corporation	UoN	University of Newcastle
CSD	Cotton Seed Distributors	UQ	University of Queensland
CSIRO	Commonwealth Scientific and Industrial Research Organisation	USQ	University of Southern Queensland
GRDC	Grains Research and Development Corporation	USYD	University of Sydney
HIA	Hort Innovation	WSU	Western Sydney University





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