



ANNUAL OPERATIONAL PLAN

2022-23





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2022–23

Responsible Minister

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

CRDC Board

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<i>Deputy Chair</i>	Rosemary Richards
<i>Non-executive Directors</i>	Emeritus Professor Les Copeland AM Ross Burnett Dr Gary Fitt Dr Danielle Kennedy Peta Slack-Smith Dr Ian Taylor

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CRDC Management

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<i>CottonInfo Communications Lead</i>	Brad Pfeffer
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<i>R&D Manager (part-time)</i>	Elsie Hudson
<i>R&D Manager (part-time)</i>	Dr Meredith Conaty
<i>R&D Manager (contractor)</i>	Elle Storrer
<i>R&D Manager (contractor)</i>	Stacey Vogel
<i>R&D Manager (contractor)</i>	Rachel Holloway
<i>Commercialisation Manager (contractor)</i>	Dr Jarrod Ward
<i>Project Administration</i>	Megan Baker
<i>Project Administration</i>	Lynda George
<i>Project Administration/Reception</i>	Callie Hudson
<i>Senior Accountant (part-time)</i>	Emily Luff
<i>Accounts Officer (part-time)</i>	Jeevi Arjunan
<i>Executive Assistant</i>	Delece Hartnett

About CRDC and Australian cotton

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 Commonwealth 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 \$1.65 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, growers are harvesting the 2021-22 crop: predicted to be 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.



Contents

Introduction to the Annual Operational Plan	4
Our R&D investment priorities: the 2018–23 CRDC Strategic RD&E Plan	6
Our structure: CRDC governance	11
The year ahead: 2022–23 industry and financial outlook	13
Our 2022–23 investment portfolio	14
Our 2022–23 investments by CRDC priority area	17
Our 2022–23 financial budget statements	25
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▶ ATTACHMENTS	33
Our expenditure across the Government priorities	33
Research partner acronyms	36



Introduction to the Annual Operational Plan

CRDC's investments are governed by a five-year strategic plan, and the 2022-23 year marks the fifth and final year under CRDC's Strategic RD&E Plan 2018-23.

This Strategic Plan provides an ambitious roadmap for CRDC's investments. Through this plan, our aim has been 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 has been tempered by dry conditions during the first half of the strategic plan period, and the challenges associated with COVID-19 in the second, but we remain optimistic about the future of the cotton industry, and focused on maximising the benefits to growers and the community.

The strategic RD&E investments that CRDC will make in 2022-23 under this plan will help continue to drive the Australian cotton industry towards a future of innovation, increased commercialisation and digital transformation.

During this year, Australian cotton growers and the Commonwealth Government will co-invest \$18.6 million through CRDC, in collaboration with around 100 research partners.

The investments will be made in five key areas identified in the CRDC 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; and
- driving RD&E impact.

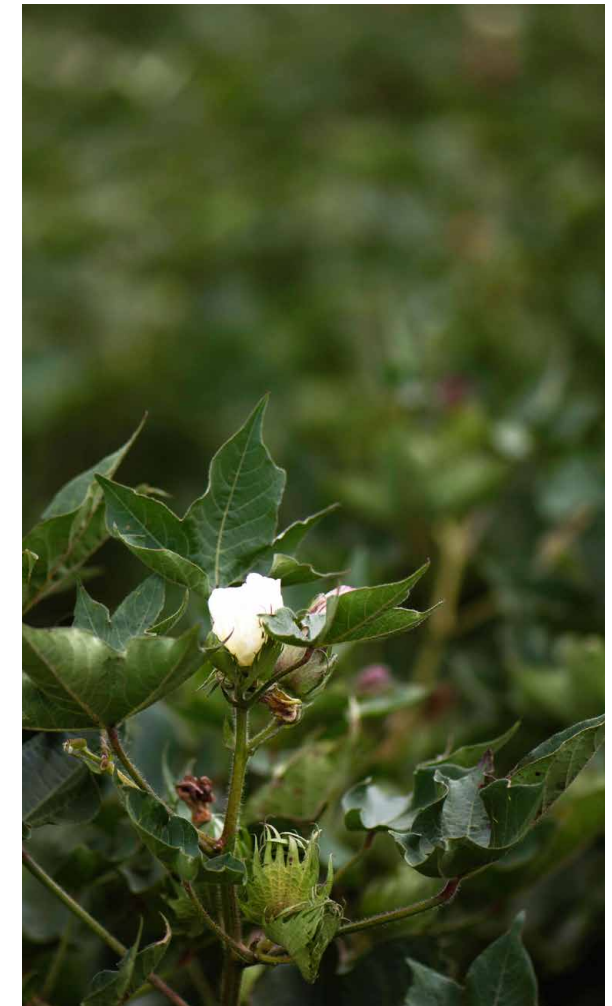
This Annual Operational Plan outlines these investments and the targets CRDC aims to achieve in the 2022-23 year.





CRDC’s Strategic RD&E Plan 2018–23 snapshot

GOALS	KEY FOCUS AREAS
 <p>Increase productivity and profitability on cotton farms</p>	<ul style="list-style-type: none"> • Optimised farming systems • Transformative technologies • Protection from biotic threats and environmental stresses
 <p>Improve cotton farming sustainability and value chain competitiveness</p>	<ul style="list-style-type: none"> • Sustainability of cotton farming • Create higher-value uses for cotton • Measurement and reporting throughout the value chain
 <p>Build adaptive capacity of the cotton industry</p>	<ul style="list-style-type: none"> • Science and innovation capability, and new knowledge • Futures thinking
ENABLING STRATEGIES	KEY FOCUS AREAS
 <p>Strengthening partnerships and adoption</p>	<ul style="list-style-type: none"> • Partnerships and collaboration • Best practice (<i>myBMP</i>) • Innovation and commercialisation
 <p>Driving RD&E impact</p>	<ul style="list-style-type: none"> • Impact and effectiveness





Our R&D investment priorities: the 2018-23 CRDC Strategic RD&E Plan

CRDC has documented five strategic outcomes that it seeks to achieve under the 2018-23 Strategic RD&E Plan, which in turn are the key focus areas for R&D investment under this 2022-23 Annual Operational Plan:

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; and

Enabling Strategy 2: Driving RD&E impact.

Through focusing on these five strategic priorities, CRDC is working to achieve its outcome of delivering *increased economic, social and environmental benefits for the Australian cotton industry, and the wider community, by investing in knowledge, innovation and its adoption.*

Achievement against these outcomes is monitored, evaluated and reported annually, in the Annual Report, the Performance Report and the Portfolio Budget Statement. The Strategic RD&E Plan targets are outlined in this table.

	Strategic Plan goals	Performance criteria	2022–23 targets	End of Plan targets (to achieve by 2023)
	GOAL 1: Increase productivity and profitability on cotton farms	Improved yield and quality	Annual increase of 0.35 bales/ha for irrigated cotton, and 0.14 bales/ha for dryland cotton.	Increase in average bales/ha from 9.86 to 11.6 bales/ha for irrigated cotton, and from 4.0 to 4.7 bales/ha for dryland cotton
	GOAL 2: Improve cotton farming sustainability and value chain competitiveness	CRDC collaborates in global leadership for sustainability initiatives	CRDC to participate in 6 global initiatives per annum.	CRDC participates in 6 global initiatives
	GOAL 3: Build adaptive capacity of the cotton industry	Science and innovation capacity is strengthened and strategically fit for a digital future	10+ new/early career researchers supported per annum through strategic career pathways.	50+ researchers supported through strategic career pathways
	ENABLING STRATEGY 1: Strengthening partnerships and adoption	Partnerships are strengthened to engage multi-disciplinary and multi-institutional resources (centres of excellence)	40 per cent of CRDC investments per annum to include cross sectoral partnerships.	40 per cent of CRDC investments include cross sectoral partnerships
	ENABLING STRATEGY 2: Driving RD&E impact	CRDC monitors and evaluates RD&E impact	One RD&E impact report per annum.	CRDC delivers 5 RD&E impact reports

Our five key investment priorities



GOAL ONE: Increasing productivity and profitability on Australian cotton farms

Increasing the productivity and profitability of Australian cotton farms is CRDC's aim within this goal. To work towards this, CRDC is focusing investments in RD&E to deliver optimised farming systems, adapt transformative technologies and protect our industry from biotic threats and environmental stresses.

Our investment priorities are helping to improve production yield, quality and input efficiencies, support sustainable on-farm development and strengthen the reliability of cotton production to optimise our farming systems. RD&E is ensuring that cotton growers benefit from the adaption of transformative technologies and are supported to increase their on-farm use of digital and emerging technologies.

CRDC's investments aim to increase our protection from biotic threats (pests, diseases and weeds) and environmental stresses (drought, extreme temperature, low rainfall and associated risks, e.g., spray drift) by improving surveillance, our understanding of the impacts, and sustainable and responsible management. RD&E is assisting the Australian cotton industry to not only responsibly manage known biotic threats but to increase our preparedness for biosecurity incursions.

The combined outcomes of these research priorities aim to support Australian cotton growers to increase their long-term productivity and profitability. In 2022-23, CRDC's investments in this goal account for 49 per cent of our R&D expenditure.



GOAL TWO: Improve cotton farming sustainability and value chain competitiveness

Improving value chain competitiveness and sustainability to derive greater value for Australian cotton growers – and helping Australian cotton achieve its ambition to be the highest yielding, finest, cleanest and most responsibly-produced cotton in the world – are CRDC's aims within this goal.

To work towards this, CRDC is focusing investments in RD&E to create higher value uses for cotton, ensure the sustainability of cotton farming, and support measurement and reporting through the value chain.

CRDC's investment into improving the understanding of markets and trends is helping to identify opportunities to add value across the cotton value chain, while our investments in economic research are identifying key areas for innovation and improvement. In addition, our investments into measurement and reporting are helping to create transparency, ensure the continuous adoption of best practice, address emerging issues, and encourage collaboration in global leadership for sustainability.

The combined outcomes of these research priorities will help ensure Australian cotton continues to be produced to the highest environmental and social standards, with increased competitiveness and sustainability. In 2022-23, CRDC's investments in this goal account for 10 per cent of our R&D expenditure.



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 is CRDC's aim within this goal. To work towards this, CRDC is focusing investments to deliver science and innovation capability and new knowledge, and facilitate futures thinking.

CRDC's investments are helping to ensure the science and innovation capacity of Australian cotton is strengthened and strategically fit for a changing and digital future. These investments tap into the depth and diversity of industry knowledge and ability across regional communities to unearth opportunities for problem solving and innovation, and provide the industry with opportunities to develop and advance innovation skills. CRDC is also investing to enhance strategic foresighting, allowing the industry to respond and adapt to possible future eventualities.

The combined outcomes of these research priorities will help strengthen our adaptive capacity. In 2022-23, CRDC's investments in this goal account for nine per cent of our R&D expenditure.

Our five key investment priorities (ctd)



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 are CRDC's aims within this enabling strategy.

To work towards this, CRDC is focusing investments in strengthening partnerships and collaboration, best practice through *myBMP*, and supporting innovation and commercialisation.

CRDC is working with the industry to ensure research investments add value and remain relevant to growers. The CottonInfo and *myBMP* partnerships are being enhanced, connecting growers with best practice information that reflects the latest R&D outcomes. National and international collaborations are being fostered and cross-sectoral research strengthened to develop multi-disciplinary and multi-institutional resources and create cotton industry centres of excellence. Commercialisation of R&D is being proactively increased through improved processes and by ensuring intellectual property (IP) assets are managed holistically. CRDC is also working with research partners to improve adoption pathways and to support those partners who are in the strongest position to commercialise IP.

In 2022-23, CRDC's investments in this enabling strategy account for 20 per cent of our R&D expenditure.



ENABLING STRATEGY TWO: Driving RD&E impact

Ensuring CRDC's investments deliver impact and effectiveness, therefore creating value for our stakeholders, is CRDC's aim within this enabling strategy. To work towards this, CRDC is ensuring our RD&E investments meet grower, industry and government needs and our projects align with stakeholder priorities.

To demonstrate the delivery of RD&E impact, CRDC is using a monitoring and evaluation framework to report on performance against desired impacts and assess the capacity to which funded projects demonstrate value and provide a positive return on investment. We will ensure that growers, the wider industry and government are informed and aware of the impact of the RD&E.

In 2022-23, CRDC's investments in this enabling strategy account for three per cent of our R&D expenditure.



Alli Kuchel



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 2018-23 Strategic RD&E Plan.

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 in the development and implementation of the Strategic RD&E Plan including R&D investments. This engagement ensures industry research priorities are regularly reviewed, emerging issues are actively considered, and research outcomes are adopted in the form of best practices and the overall performance of the Australian industry.

Cotton industry priorities for RD&E:

- Invest in the skills, strengths and occupational health and safety of the human resources in the cotton industry and its communities.
- Improve the sustainability of the cotton industry and its catchments.
- Improve the profitability of the cotton industry.
- Create and support a strong, focused and committed research program.

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.

Government research priorities

The PIRD Act makes provision for funding and administration of primary industry research and development with a view to:

- increasing the economic, environmental and social benefits to members of primary industries and to the community in general by improving the production, processing, storage, transport or marketing of the products of primary industries;
- achieving the sustainable use and sustainable management of natural resources;
- supporting the development of scientific and technical capacity;
- developing the adoptive capacity of primary producers; and
- improving accountability for expenditure upon research and development activities in relation to primary industries.

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.
- 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 an active participant in Agricultural Innovation Australia Pty Ltd, established to facilitate joint investment and collaboration in cross-industry issues of national importance. Cross sectoral collaboration is a key focus for CRDC under Enabling strategy one: Strengthening partnerships and adoption.



Melanie Jenson

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 2022-23, including superannuation, is \$540,253.

Payment to representative bodies

The Corporation's industry representative body in 2022-23 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 R&D 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 2022-23, 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 research and development 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 \$2.25 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 2022-23, 28 per cent of all CRDC investments will be made in cross-sectoral RD&E.

The year ahead: 2022–23 industry and financial outlook

Industry

As at June 2022, the 2021-22 cotton season is drawing to a close. Approximately 525,000 hectares were planted to irrigated and dryland cotton this season: a remarkable recovery for the industry from the 58,000 hectares planted in 2019-20. This is due to a return to positive seasonal conditions, more frequent rainfall, and stored moisture across the valleys.

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 5.2 million bales: almost ten times larger than the drought impacted 2019-20 crop of 590,000 bales. The irrigated average yield is expected to reach 12.5 bales per hectare, and the dryland yield 6.25 bales per hectare.

Looking forward to the 2022-23 cotton season, the current industry estimate is for 623,000 hectares to be planted to cotton, achieving 5.3 million bales. This reflects the growth of cotton production in new production areas (particularly northern Australia, where the crop has increased in size from 1,000 hectares in 2016-17 to approximately 30,000 hectares in 2022-23), the continued optimism resulting from recent rainfall, and increases in stored irrigation water levels.

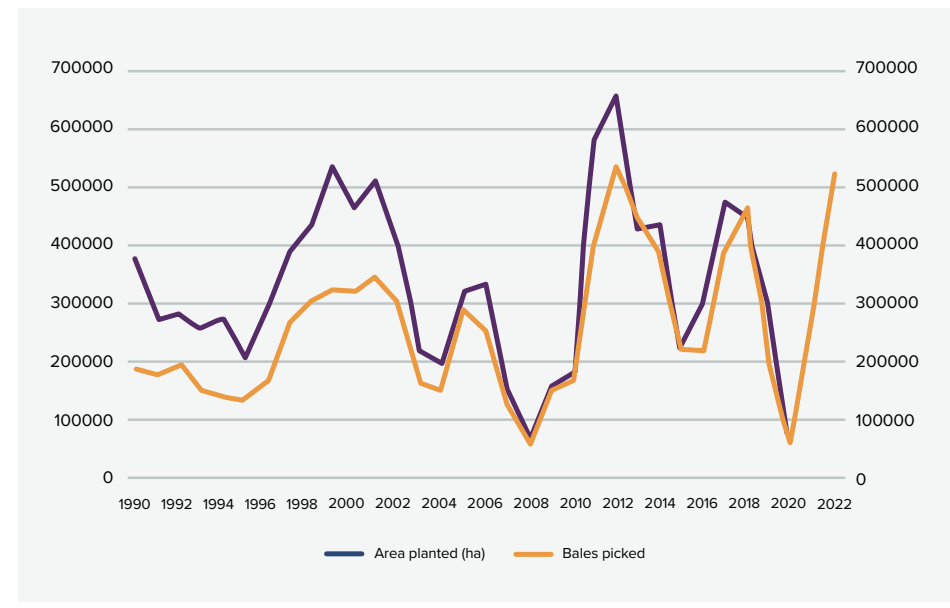
Financial

In 2022–23, CRDC has budgeted for a surplus of \$5.3 million, based on revenues of \$23.9 million and expenditure of \$18.6 million, which includes RD&E expenditure of \$14.7 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.

Australian cotton area and production





Our 2022–23 investment portfolio

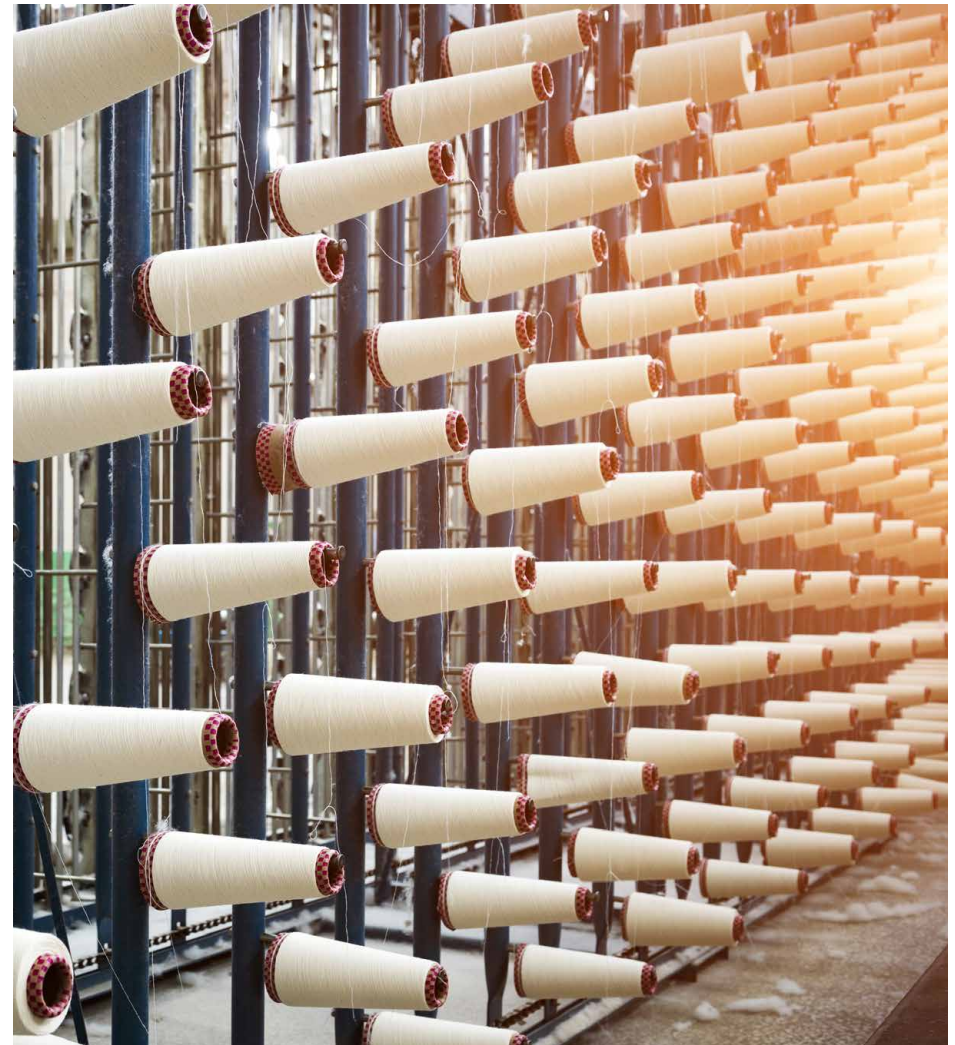
CRDC's total planned expenditure including RD&E investment in 2022-23 is \$18.6 million.

CRDC had planned to invest a total of \$125 million over the 2018-23 Strategic Plan, however the prolonged dry seasonal conditions and the resulting reduction in cotton production in the first half of this period impacted CRDC's revenue and ability to invest. The forward estimate is for a total investment of \$98.5 million over the five-year plan.

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.

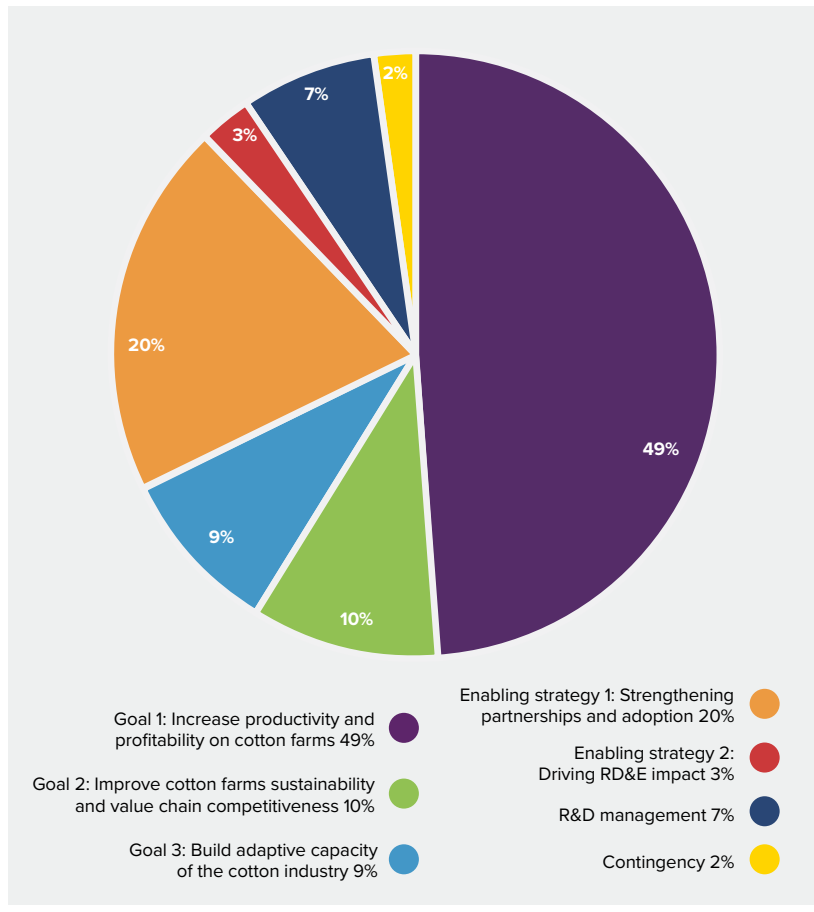
Of this expenditure, \$7.4 million is to be invested in new research commencing in 2022-23 as part of the total RD&E portfolio.



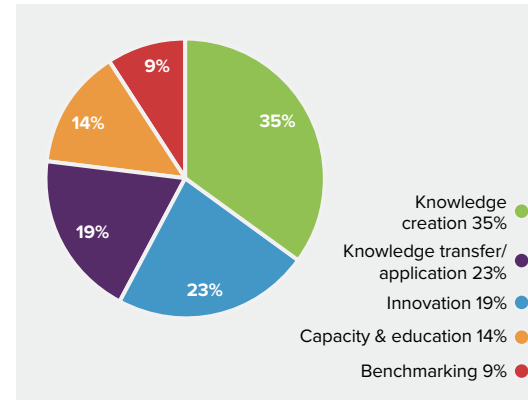
CRDC 2022–23 portfolio balance

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.

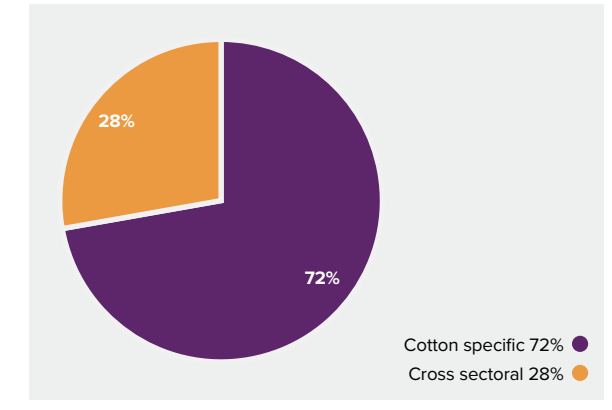
RD&E expenditure - investment by the five CRDC priority areas:



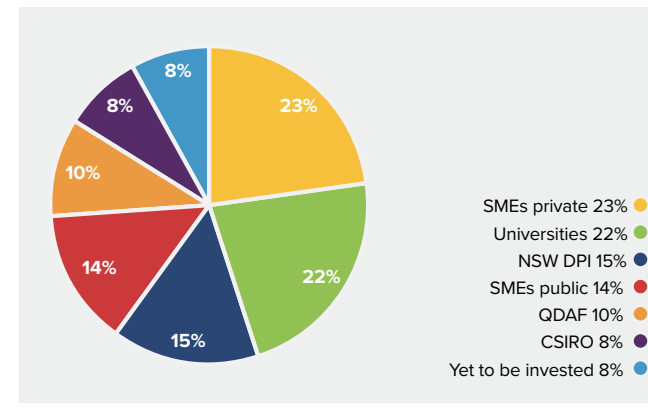
Investment by research type:



Investment by sector – cotton specific and cross sectoral RD&E:



Investment by CRDC in the RD&E projects led by key research partners:



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 provides advice to the CRDC on research projects and where research dollars should be invested, guided by the priorities established in the 2018-23 Strategic RD&E Plan.

In line with this Plan, CRDC holds 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 also holds discipline forums with research partners, to identify any 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, via the Cotton Australia panels, 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.

2022–23 R&D priorities

The 2022-23 priorities forum, held in June 2021, identified key areas of focus for future RD&E investment. These key areas were prioritised for investment considering strategic research gaps, maintenance of core industry research capacity (given the previous impact of prolonged dry conditions on CRDC's budget), and feedback received from the advisory panels in November 2021.

These key areas included:

- Benchmarking water use productivity for irrigated and dryland cotton;
- Optimising irrigation performance in bankless channel cotton layouts to improve water management and nitrogen use efficiency;
- Assessing the critical nitrogen and phosphorus values of cotton cultivars for improved yield and fertiliser efficiency;
- Supporting the sustainable development of the Northern Australian cotton industry;
- Benchmarking soil carbon, soil properties and best practice soil management;
- Seeking regionally specific guidelines for cover crops through farmer-led best practice;
- Supporting fibre quality research for southern crops;
- Improving cotton management via advanced field sensing;
- Surveying key diseases, including verticillium, fusarium and reoccurring wilts, and providing tactical management;
- Demonstrating integrated weed tactics across farming systems;
- Improving insecticide resistance monitoring for key pests to support sustainable insect management;
- Investigating textile waste composting for improved carbon footprinting and sustainability;
- Evaluating the economic and environmental return on investment of fish screens;
- Benchmarking carbon and biodiversity in native vegetation on cotton farms;
- Integrating deep learning AI software with hardware for next generation acoustic biodiversity monitoring; and
- Capacity building, including exploring a cotton and grains agricultural traineeship model, understanding diversity in the cotton industry, and investigating how to attract and retain young people on cotton farms.

Through the 2022-23 procurement process, CRDC is investing in projects to address these key needs.



Our 2022–23 investments by priority area



GOAL ONE: Increasing productivity and profitability on cotton farms

Outcome	Key Activity	R&D Investments 2022-23	Collaborative Partners
OPTIMISED FARMING SYSTEMS			
Improved yield and quality	Investigating and communicating the application of beneficial new on-farm technologies and scientific approaches	<ul style="list-style-type: none"> Continuing research to support the production of high-quality cotton. A PhD assessing yield and fibre quality variability in cotton systems through data science for improved management. An ongoing project investigating the potential for broadacre cropping in the NT, and a new project to support sustainable northern Australian cotton grains and cattle farming systems. 	Textile Technical Services USYD CRCNA, GRDC
Improved input efficiencies	Investing in real time monitoring, building adoption capacity and developing benchmarks, decision tools and practices to support on-farm resource efficiency decisions	<ul style="list-style-type: none"> Continuing projects focused on improving soil health. Continuing projects focused on benchmarking water use efficiency and measurement for improved water productivity in fully and partially irrigated systems, with new work to also benchmark dryland farming systems. A new project for optimising irrigation performance and nitrogen use efficiency in bankless channel cotton layouts. New and continuing projects investigating the requirements for carbon neutral cotton production, including textile waste recycling, benchmarking soil carbon, contribution of native vegetation, and regionally-specific guidelines for cover crops. Continuing projects investigating dryland and limited water farming systems. A new project assessing the critical nitrogen and phosphorus values of cotton cultivars for improved yield and fertiliser efficiency. A PhD investigating sub paddock scale prediction of soil/water characteristics. 	UNE, NSW DPI NSW DPI Deakin University CSIRO, USYD, UNE, UN, NSW DPI, DCRA NSW DPI, DCRA UQ USQ
On-farm sustainable development is supported	Testing and providing information on the social, environmental and economic viability of new farming systems	<ul style="list-style-type: none"> A continuing project providing science leadership for cotton development in northern Australia. Continuing projects investigating novel cotton farming systems, including innovative integrated pest management (IPM) strategies. An ongoing project investigating the potential for broadacre cropping in the NT, and a new project to support sustainable northern Australian cotton grains and cattle farming systems. A PhD classifying the suitability of Murrumbidgee Valley soils for cotton production. 	CSIRO CCA, QDAF CRCNA, GRDC USYD
Improved reliability of cotton production	Investigating the drivers behind farming system volatility and potential mitigations	<ul style="list-style-type: none"> A new project, building on a previous project, supporting southern cotton farming systems. Continuing projects investigating dryland and limited water farming systems. 	NSW DPI USYD, DCRA, NSW DPI



TRANSFORMATIVE TECHNOLOGIES			
New technologies are adapted for use in cotton	Investigating and facilitating the development (by third parties) and adaption of beneficial new technologies and systems for cotton farms	<ul style="list-style-type: none"> • A new project investigating the opportunities for advanced field sensing for improved cotton management. • A continuing project investigating the use of sensors for better water management in cotton. • A new project, building on a previous project, to deploy a spray hazard prediction system. • A new project integrating deep learning AI software with hardware for next generation acoustic biodiversity monitoring. 	USQ, QDAF USQ GRDC, Goanna Ag QUT
Cotton farms are digitally enabled	Working with partners to develop strategies to support digital applications and develop frameworks for digital agricultural tools in Australia	<ul style="list-style-type: none"> • A new project investigating the opportunities for advanced field sensing for improved cotton management. • A continuing project investigating the use of sensors for better water management in cotton. • A new project, building on a previous project, to deploy a spray hazard prediction system. • A new project integrating deep learning AI software with hardware for next generation acoustic biodiversity monitoring. • Development of a digital strategy for the cotton industry (phase 2). 	USQ, QDAF USQ GRDC, Goanna Ag QUT DataGene
PROTECTION FROM BIOTIC THREATS AND ENVIRONMENTAL STRESSES			
Increased understanding of the impact of pests, diseases and weeds, and environmental stresses	Investigating and monitoring the economic, environmental and social impacts of biotic threats and environmental stresses	<ul style="list-style-type: none"> • A continuing project to investigate the use of DNA diagnostics to monitor disease suppressive farming systems. • New projects focused on disease management, including reoccurring wilt • A new project looking at improving crop water use and photosynthetic carbon assimilation. • A new PhD investigating improving cotton productivity under limited water and heatwave conditions. 	Crown Analytical NSW DPI, QDAF WSU WSU
Improved identification, surveillance and management systems for pests, diseases and weeds, and environmental stresses	Investigating and delivering new and improved tools, systems and strategies for the surveillance, prevention and sustainable and responsible management of biotic threats and environmental stresses	<ul style="list-style-type: none"> • A continuing project to develop more resilient cotton production systems. • Continuing projects for integrated management of weeds in cotton and grains farming systems, including a regional focus and area-wide approach. • A new project, building on a previous project, for sustainable insect management through improved insect resistance monitoring. • A new project, building on a previous project, to improve the management of silverleaf whitefly through resistance monitoring. • A continuing project investigating the use of biological-based products for improved cotton production. • A continuing project to provide technical leadership in IPM systems for high yielding cotton. • A continuing collaborative project for alternative methods of pest control. • A continuing project applying new molecular tools for resistance monitoring. • Two projects looking at novel options for IPM in Australian cotton. • A new project for providing regional demonstrations of integrated weed tactics across farming systems. 	CSIRO NSW DPI, GRDC NSW DPI QDAF WSU QDAF HIA/UQ CSIRO CSIRO, CCA NSW DPI
Industry is prepared for a biosecurity incursion	Working collaboratively with growers and consultants to deliver industry-led biosecurity preparedness activities and address identified knowledge gaps	<ul style="list-style-type: none"> • A continuing project to review the cotton industry biosecurity plan. • Membership of Plant Health Australia. • Membership of the collaborative Plant Biosecurity Research Initiative (PBRl). • A collaborative project to boost the diagnostic capacity for plant production industries. 	PHA PHA PBRI GRDC



GOAL TWO: Improve cotton farming sustainability and value chain competitiveness

Outcome	Key Activity	R&D Investments 2022-23	Collaborative Partners
SUSTAINABILITY OF COTTON FARMING			
Improved environmental footprint for cotton farms	Undertaking research on how to improve the most significant components of cotton's environmental footprint, including water and nitrogen management, native vegetation and soil carbon	<ul style="list-style-type: none"> • A continuing project to develop tools for assessing and achieving the industry's pesticide sustainability targets. • A continuing project to undertake the fourth environmental audit of the Australian cotton industry. • A new project to evaluate the economic and environmental return on investment of modern fish screens. • New and continuing projects investigating the requirements for carbon neutral cotton production, including textile waste recycling, benchmarking soil carbon, contribution of native vegetation, and regionally-specific guidelines for cover crops. • A continuing project investigating the environmental co-benefits of irrigation water in the northern Murray-Darling Basin. • A cross-RDC collaborative project to develop a common methodology for greenhouse gas (GHG) accounting. • A new project integrating deep learning AI software with hardware for next generation acoustic biodiversity monitoring. 	NSW DPI GHD NSW DPI CSIRO, USYD, UNE, UON, NSW DPI, DCRA Griffith University AIA QUT
	Understanding and informing the methodologies and metrics used to assess the footprint of raw materials and their value chains	<ul style="list-style-type: none"> • A continuing collaborative project investigating the methodologies used to assess the environmental impacts of agricultural production according to the EU's Product Environmental Footprint Category Rules. 	AWI
CREATE HIGHER VALUE USES FOR COTTON			
Increased understanding of market requirements & opportunities throughout the value chain	Investigating market requirements and opportunities throughout the value chain, and communicating those to industry	<ul style="list-style-type: none"> • A continuing project for improving labour conditions within the Australian cotton value chain. • A continuing cross-RDC project focused on understanding and enhancing community trust for agriculture. 	QUT, UTS AgriFutures
MEASUREMENT AND REPORTING THROUGHOUT THE VALUE CHAIN			
CRDC collaborates in global leadership for sustainability initiatives	Facilitating and participating in global sustainability forums	<ul style="list-style-type: none"> • Two continuing projects supporting membership of the Sustainable Apparel Coalition and the Sustainable Agriculture Initiative. • A continuing collaborative project supporting Australian participation in the EU's Product Environmental Footprint Category Rules development process. 	SAC, SAI AWI
The value chain is transparent and understood by participants to improve market opportunities	Providing information to the value chain	<ul style="list-style-type: none"> • Three continuing projects to support the reporting of the Australian industry's sustainability performance. • Two continuing PhD projects investigating cotton supply chain accountability and transparency. • A new project to undertake the 4th environmental audit of the Australian cotton industry. 	Sustenance Asia, Canberra University, AgriPath QUT, University of Leeds GHD



GOAL THREE: Build adaptive capacity of the cotton industry

Outcome	Key Activity	R&D Investments 2022–23	Collaborative Partners
SCIENCE AND INNOVATION CAPABILITY, AND NEW KNOWLEDGE			
Science and innovation capacity is strengthened and strategically fit for a digital future	Facilitating and participating in global initiatives, supporting researchers to use new technologies and uses for data, and creating and facilitating opportunities for national and international RD&E exchange	<ul style="list-style-type: none"> Continuing projects to support CRDC and CSIRO summer scholars and the ABARES Science and Innovation Awards. A continuing project investigating how to improve grower decisions in complex systems. A continuing project to develop a digital strategy for the Australian cotton industry (phase 2). 	CRDC, CSIRO, DAFF QUT DataGene
Increased understanding of and participation from the diverse human capital in regional communities	Investigating regional community demographics and available service providers and supporting opportunities for greater diversity in the cotton industry	<ul style="list-style-type: none"> A continuing collaborative project focused on understanding and enhancing community trust for agriculture. Continuing support for the 'People in Agriculture' website. A new project for delivering best practice management of future cotton workforce skills. Three new projects looking at traineeship models for cotton and grains farms, how to attract and retain young people on farms, and opportunities for greater diversity in the workforce. 	AgriFutures Dairy Australia CQU CQU, GRDC
Increased opportunities for innovation skills development	Working collaboratively with cross-sectorial partners to support regional innovation	<ul style="list-style-type: none"> Projects that support the development of future leaders for the industry. A project to deploy a spray hazard prediction system. An ongoing project to investigate the potential for broadacre cropping in the Northern Territory, and a new project to support sustainable northern Australian cotton grains and cattle farming systems. 	ARLF, Cotton Australia, Nuffield Australia GRDC, Goanna Ag CRCNA, GRDC
FUTURES THINKING			
Australian cotton growers are able to adapt to change	Assessing and monitoring grower resilience and on-farm natural capital, and supporting and communicating initiatives to address knowledge gaps	<ul style="list-style-type: none"> A continuing project to support the work of the Rural Safety and Health Alliance. Continued support for CRDC Grassroots Grants to local Cotton Grower Associations. A new collaborative cross-RDC project investigating design thinking options for integration of extension into research projects. 	RSHA CGAs HIA
Increased opportunities for strategic foresighting	Investigating existing and future markets for Australian cotton and communicating this to the industry	<ul style="list-style-type: none"> A continuing project to support cotton growers on the research and development advisory panels. 	Cotton Australia



ENABLING STRATEGY ONE: Strengthening partnerships and adoption

Outcome	Key Activity	R&D Investments 2022–23	Collaborative Partners
PARTNERSHIPS AND COLLABORATION			
Growers/consultants value CRDC farming systems research outcomes	Investing in research that meets the needs of growers and consultants and working with partners to tailor and disseminate research outcomes	<ul style="list-style-type: none"> • A continuing project to support the Cotton Production Course. • A continuing project to conduct annual quantitative and qualitative surveys of cotton crop consultants. • A continuing project developing videos to communicate best practice cotton production. • A continuing project to assess grower sentiment and issues relating to RD&E. 	UNE CCA QLD DAF Intuitive Solutions
CottonInfo partnership is maintained and practice change improved	Working collaboratively with CottonInfo to demonstrate, build and communicate practical applications for R&D outcomes	<ul style="list-style-type: none"> • A suite of projects that provide technical leadership for CottonInfo across core research investment areas, including pests, weeds and diseases, IPM, Bt stewardship, fibre quality, water, crop productivity, biosecurity, natural resource management, soil health, nutrition, climate and energy. • A continuing project developing videos to communicate best practice cotton production. • A new project for demonstrating and integrating irrigation technology for cotton. 	NSW DPI, QDAF, CSIRO, UNE, AgEcon, Stacey Vogel Consulting, TTS, GVIA, USQ QDAF USQ
Partnerships are strengthened to engage multi-disciplinary and multi-institutional resources (centres of excellence)	Working collaboratively for mutual benefit	<ul style="list-style-type: none"> • CRDC currently invests in collaborative and cross-sectoral projects representing 28 per cent of our investment portfolio in 2022-23. These include, but are not limited to, our participation in the Plant Biosecurity Research Initiative, People in Agriculture, Rural Safety and Health Alliance, the CRC for Northern Australia. • Continued support for Field Demonstration Trial sites • Membership of Agriculture Innovation Australia 	Various CottonInfo AIA
BEST PRACTICE (<i>myBMP</i>)			
Best practice is based on science and measured impact	Working closely with partners to ensure R&D outcomes are included in <i>myBMP</i> practice modules	<ul style="list-style-type: none"> • 13 technical and module lead projects to update <i>myBMP</i> modules from R&D outcomes annually. 	CSIRO, NSW DPI, QDAF, UNE, Sustenance Asia.
INNOVATION AND COMMERCIALISATION			
Improved R&D innovation and commercialisation	Working with research partners from development to proof of concept and commercialisation (where a strong business case exists)	<ul style="list-style-type: none"> • Projects to support commercialisation of research project outputs, including multi-array sensor algorithms, spray hazard towers, biopesticides, and the silverleaf whitefly app. 	Various



ENABLING STRATEGY TWO: Driving RD&E impact

Outcome	Key Activity	R&D Investments 2022–23	Collaborative Partners
IMPACT AND EFFECTIVENESS			
CRDC's RD&E investments meet grower, industry and government needs	Engaging with stakeholders and partners annually to identify and prioritise the challenges and opportunities facing the Australian cotton industry	<ul style="list-style-type: none"> • A continuing project to support grower panels to identify and prioritise RD&E issues and opportunities to benefit the Australian cotton industry. 	Cotton Australia
CRDC monitors and evaluates RD&E impact	Assessing and monitoring the effectiveness of RD&E investments and the extent to which stakeholder priorities are addressed	<ul style="list-style-type: none"> • A continuing project surveying cotton consultants to quantitatively and qualitatively assess practice change and the impact of RD&E. • A continuing project that identifies how RD&E priorities identified by cotton growers have been addressed. • A continuing project surveying cotton growers about their on-farm practices. 	CCA Cotton Australia Intuitive Solutions
CRDC funded projects demonstrate value and return on investment	Assessing the impact and return on investment from RD&E projects	<ul style="list-style-type: none"> • New projects to evaluate the impact of CRDC-supported research. 	CRDC
Growers, the cotton industry and government are informed and aware of RD&E outcomes	Effectively communicating the outcomes and impacts of RD&E investments to stakeholders	<ul style="list-style-type: none"> • Continuing projects supporting the CottonInfo initiative to communicate outcomes and impacts of RD&E investments. • A continuing project to communicate RD&E outcomes and impacts to government and grower stakeholders. • Supporting regional demonstration field trials. 	CottonInfo CRDC CottonInfo

Our 2022–23 financial budget statements

TABLE 1.1: COTTON RESEARCH AND DEVELOPMENT CORPORATION – RESOURCE STATEMENT
– BUDGET ESTIMATES FOR 2022–23 AS AT BUDGET MARCH 2022

	2021–22 <i>Estimated actual</i> \$'000	2022–23 Estimate \$'000
Opening balance/cash reserves at 1 July	22,130	19,203
Funds from Government		
Special appropriations^(a)		
<i>Primary Industries Research and Development Act 1989 s.30(3)</i> – Cotton R&D Corporation	12,016	24,233
Total special appropriations	12,016	24,233
Amounts received from related entities		
Amounts from portfolio department ^(b)	2,151	713
Total amounts received from related entities	2,151	713
Total funds from Government	14,167	24,946
Funds from industry sources		
Levies ^(c)	7,822	11,385
<i>less amounts paid to the CRF</i>	<i>(7,822)</i>	<i>(11,385)</i>
Total funds from industry sources	-	-
Funds from industry sources		
Interest	47	75
Royalties	39	30
Other	1,781	435
Total funds from other sources	1,867	540
Total net resourcing for CRDC	38,164	44,689
	2021–22	2022–23
Average staffing level (number)	15	15



- (a) CRDC's special appropriation is not directly appropriated as it is a corporate Commonwealth entity under the PGPA Act. Appropriations are made to the Department of Agriculture, Fisheries and Forestry (formerly the Department of Agriculture, Water and the Environment) and are then paid to CRDC and are considered departmental for all purposes.
- (b) Funding provided by the portfolio department that is not specified within the Annual Appropriation Bills as a payment to that corporate entity (for example, a grant awarded to a corporate entity from one of its portfolio department's administered programs).
- (c) The levies are imposed by the *Primary Industries (Excise) Levies Act 1999*. The levies are collected by the Department under the *Primary Industries Levies and Charges Collection Act 1991* and transferred to the Consolidated Revenue Fund (CRF). These amounts are then drawn down by the department as a special appropriation and paid to CRDC under the *Primary Industries Research and Development Act 1989, s. 30(3)* – Cotton R&D Corporation.

Please note: All figures shown above are GST exclusive – these may not match figures in the cash flow statement.

Prepared on a resourcing (i.e. appropriations available) basis.

Our 2022–23 financial budget statements

TABLE 2.1: BUDGETED EXPENSES FOR OUTCOME 1

Outcome 1: Adoption of innovation that leads to increased productivity, competitiveness and environmental sustainability through investment in research and development that benefits the Australian cotton industry and the wider community.

	2021–22 Estimated actual \$'000	2022–23 Budget \$'000	2023–24 Forward estimate \$'000	2024–25 Forward estimate \$'000	2025–26 Forward estimate \$'000
PROGRAM 1.1: COTTON RESEARCH AND DEVELOPMENT CORPORATION					
Revenue from Government					
Special appropriations					
<i>Primary Industries Research and Development Act 1989 s. 30(3) – Cotton R&D Corporation</i>	7,822	11,385	12,397	10,823	9,360
Industry contribution	7,824	11,385	12,398	10,823	9,360
Revenues from other independent sources	3,908	1,168	470	380	390
Expenses not requiring appropriation in the budget year ^(a)	67	(5,325)	(4,112)	(2,522)	(2,266)
Total expenses for program 1.1	19,621	18,613	21,153	19,504	16,844
OUTCOME 1 TOTALS BY RESOURCE TYPE					
Revenue from Government					
Special appropriations	7,822	11,385	12,397	10,823	9,360
Revenues from industry sources	7,824	11,385	12,398	10,823	9,360
Revenues from other independent sources	3,908	1,168	470	380	390
Expenses not requiring appropriation in the budget year ^(a)	67	(5,325)	(4,112)	(2,522)	(2,266)
Total expenses for Outcome 1	19,621	18,613	21,153	19,504	16,844
	2021–22	2022–23			
Average staffing level (number)	15	15			

(a) Expenses not requiring appropriation in the Budget year are made up of make good expenses, audit fees, and can include depreciation / amortisation expenses not requiring an appropriation.

Note: Departmental appropriation splits and totals are indicative estimates and may change in the course of the budget year as government priorities change.

Prepared on Australian Accounting Standards basis.

Our 2022–23 financial budget statements

TABLE 2.2: PERFORMANCE CRITERIA FOR OUTCOME 1

Outcome 1: Adoption of innovation that leads to increased productivity, competitiveness and environmental sustainability through investment in research and development that benefits the Australian cotton industry and the wider community.

PROGRAM 1.1: COTTON RESEARCH AND DEVELOPMENT CORPORATION

Objective 1	Increase productivity and profitability on cotton farms	
	Deliver RD&E for cotton producers to increase productivity, successfully protect crops from biotic threats and environmental stresses, adopt transformative technologies and innovate for improved profitability.	
Key Activities 1	Strategically prioritise investment in basic, applied and blue-sky research collaboratively with research and cross-sectoral partners to develop new knowledge, practices and adapt transformative technologies for on-farm application that also protect industry from biotic threats and environmental stresses.	
Year	Performance measures	Expected Performance Results
Current year 2021–22	Improved yield and quality.	Annual increase of 0.35 bales per hectare for irrigated cotton and 0.14 bales per hectare for dryland cotton. <i>On target for irrigated cotton. Not on target for dryland due to drought conditions in 2020–21.</i>
Year	Performance measures	Expected Performance Results
Budget Year 2022–23	As per 2021–22.	As per 2021–22.
Forward Estimates 2023–26	As per 2022–23.	As per 2022–23.

Objective 2	Improve cotton farming sustainability and value chain competitiveness	
	Deliver RD&E and innovation to create higher value uses for cotton and assist the industry achieve its ambition to be the highest yielding, finest, cleanest and most responsibly produced cotton in the world.	
Key Activities 2	Strategically prioritise investment in basic, applied and blue-sky research collaboratively with research, industry and cross-sectoral partners to develop new knowledge, practices, processes, higher value products and innovative approaches to improve the sustainability of cotton farming and strengthen value chain competitiveness.	
Year	Performance measures	Expected Performance Results
Current year 2021–22	CRDC collaborates in global leadership for sustainability initiatives.	Participates in six global initiatives. <i>On target.</i>
Year	Performance measures	Expected Performance Results
Budget Year 2022–23	As per 2021–22.	As per 2021–22.
Forward Estimates 2023–26	As per 2022–23.	As per 2022–23.

Our 2022–23 financial budget statements

Objective 3 Build adaptive capacity of the cotton industry

Deliver RD&E to develop science and innovation capacity as well as new knowledge to strengthen adaptive capacity.

Key Activities 3 Strategically prioritise investment in RD&E collaboratively with research, industry and cross-sectoral partners to develop new knowledge, futures thinking, science and innovation capability.

Year	Performance measures	Expected Performance Results
Current year 2021–22	Science and innovation capacity is strengthened and strategically fit for a digital future.	10+ new/early career researchers supported through strategic career pathways. <i>On target.</i>
Budget Year 2022–23	As per 2021–22.	As per 2021–22.
Forward Estimates 2023–26	As per 2022–23.	As per 2022–23.

Objective 4 Strengthening partnerships and adoption

Deliver RD&E and innovation through collaborative partnerships to ensure adoption of best practice, new knowledge, products and services.

Key Activities 4 Strategically prioritise investment in the effective adoption of research by strengthening partnerships and collaboration, development of best practice and supporting innovation and commercialisation.

Year	Performance measures	Expected Performance Results
Current year 2021–22	Partnerships are strengthened to engage multi-disciplinary and multi-institutional resources.	40 per cent of annual RD&E investments are through cross sectoral partnerships. <i>On target.</i>
Budget Year 2022–23	As per 2021–22.	As per 2021–22.
Forward Estimates 2023–26	As per 2022–23.	As per 2022–23.

Objective 5 Driving RD&E impact

Deliver assessments of the impact of CRDC's RD&E investments that inform future investment direction and continuous improvement.

Key Activities 5 Strategically prioritise investment in research, data capture, analysis and reviews with stakeholders and partners to demonstrate that RD&E investments deliver impact.

Year	Performance measures	Expected Performance Results
Current year 2021–22	CRDC monitors and evaluates RD&E impact.	One RD&E impact report per annum. <i>On target.</i>
Budget Year 2022–23	As per 2021–22.	As per 2021–22.
Forward Estimates 2023–26	As per 2022–23.	As per 2022–23.

Our 2022–23 financial budget statements

TABLE 3.1 COMPREHENSIVE INCOME STATEMENT (SHOWING NET COST OF SERVICES) FOR THE PERIOD ENDED 30 JUNE

	2021–22 Estimated actual \$'000	2022–23 Budget \$'000	2023–24 Forward estimate \$'000	2024–25 Forward estimate \$'000	2025–26 Forward estimate \$'000
EXPENSES					
Employee benefits	2,280	2,423	2,533	2,648	2,769
Suppliers	1,166	1,319	1,128	1,145	1,171
Grants	16,006	14,658	17,279	15,498	12,691
Depreciation and amortisation	169	213	213	213	213
Total expenses	19,621	18,613	21,153	19,504	16,844
LESS:					
OWN-SOURCE INCOME					
Own-source revenue					
Interest	69	75	90	100	110
Grants	1,399	100	100	-	-
Royalties	39	30	30	30	30
Other	250	250	250	250	250
Total own-source revenue	1,757	455	470	380	390
Net cost of (contribution by) services	17,864	18,158	20,683	19,124	16,454
Revenue from Government^(a)					
Commonwealth contribution	7,822	11,385	12,397	10,823	9,360
Industry contributions	7,824	11,385	12,398	10,823	9,360
Payment from related entities	2,151	713	-	-	-
Total revenue from Government	17,797	23,483	24,795	21,646	18,720
Surplus/(deficit) attributable to the Australian Government	(67)	5,325	4,112	2,522	2,266
Total comprehensive income/(loss) attributable to the Australian Government	(67)	5,325	4,112	2,522	2,266

(a) Revenue from Government includes a Commonwealth contribution under the PIRD Act and levies collected from industry by the Department of Agriculture, Fisheries and Forestry (formerly the Department of Agriculture, Water and the Environment).

Prepared on Australian Accounting Standards basis.

Our 2022–23 financial budget statements

TABLE 3.2: BUDGETED DEPARTMENTAL BALANCE SHEET (AS AT 30 JUNE)

	2021–22 Estimated actual \$'000	2022–23 Budget \$'000	2023–24 Forward estimate \$'000	2024–25 Forward estimate \$'000	2025–26 Forward estimate \$'000
ASSETS					
Financial assets					
Cash and cash equivalents	2,203	1,914	1,500	1,497	1,686
Trade and other receivables	6,018	4,505	4,970	4,512	3,594
Investments in Shares	213	213	213	213	213
Investments	17,000	24,000	28,000	31,000	34,000
Total financial assets	25,434	30,632	34,683	37,222	39,493
Non-financial assets					
Land and buildings	884	994	1,074	1,104	1,134
Property, plant and equipment	276	298	334	342	362
Intangibles	157	192	177	162	147
Total non-financial assets	1,317	1,484	1,585	1,608	1,643
Total assets	26,751	32,116	36,268	38,830	41,136
LIABILITIES					
Payables					
Suppliers	115	115	115	115	115
Grants	3,000	3,000	3,000	3,000	3,000
Total payables	3,115	3,115	3,115	3,115	3,115
Provisions					
Employee provisions	526	566	606	646	686
Total provisions	526	566	606	646	686
Total liabilities	3,641	3,681	3,721	3,761	3,801
Net assets	23,110	28,435	32,547	35,069	37,335
EQUITY*					
Parent entity interest					
Reserves	450	450	450	450	450
Retained surplus / (accumulated deficit)	22,660	27,985	32,097	34,619	36,885
Total parent entity interest	23,110	28,435	32,547	35,069	37,335
Total Equity	23,110	28,435	32,547	35,069	37,335

*Equity is the residual interest in assets after deduction of liabilities.

Prepared on Australian Accounting Standards basis.

Our 2022–23 financial budget statements

TABLE 3.3: DEPARTMENTAL STATEMENT OF CHANGES IN EQUITY (BUDGET YEAR 2022–23)

	Retained earnings \$'000	Asset revaluation reserve \$'000	Other reserves \$'000	Total equity \$'000
OPENING BALANCE AS AT 1 JULY 2022				
Balance carried forward from previous period	22,660	347	103	23,110
Adjusted opening balance	22,660	347	103	23,110
COMPREHENSIVE INCOME				
Surplus/ (deficit) for the period	5,325	-	-	5,325
Total comprehensive income	5,325	-	-	5,325
of which:				
Attributable to the Australian Government	5,325	-	-	5,325
Estimated closing balance as at 30 June 2023	27,985	347	103	28,435
Closing balance attributable to the Australian Government	27,985	347	103	28,435

Prepared on Australian Accounting Standards basis.



Melanie Jensen

Our 2022–23 financial budget statements

TABLE 3.4: BUDGETED DEPARTMENTAL STATEMENT OF CASH FLOWS (FOR THE PERIOD ENDED 30 JUNE)

	2021–22 Estimated actual \$'000	2022–23 Budget \$'000	2023–24 Forward estimate \$'000	2024–25 Forward estimate \$'000	2025–26 Forward estimate \$'000
OPERATING ACTIVITIES					
Cash received					
Revenue from Government	5,171	12,953	12,140	11,052	9,819
Industry contributions	6,845	11,280	12,140	11,052	9,819
Other Government Grants	2,151	713	-	-	-
Other Industry Grants	1,399	100	100	-	-
Interest	47	75	90	100	110
Net GST received	1,601	972	1,017	1,072	-
Other	385	330	330	280	280
Total cash received	17,599	26,423	25,817	23,556	20,028
Cash used					
Employees	2,240	2,383	2,493	2,608	2,729
Suppliers	1,161	1,319	1,128	1,145	1,171
Grants	16,704	15,630	18,296	16,570	12,691
Total cash used	20,105	19,332	21,917	20,323	16,591
Net cash from (used by) operating activities	(2,506)	7,091	3,900	3,233	3,437
INVESTING ACTIVITIES					
Cash received					
Proceeds from sale of property, plant and equipment	36	35	36	37	37
Investments	30,000	20,000	20,000	20,000	20,000
Total cash received	30,036	20,035	20,036	20,037	20,037
Cash used					
Purchase of property, plant and equipment and intangibles	457	415	350	273	285
Investments	40,000	27,000	24,000	23,000	23,000
Total cash used	40,457	27,415	24,350	23,273	23,285
Net cash from (used by) investing activities	(10,421)	(7,380)	(4,314)	(3,236)	(3,248)
Net increase (decrease) in cash held	(12,927)	(289)	(414)	(3)	189
Cash and cash equivalents at the beginning of the reporting period	15,130	2,203	1,914	1,500	1,497
Cash and cash equivalents at the end of the reporting period	2,203	1,914	1,500	1,497	1,686

Prepared on Australian Accounting Standards basis.

Our 2022–23 financial budget statements

TABLE 3.5: DEPARTMENTAL CAPITAL BUDGET STATEMENT (FOR PERIOD END 30 JUNE)

	2021–22 Estimated actual \$'000	2022–23 Budget \$'000	2023–24 Forward estimate \$'000	2024–25 Forward estimate \$'000	2025–26 Forward estimate \$'000
PURCHASE OF NON-FINANCIAL ASSETS					
Funded internally from departmental resources ^(a)	457	415	350	273	285
TOTAL	457	415	350	273	285
RECONCILIATION OF CASH USED TO ACQUIRE ASSETS TO ASSET MOVEMENT TABLE					
Total purchases	457	415	350	273	285
Total cash used to acquire assets	457	415	350	273	285

(a) Includes the following s74 external revenue:
 – internally developed assets; and
 – proceeds from the sale of assets.

Consistent with information contained in the Statement of Asset Movements and the Budgeted Statement of Cash Flows.

Prepared on Australian Accounting Standards basis.

Our 2022–23 financial budget statements

TABLE 3.6: STATEMENT OF ASSET MOVEMENTS (BUDGET YEAR 2022-23)

	Land	Buildings	Other property, plant and equipment	Computer software and intangibles	Total
	\$'000	\$'000	\$'000	\$'000	\$'000
As at 1 July 2022					
Gross book value	210	690	651	1,011	2,562
Accumulated depreciation/amortisation and impairment	-	(16)	(375)	(854)	(1,245)
Opening net book balance	210	674	276	157	1,317
CAPITAL ASSET ADDITIONS					
Estimated expenditure on new or replacement assets					
By purchase – other ^(a)	-	130	190	95	415
Total additions	-	130	190	95	415
Other movements					
Depreciation/amortisation expense	-	(20)	(133)	(60)	(213)
Disposals at gross value	-	-	(155)	-	(155)
Disposals add back depreciation/amortisation	-	-	120	-	120
Total other movements	-	(20)	(168)	(60)	(248)
As at 30 June 2023					
Gross book value	210	820	686	1,106	2,822
Accumulated depreciation/ amortisation and impairment	-	(36)	(388)	(914)	(1,338)
Closing net book balance	210	784	298	192	1,484

(a) "By purchase-other" refers to funding provided through other internal funding sources.

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 2022–23 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
\$224	\$2,145	\$3,895	\$819	\$3,739	\$252	\$833	\$1,185	\$181	\$27	\$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	\$64	\$0	\$27	\$0	\$0	\$0	\$0	\$0	\$0	\$850	\$0	\$68	\$0	\$349	\$0	\$0	\$14,658

Science and Research Priorities

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:
 - 1.3.1 novel technologies, such as sensors, robotics, real-time data systems and traceability, all integrated into the production chain.
 - 1.3.2 enhanced food production through better management and use of waste and water; increased food (and fibre) quality, safety, stability and shelf life.
 - 1.3.3 enhanced food production through protection of food (and fibre) sources through enhanced biosecurity

- 1.3.4 enhanced food production through genetic composition of food (and fibre) sources appropriate for present and emerging Australian conditions.

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.

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.

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.

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.

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.

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.

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.

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 2022–23 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	\$1,977	\$4,145	\$5,609	\$2,927	\$14,658
Percentage of total	14%	28%	38%	20%	100%



Attachment B: Research partner acronyms

AgriFutures	AgriFutures Australia	NSW DPI	NSW Department of Primary Industries
AIA	Agricultural Innovation Australia	PBRI	Plant Biosecurity Research Initiative
ARLF	Australian Rural Leadership Foundation	PHA	Plant Health Australia
AWI	Australian Wool Innovation	QDAF	Queensland Department of Agriculture and Fisheries
CCA	Crop Consultants Australia	QUT	Queensland University of Technology
CGAs	Cotton Grower Associations	RSHA	Rural Safety and Health Alliance
CQU	Central Queensland University	SAC	Sustainable Apparel Coalition
CRCNA	Cooperative Research Centre for Northern Australia	SAI	Sustainable Agriculture Initiative
CRDC	Cotton Research and Development Corporation	TTS	Textile Technical Services
CSIRO	Commonwealth Scientific and Industrial Research Organisation	UNE	University of New England
DAFF	Department of Agriculture, Fisheries and Forestry (formerly the Department of Agriculture, Water and the Environment)	UON	University of Newcastle
DCRA	Dryland Cotton Research Association	UQ	University of Queensland
GRDC	Grains Research and Development Corporation	USQ	University of Southern Queensland
GVIA	Gwydir Valley Irrigators Association	USYD	University of Sydney
HIA	Hort Innovation	WSU	Western Sydney University



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Published: June 2022

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