

Independent performance review: final report

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CRDC

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EXECUTIVE SUMMARY

This report presents the findings of an independent performance review of the Cotton Research and Development Corporation (CRDC). The review has assessed how well CRDC has performed against the Funding Agreement 2015-2019, and the performance principles of the subsequent Statutory Funding Agreement 2020-2030 (SFA), between CRDC and the Australian Government.

The review involved the examination of a large number of relevant documents, including policies and procedures, plans, reports, and evaluations (listed in Appendix 1) and a series of in-depth consultations with stakeholders, conducted face-to-face, by videoconference or by telephone. Thirty-nine stakeholders were interviewed, drawn from the CRDC board and management, cotton growers, peak bodies and regional chairs or presidents of the Cotton Grower Associations, other industry bodies, agronomists and consultants, the Department of Agriculture, Fisheries and Forestry (DAFF), and service providers to CRDC. Some of those interviewed for this review were also interviewed in the previous review in 2018 to provide a longitudinal assessment. A dedicated web page was set up and communicated to stakeholders and an open invitation extended for any interested party to make a submission to the review (although none were received).

The review covered an extraordinary period in Australian cotton production. 2021/22 saw record production of cotton, and almost 11 times that of 2019/20, which was the smallest cotton crop in over 30 years due to severe drought. The global cotton price rose throughout much of the period, reaching a 12-year peak of 170 US c/lb in May 2022, before declining sharply to around 100 US c/lb, still above the prices seen for much of the period between 2012 and 2021. CRDC has successfully navigated the huge production fluctuations in this period and the knock-on effects of this variability on levy revenue.

CRDC is a high-performing research and development corporation (RDC). Its governance processes are very sound and attention to compliance and risk is strong. Planning and reporting processes are excellent, and the organisation is about to embark upon a bold and far-sighted new strategic plan. The project procurement process has evolved to a mix of open call and direct targeted investment, and this brings a number of advantages over the previous approach employing open call only. The move towards a more program-oriented R&D portfolio is commended.

Management is very well regarded by cotton growers and RD&E providers, with many of the latter believing that CRDC is the best of the RDCs to work with. The culture at CRDC has improved since the last performance review in 2018 and is highly constructive. Collaboration with other industry participants and other RDCs, particularly GRDC, is a feature of CRDC's approach and appreciated by levy payers. CRDC is well engaged with and highly supported by the cotton industry and has delivered demonstrable benefits to its stakeholders.

There is no evidence of CRDC having failed to fulfil, or being at risk of not fulfilling, its strict obligations under the SFA.

The main challenge for CRDC now will be the effective implementation of the new strategic plan. We especially note the need to effectively deploy the resources of an apparently stretched R&D Investment team to deliver on the ambitions of the plan, and to ensure the R&D prioritisation process with Cotton Australia remains fit for purpose. There are opportunities too to upgrade the monitoring and evaluation framework and the methodology applied to the impact assessments undertaken to quantify the benefits delivered by CRDC investments.

Eight recommendations are made as a result of the review. These are listed below, and each is rated either:

- ⊕ Critical: should be implemented as a matter of urgency in order for CRDC to meet its legal and regulatory obligations (0).
- ⊕ Important: actions that are expected to deliver significant benefits to the organisation and industry (2).
- ⊕ Better practice: expected to deliver incremental performance improvements (6).

No recommendations are rated as ‘critical’, while two are rated ‘important’ and six rated as ‘better practice’.

RECOMMENDATION		SECTION	RATING
1	CRDC should consider the application of <i>ex-ante</i> benefit-cost evaluations to ensure appropriate allocation of investments across the RD&E portfolio and within investment plans for each theme	6.1	Better practice
2	CRDC should actively communicate to all R&D partners the move towards investment plans and a focus on larger, longer-term programs of activity within the RD&E portfolio	6.1	Better practice
3	CRDC should engage with Cotton Australia and other key stakeholders to re-design the RD&E consultative process to ensure it is fit for purpose as CRDC implements the new strategic plan	6.2	Important
4	CRDC should critically review its current capacity and capability in R&D management and develop a staffing plan to allow it to deliver on the ambitions of the new strategic plan	6.3	Important
5	CRDC should include greater detail in the monitoring and evaluation framework to accompany the new strategic plan, for example to clarify how it will track progress towards outcomes	6.8	Better practice
6	CRDC should consider the revitalisation of the Cotton Innovation Network, with a focus on building multiparty investment programs of RD&E	7.4	Better practice
7	CRDC should ask its impact assessment researchers to provide more detailed commentary on the likely distribution of benefits from projects / clusters between sectors of the Australian cotton industry, notably between cotton growers, ginners, merchants, and shippers	8.4	Better practice
8	CRDC should consider a project to conduct a literature review of non-market valuation studies of environmental and social attributes of the Australian cotton industry as input into future assessments of the environmental and social impacts of CRDC-funded projects	8.5	Better practice

ACRONYMS AND ABBREVIATIONS

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
AIA	Agricultural Innovation Australia
AOP	Annual operational plan
APL	Australian Pork Limited
BCA	Benefit-cost analysis
BCR	Benefit-cost ratio
BMP	Best management practice
CA	Cotton Australia
CCA	Crop Consultants Australia
CGA	Cotton Grower Association
CIN	Cotton Innovation Network
CRDC	Cotton Research and Development Corporation
CRRDC	Council of Rural Research and Development Corporations
CSD	Cotton Seed Distributors
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFF	Department of Agriculture, Fisheries and Forestry
ED	Executive Director
EOI	Expression of interest
FRDC	Fisheries Research and Development Corporation
FRP	Full research proposal
FY	Financial year
GM	General Manager
GRDC	Grains Research and Development Corporation
GPWUI	Gross Production Water Use Index
GVP	Gross value of production
IP	Intellectual property
IP&C	Intellectual Property & Commercialisation (Committee)
IRR	Internal rate of return

KPI	Key performance indicator
M&E	Monitoring and evaluation
MIRR	Modified internal rate of return
ML	Megalitres
NED	Non-executive director
Northern Australia CRC	Cooperative Research Centre for Developing Northern Australia
NPV	Net present value
NR	Not reported
PGPA Act	<i>Public Governance, Performance and Accountability Act 2013</i>
PIRD Act	<i>Primary Industries Research and Development Act 1989</i>
PSPF	Protective Security Policy Framework
PVB	Present value of benefits
PVC	Present value of costs
R&D(RD&E)	Research & development (Research, development & extension)
RDC	Research & Development Corporation
REO	Regional Extension Officer
SFA	Statutory Funding Agreement 2020-2030
WAND	Weather and networked data (project)

1. INTRODUCTION

1.1 PURPOSE OF THE REVIEW

Under its Statutory Funding Agreement 2020-2030 (SFA) with the Commonwealth Government (clause 9.6), the Cotton Research and Development Corporation (CRDC) is required to engage an independent consultant to undertake a comprehensive review of the organisation's performance as directed by the Commonwealth from time to time.

The review is required to assess the performance of CRDC in meeting its obligations under the performance principles described in clause 9.2 of the SFA. The performance principles are:

- a. *To engage stakeholders to identify RD&E [research, development, and extension] priorities and activities that provide benefits to the industry;*
- b. *To ensure RD&E priorities and activities are strategic, collaborative, and targeted to improve profitability, productivity, competitiveness, and preparedness for future opportunities through a balanced portfolio;*
- c. *To undertake strategic and sustained cross industry and cross sectoral collaboration that addresses shared challenges and draws on experience from other sectors;*
- d. *For governance arrangements and practices to fulfil legislative requirements and align with contemporary best practice for open, transparent, and proper use and management of funds; and*
- e. *To demonstrate positive outcomes and delivery of RD&E benefits to levy payers and the community in general and show continuous improvement in governance and administrative efficiency.*

The performance principles are a relatively new feature of funding agreements between the government and rural research and development corporations (RDCs). Likewise, the requirement of independent performance reviews to specifically consider the performance principles, rather than all of the provisions of the SFA as stipulated in earlier funding agreements, is also recent.

The performance review is to focus on the period from 3 April 2020 to 31 December 2022.

1.2 REVIEW METHODOLOGY

The review was conducted as follows. Note that the desktop review, consultation, and reporting stages were overlapping.

1. Inception meetings: an inception meeting between the consultants and the Executive Director (ED), General Manager (GM) Business and Finance, and GM R&D Investment was held by videoconference shortly after confirmation of appointment. The meeting confirmed the scope of the review, CRDC input requirements (including access to documentation, personnel, stakeholders to be interviewed), output and reporting requirements and finalisation of timeframes. Following this meeting, a short face-to-face meeting was held with the CRDC board in February in Sydney to provide an overview of the consultation process and to confirm timelines.

2. Establishment of communication channels: a dedicated page for the review was created on the Forest Hill Consulting website (<https://www.foresthillconsulting.com.au/crdc-review/>). The page gave the background to the review and described the terms of reference. The site also provided an email address by which any stakeholders could provide a submission to the review or seek further information. The purpose of the site was to provide a communication channel with stakeholders that was clearly independent of CRDC.

The review was publicised by CRDC, but no submissions were received via the designated email address.

3. Desktop review: a large number of relevant documents were made available to the consultants via a secure portal and were progressively reviewed. A list of the documents reviewed is provided in Appendix 1.
4. Consultation: a list of interviewees for the review was drawn up in consultation with the CRDC executive. The list included individuals from among the CRDC executive team, other managers and staff, members of the CRDC board, individual cotton growers, peak bodies and regional chairs or presidents of the Cotton Grower Associations, other industry bodies, agronomists and consultants, and service providers to CRDC. CRDC was asked to provide a long list from which a sample was drawn by the consultants, to provide a cross-section of different regions, business sizes and types. Some of those interviewed had been interviewed in the previous review to enable a longitudinal assessment.

CRDC staff were mostly interviewed face-to-face, as were some growers and R&D providers. The majority of the interviews were conducted by videoconference or telephone. A semi-structured questionnaire was used as the basis for discussions. Interviewees were assured that their comments would be treated in confidence and, if reported, would be presented in a way that did not allow the source to be identified.

A total of 39 individuals were interviewed, comprising:

- ⊕ CRDC management and staff: 7
- ⊕ CRDC directors: 6
- ⊕ Cotton growers: 10
- ⊕ Other industry stakeholders: 16.

Note that while we approached 20 growers for interview, a large proportion either declined the opportunity or did not respond to our requests. This may have been due partly to the busy time of year and a focus in some areas on flood recovery.

Names of the individuals interviewed have not been reported in order to protect confidentiality.

5. Presentation of interim findings: the interim findings from the review were presented to the board and executive via videoconference in order to test the findings for accuracy and completeness.
6. Report preparation: this draft report was submitted and presented to the CRDC board. It was then provided to DAFF. Feedback on the draft was considered by the review team and changes made where required to correct factual errors and produce the final report.

2. OVERVIEW OF CRDC

2.1 LEGAL FRAMEWORK

CRDC was declared to be established on 1 October 1990 by the Cotton Research and Development Corporation Regulations 1990, made under section 8 of the *Primary Industries Research & Development Act 1989* (PIRD Act). The stated purpose of CRDC is '*Increased economic, social and environmental benefits for the Australian cotton industry and the wider community, by investing in knowledge, innovation and its adoption*'.¹

CRDC is one of four research & development corporations (RDCs) established under the PIRD Act and therefore 'statutory' as distinct from 'industry-owned' RDCs. CRDC is a corporate Commonwealth entity under the *Public Governance, Performance and Accountability Act 2013* (PGPA Act) and is an agency within the Agriculture, Fisheries and Forestry portfolio.² CRDC must meet the finance and administration arrangements detailed in the PGPA Act and associated instruments such as various Rules.

Since 2013, the PIRD Act has permitted the Minister to enter into formal funding agreements with statutory RDCs. The current SFA between CRDC and the Minister is CRDC's second such agreement and commenced in April 2020. The SFA supports the compliance framework of the PIRD and PGPA Acts and introduces some additional obligations, notably the performance principles described in section 1.1 of this report.

The cotton levy is governed by the *Primary Industries (Excise) Levies Act 1999* and the *Primary Industries Levies and Charges Collection Act 1991*.

2.2 FUNDING

CRDC is funded principally by industry levies, and levy-matching contributions and other research grants from the Commonwealth Government, with smaller contributions to revenue from royalties, interest, and other sources.

Industry R&D levies, collected through the tax system and remitted to CRDC, are:

- ⊕ \$2.21 paid on each 227kg bale of cotton lint, or
- ⊕ \$3.99 / tonne of seed cotton.³

¹ Annual Report 2021-22

² A further RDC, Wine Australia, was established under its own act and is therefore also a 'statutory' RDC

³ The total levy paid is \$2.25/bale and \$4.06/t respectively, but \$0.04 (\$0.07) is remitted to Plant Health Australia for cotton industry membership

Each levy is payable by the person who owns the cotton or seed cotton immediately after harvest. Australian ginning and export of seed cotton occurs between March and September of each year, so levy revenue in a given financial year can be derived from two consecutive crops.

The Commonwealth Government provides matching contributions on eligible R&D expenditure as stipulated in section 30 of the PIRD Act. These contributions are capped at the lower value of R&D levies received, 0.5 percent of the industry's 3-year rolling average gross value of production (GVP), or 50 per cent of eligible RD&E expenditure.

A summary of CRDC's financials over the review period is provided in Table 1.

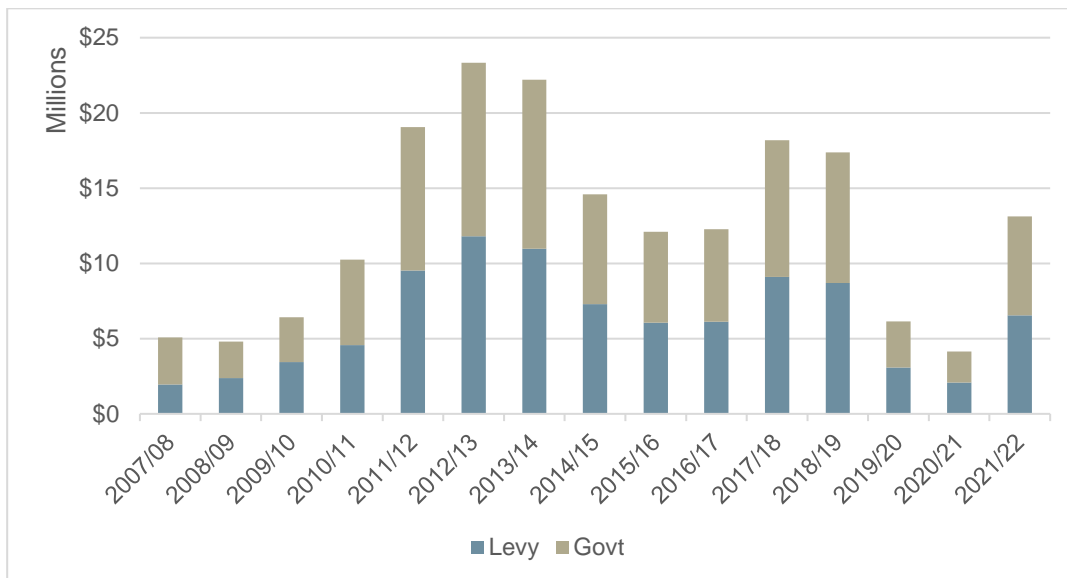
Table 1: Key financial figures for CRDC, 2019/20 – 2022/23

\$M	2019/20	2020/21	2021/22	2022/23 ^F
Total revenue	11.914	9.207	17.712	23.938
Industry levies	3.070	2.077	6.556	
Australian Government	3.070	2.077	6.552	
Royalties	0.007	0.072	0.049	
Interest	0.620	0.191	0.091	
Research grants	3.676	4.104	3.465	
Other	1.471	0.686	0.999	
Total expenditure	20.042	16.924	18.309	18.613
Cotton RD&E activities	16.666	13.614	14.835	
Total equity position	30.751	23.177	22.460	28.435

F = forecast. Forecasts are presented differently to annual financial reports, so only aggregated numbers are presented here
Source: Annual reports (2019/20, 2020/21, 2021/22), annual operating plan (2022/23)

The 2018 performance review noted that CRDC's revenues had been reasonably even over that review period (2014/15 to 2018/19), varying between approximately \$19 and \$26 million per annum. Revenue volatility has been much greater over the past four years, as shown in Table 1. This is due to the drought conditions experienced by the industry during 2019/20 and 2020/21, as described in section 3.2. The board drew down on reserves during this time so that R&D expenditure could be maintained at only around 10 to 20 per cent lower than previous years.

A longer-term perspective on the variation in CRDC's revenue base can be seen in Figure 1.



Source: Annual reports

Figure 1: CRDC levy and matching government revenue since 2007/08

The 2018 review noted the fixed nature of the cotton levy and the implication that, over time, the real value of levy paid per bale to CRDC will decline. This drop in revenue is being offset in absolute terms by long-term increases in the number of bales sold. However, the cotton industry is leaving increasing amounts of government matching funding ‘on the table’ as cotton prices increase because levy revenues fall below 0.5 per cent of GVP. When the levy was last increased (from \$1.75 to \$2.25 / bale) in 2001, the new levy was estimated to represent 0.49 per cent of GVP, almost the maximum level of matching funding.⁴ It now represents much less than 0.5 per cent of GVP.

We noted in 2018 that the wide variability in revenues makes budgeting a challenge, and that this challenge is made more difficult by the fact that while CRDC controls its reserves it may require approval from the Minister for Finance to draw down on them through a ‘loss application’. The board, Audit Committee and management are well aware of and actively manage revenue volatility. Their management of the financials over the review period is commendable.

We noted too in the 2018 review that competitive government research grant funding had become an increasingly important part of CRDC’s revenue. This stream contributed 31 per cent of revenue in 2016/17. In the drought year of 2020/21, research grants contributed almost 45 per cent, providing a valuable partial buffer

⁴ Cotton Australia 2011, Submission to Productivity Commission Inquiry into the RDC Model

against the decline in levy and matching funding. Whether such additional grant funding will continue to be available as governments seek to balance budgets remains to be seen.

3. OPERATING ENVIRONMENT

A brief description of CRDC's operating environment during the review period is provided here as context for the review.

3.1 INDUSTRY PROFILE

There are up to 1,500 cotton farms in Australia, depending on water availability and landowner choice among competing crops. Cotton is grown mainly in New South Wales and Queensland, with smaller amounts produced in northern Victoria. Cotton production trials are underway in northern Queensland, northern Western Australia, and the Northern Territory (Figure 2). Around 90 per cent of cotton growing business are family-owned mixed farming operations.

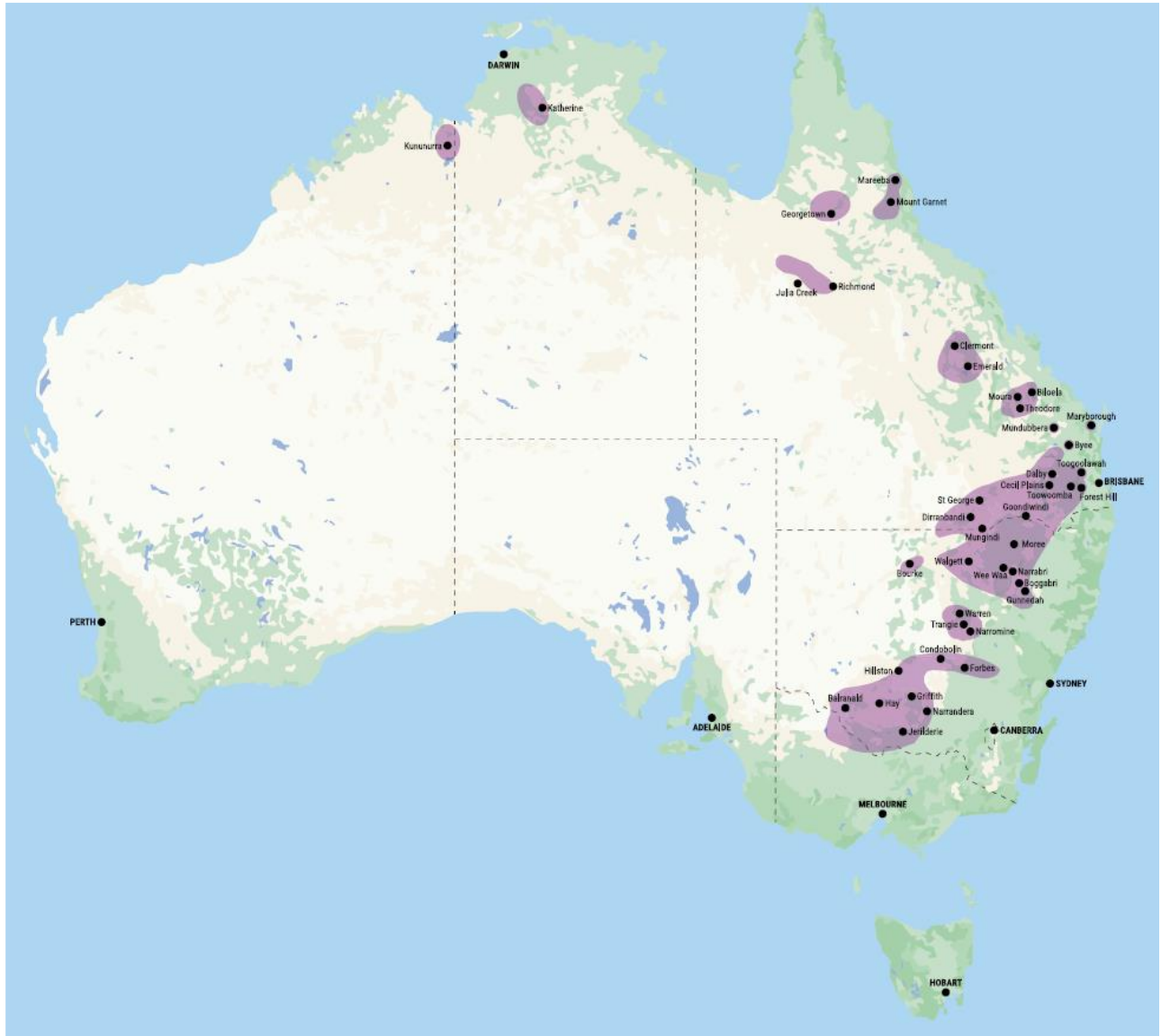
Cotton production employs sophisticated management practices and faces a high degree of regulation. These factors, and the processing / ginning activities within the regions, result in significant industry labour requirements. Over 95 per cent of cotton farms have specialist internal or external consultants that provide advice on agronomy, integrated pest management, marketing, and other areas. It is estimated that over 10,000 people are indirectly employed or engaged in the Australian cotton industry.

Cotton is grown in rotation with other crops including cereal grains and legumes, and in some cases livestock. In most areas, the growing season starts in spring / summer and runs through to autumn / winter. Around 90 per cent of cotton is grown under irrigation. Australian cotton production is among the most water-efficient in the world and has improved water use efficiency by 52 per cent since 1993.

Following picking, seed cotton is subject to a process called ginning, which separates the cotton lint (raw cotton fibre) from the seed. The lint is cleaned and pressed into 227-kilogram bales. Cotton seed is used as a high-quality protein supplement for predominantly ruminant livestock (beef feedlots) or crushed to produce cottonseed oil, which has a strong market due to its cooking temperature and flavour profiles. A by-product of the oil extraction process is cottonseed meal, which is also used for stockfeed.

The industry produces on average around 680,000 tonnes of raw cotton fibre per annum, worth about \$2 billion, although production fluctuates substantially from year to year (see section 3.2). Australia is a relatively small cotton producer by international standards, but among the top exporters of cotton in good seasons. All Australian cotton is exported as there are no domestic spinning mills. The main markets for Australian cotton include Vietnam, Indonesia, Turkey, and Thailand. Australian cotton is among the highest quality in the world, having almost zero contamination, good colour, high staple length and strength, and consistent micronaire (an approximation of fibre thickness) within the preferred range.⁵

⁵ Information sourced mainly from Cotton Australia and the Australian Cotton Shippers Association



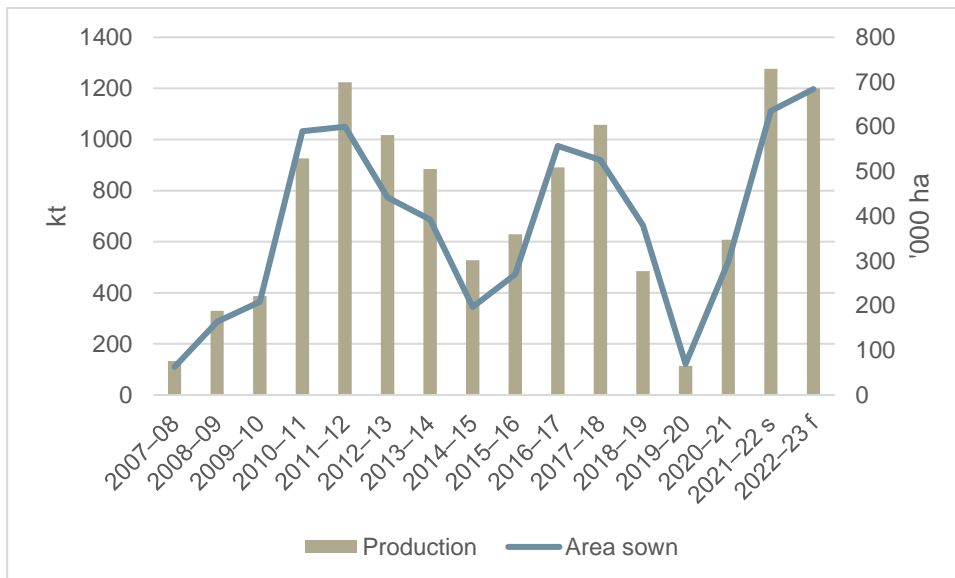
Source: Cotton Seed Distributors

Figure 2: Cotton growing regions of Australia

3.2 TRENDS IN PRODUCTION, PRICES, AND MARKETS

Australia’s cotton production varies substantially from year to year, depending on seasonal conditions and global price. Over the four growing seasons of interest to this review, the area sown to cotton and the number of bales of cotton produced in Australia varied substantially. Figure 3 places these four seasons in the 15-year

context. 2021/22 saw record production of cotton, and almost 11 times that of 2019/20, which was the smallest cotton crop in 15 years.



Source: ABARES⁶

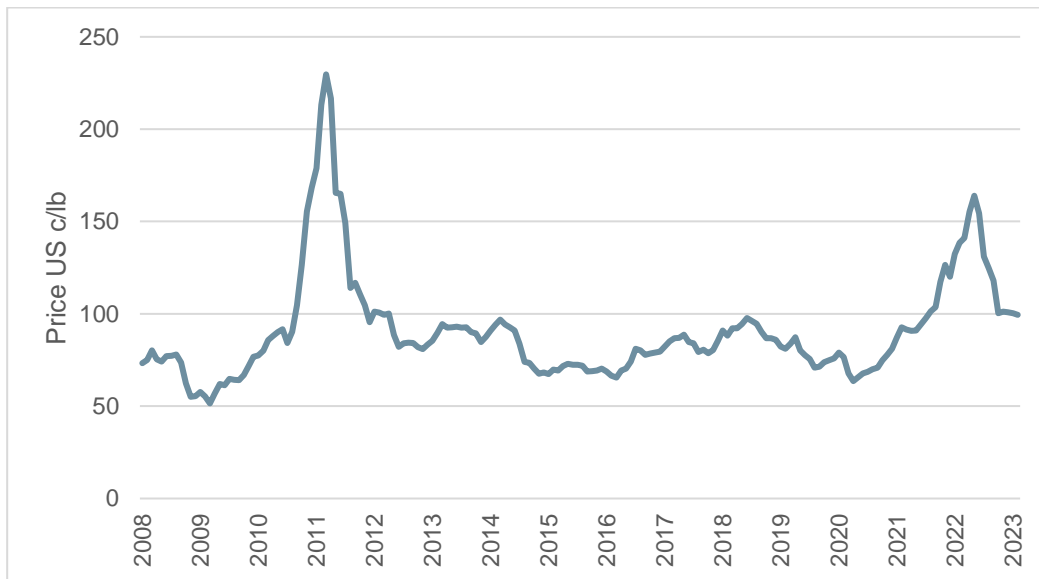
Figure 3: Area sown to cotton and cotton produced in Australia, 2008-2022

Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) forecast in its quarterly Australian Crop Report in March 2023 that the 2023 cotton crop would be constrained by below-average summer rainfall (predominantly dry-land), although the crop would still be above average (Figure 3).

The global cotton price over the 15-year period is shown in Figure 4. The price declined steadily from the record peak in 2011 through to August 2019, at the beginning of the review period, before rising to a 12-year peak of 170 US c/lb in May 2022. This was due to a range of factors, including drought in the US and US restrictions on the use of Chinese cotton. The price has since declined sharply to around 100 US c/lb, reportedly the result of pessimism over forward demand and a generalised fall in agricultural commodity prices.⁷ Nevertheless, global prices remain above the prices seen for much of the period between 2012 and 2021.

⁶ ABARES 2023, Australian Crop Report, March

⁷ Mecardo, August 2022, 'Cotton outlook soft', <https://mecardo.com.au/cotton-outlook-soft/>



Source: International Monetary Fund

Figure 4: Global cotton price, 2008-2022

3.3 INDUSTRY ISSUES AND DEVELOPMENTS

In common with every industry, cotton faces several challenges. These include but are not limited to:

- # Maintaining high quality cotton whilst also increasing yield;
- # Accessing skilled labour in regional communities and providing training opportunities to maintain both capacity and capability;
- # Implementing innovative technologies and management practices;
- # Managing climate variation and maintaining access to water;
- # Reducing energy consumption and maintaining availability in regional environments;
- # Managing chemical use and spray drift; and
- # Maintaining community trust and social licence.

The new strategic plan recognises these challenges and has adopted a three-pillar approach described as: 'paddock', addressing the production and agronomic challenges; 'people', the capacity and capability requirements of industry; and 'planet', the social and environment expectations by the global community of the Australian cotton industry. This is described more fully in section 5.3.

4. GOVERNANCE AND PEOPLE

4.1 STRUCTURE OF THE BOARD

The PIRD Act dictates the size and composition of the boards of the statutory RDCs, including CRDC. The board must comprise a chairperson, an executive director, and between five and seven other directors, as determined by the minister.

The minister appoints the non-executive directors (NEDs), including the Chair and Deputy Chair, from a list of persons nominated by a selection committee. The selection committee is overseen by a presiding member appointed by the Minister. The presiding member must consult with the representative organisation/s (in this case Cotton Australia (CA)) in constituting the committee. NEDs are appointed for a term not exceeding three years and are eligible for re-appointment for a second 3-year term. The ED is appointed by the board and holds office *'during the Corporation's pleasure'* (section 78(1)(b)).

The board currently comprises eight directors including the Chair and ED. The board believes this number provides an optimal balance of efficacy and cost. There has been a total of 11 NEDs over the review period, with four of the NEDs being replaced in September 2020 (Table 2). This represents a period of relative stability for the board in comparison to earlier periods, as noted in the previous performance review, including October 2014 when half of the directors were replaced.

Table 2: CRDC directors during the review period

YEAR*	2019/20	2020/21	2021/22	2022/23
Richard Haire (chair)	X	X	X	X
Kathryn Adams (deputy chair to Sep 2020)	X	To Sep 20	-	-
Rosemary Richards (deputy chair from Oct 2020)	X	X	X	X
Elizabeth Alexander	X	To Sep 20	-	-
Greg Kauter	X	To Sep 20	-	-
Jeremy Burdon	X	To Sep 20	-	-
Les Copeland	X	X	X	X
Ross Burnett		X	X	X
Gary Fitt		X	X	X
Danielle Kennedy		X	X	X
Peta Slack-Smith		X	X	X

YEAR*	2019/20	2020/21	2021/22	2022/23
Ian Taylor (executive director)	X	X	X	X

Whilst the board has not been subjected to the major turnover experienced in earlier years, there was considerable change in September 2020 when four new board members joined the three ongoing NEDs (and the relatively recently appointed Executive Director). The timing of this changeover during Covid meant that the assimilation of the new directors into the board was a slower process than usual. This has created a lingering lack of integration between the 'old board' and 'new board', with a consequent slight degree of frustration among both groups.

This is not a major issue and board dynamics are reported to be constructive and collegiate (see section 4.3). However, it does demonstrate the need for the selection committee to take account of transitional issues when formulating its recommendations to the Minister.

The selection committee is required, under section 131 of the PIRD Act, to ensure that the board has the appropriate balance of skills in: commodity production, commodity processing; commodity marketing; conservation of natural resources; management of natural resources; science; technology and technology transfer; environmental and ecological matters; economics; administration of research and development; finance; business management; communication; and public administration, as well as 'board affairs'. CRDC may nominate additional skills for inclusion in the selection process.

The current board appears to have a good balance of skills across most of these disciplines. We noted in the 2018 performance review that some stakeholders were concerned about the absence of any levy-paying cotton growers on the board at the time. This has now been addressed to some degree with the appointment of a grower to the board in September 2020. However, in our view, there should be one more grower director. Growers bring commodity production, business management and potentially other skills, but just as importantly they bring an understanding of the culture, expectations, and other less tangible attributes of the levy payer population.

4.2 COMMITTEES

There are three board committees:

1. **Audit:** The requirement for an Audit Committee is established under section 89 of the PIRD Act and section 45 of the PGPA Act / section 17 of the PGPA Rules, 'Audit committee for Commonwealth entities'. The CRDC Annual Report 2021-22 notes that the Audit Committee's '*primary role is to ensure CRDC's financial reporting is a true and fair reflection of its financial transactions... The committee also provides a forum for communication between the directors, the senior managers of CRDC and the internal and external auditors. It carries responsibility for identifying areas of significant business risk and stipulating the means of managing any such risk*'.

The Audit Committee comprises three NEDs, one of whom is chair, and an external expert. The inclusion of an external person is reported to add considerable value and is a commendable element of the committee's composition. The ED and GM Business and Finance attend the Audit Committee as observers. The committee has met three to six times per year over the review period.

2. **Intellectual Property (IP) and Commercialisation⁸ (IP&C):** The CRDC Annual Report 2021-22 notes that *'The role of the IP and Commercialisation Committee is to help CRDC's Board fulfil its responsibilities and strategic objectives for IP management and commercialisation of project outputs to maximise the benefits to the Australian cotton industry. The Committee's specific responsibilities are to review the operation of CRDC's IP and commercialisation policy and operating principles, and to consider IP and commercialisation matters directed to it by the Board for consideration'*.

The IP&C Committee comprises three NEDs, one of whom is chair. The ED and GMs attend as observers. The committee has met three to four times per year over the review period.

3. **Remuneration:** The CRDC Annual Report 2021/22 notes that the Remuneration Committee *'advises the Board on the Executive Director's remuneration and senior staff remuneration adjustments'*. The committee comprises three NEDs including the board Chair, who chairs the committee. The committee has met three to four times per year over the review period.

The structure, roles and responsibilities of the committees are detailed in the Charter of Corporate Governance. Interviews with board members and management indicates that the committees work effectively, with an appropriate balance between the work of the committees and the board.

4.3 BOARD PRACTICE

The board has undergone two performance evaluations over the review period: in April 2019, and just prior to the preparation of this report in April 2023. There was an intent to do a review in 2021 but this was shelved due to Covid. Both the 2019 and 2023 reviews were externally facilitated. The 2018 performance review of CRDC recommended that the board undertake regular performance evaluations, and we believe CRDC has implemented that recommendation.

The performance evaluations and our interviews indicate that the board operates in an effective manner. The timing and number of meetings appears appropriate, and the policy of the board to hold some of its meetings in regional locations near the grower base is commendable. We also note that the February 2023 board meeting included a joint session with the board of the Grains Research and Development Corporation (GRDC), which demonstrates an admirable willingness to engage with an RDC with which CRDC shares many of its levy payers and which is a co-investment partner in several projects (see section 6.5).

The board is well engaged with strategic planning and has a sound focus on compliance and risk. As noted in section 4.1 above, full integration of the four NEDs appointed in September 2020 has been a prolonged process, due largely to the restrictions imposed during Covid. Notwithstanding this issue, discussions are generally reported to be at the appropriate level, although there was some commentary to our review about board papers dwelling too much on operational detail. We do understand, however, that board packs have improved over time. The relationship between directors and management appears to be appropriate and constructive and all participants are well prepared for meetings.

⁸ Formerly the Intellectual Property Committee

It is not clear that directors feel they are entirely across CRDC's progress towards delivery of strategic targets. Several directors observed that the challenge for the board and management, as CRDC implements its new strategic plan, will be to develop an effective and efficient means of tracking and reporting against delivery of the planned outcomes, especially given the longer-term perspective of the new plan.

We have recommended elsewhere in the report that CRDC strengthen its monitoring and evaluation (M&E) framework. Board reporting will need to be an important component of the revamped framework (see section 6.8).

4.4 GOVERNANCE DOCUMENTATION

CRDC has a Charter of Corporate Governance describing the governance framework of the organisation. This was last revised in 2020 and is subject to triennial review by the board. As noted in the previous review, the charter is comprehensive and provides all of the information recommended for inclusion by the Australian Institute of Company Directors.

CRDC also has a series of five handbooks that contain all of the corporate policies and frameworks. These are:

- ✦ Finance and Administration Policy (revised 2022);
- ✦ Human Resource Management Policy (2022);
- ✦ Intellectual Property Policy (2020);
- ✦ Risk Management Policy (2022); and
- ✦ Workplace Health and Safety Policy (2017, new policy in draft⁹).

Each handbook references the relevant sections of the PIRD Act and PGPA Act and PGPA Rules.

A recommendation of the previous performance review was that CRDC '*should develop a register of all of its policies, procedures, plans, registers and other significant documents, showing when each was last reviewed, the approval process for the review and when the next review is due*'. A document of this description is available and presented at each board or committee meeting as part of the work plan papers.

All of the governance documentation sighted by the review is current and of a high standard.

4.5 RISK MANAGEMENT AND COMPLIANCE

CRDC's governing legislation requires that the organisation establish and maintain systems to provide an appropriate level of risk oversight and management. CRDC has a Risk Management Policy Handbook that includes policies on the Australian Government's Protective Security Policy Framework (PSPF); risk, fraud risk, and information security risk management; business continuity; and privacy. The handbook clearly sets

⁹ CRDC was without a workplace health and safety officer for a period of time, resulting in a delay in the revision of the policy

out the relevant legislative and other provisions underpinning CRDC's policies, responsible officers, and means of implementation. The handbook is an excellent resource and one that we have not seen elsewhere (except in the previous CRDC performance review).

Supporting the policy handbook is a series of risk management plans and processes and general risk, fraud risk and information security risk registers. All documentation is very thorough, current, and extensively cross-referenced.

Risk management is overseen by the Audit Committee. High-level risks are reviewed at each Audit Committee meeting, while the full risk register is reviewed annually or as otherwise required, and any changes are recommended to the board. The risk management plan is also reviewed annually. The Information Security Risk Management Plan and register are reviewed triennially or as otherwise required. CRDC also commissions an annual audit of its compliance with the PSPF. The most recent audit rated CRDC as having a 'managing' level of maturity in security capability and risk culture for 14 of the 16 PSPF requirements (the second-highest rating). Nine recommendations were made for improvement, all rated low risk. We note that CRDC has commissioned external penetration tests, the most recent in July 2022.

Directors interviewed for the review indicated a high degree of satisfaction with CRDC's oversight of compliance and risk at management, committee, and board levels.

4.6 MANAGEMENT TEAM

The present ED assumed the role on 7 March 2019 following the resignation of the previous incumbent.

CRDC has a relatively flat and simple structure appropriate to an organisation of its size (Figure 5). A number of staff are part-time or externally contracted to allow CRDC to cost-effectively access particular skills such as commercialisation and project management.



FT = full time, PT = part time
 Source: Annual Report 2021-22

Figure 5: CRDC organisational structure as at 30 June 2022

In the previous performance review, we reported that the workload of CRDC personnel had increased, due in part to the organisation taking on the management of several large joint projects with other RDCs and agencies. We also noted the challenge for CRDC in managing its staffing levels. As a government agency, CRDC is subject to freezes and other constraints on public sector employee numbers and this problem was evident in 2018. Notwithstanding these constraints, CRDC has modestly increased its staff numbers since the previous performance review. As of 30 June 2023, there were 11 full-time (including the executive director) and four part-time staff members, plus contractors to the equivalent of 1.7 full-time staff. This compares with 10 full-time staff and two part-time staff in June 2018.

Despite the additional people, some staff continue to report that they have excessive workloads, and external stakeholders such as R&D providers commented that CRDC can be difficult to engage for this reason. We are not in a position to judge whether there is a problem of too many projects with limited staff. Either way, there is the actuality or risk of an imbalance between CRDC’s ambitions and its capacity to deliver on these. As discussed in section 5.3, CRDC has developed an excellent strategic plan. Its challenge now will be to implement that plan, and this will include ensuring that staff are focused on the most important work. This is further discussed, and a recommendation made, in section 6.3.

The 2018 performance review also noted CRDC's own identification at the time of the need for a senior commercialisation manager. A consultant was appointed part-time to this position during 2019/20. This is discussed further in section 6.6.

The advantages and disadvantages of CRDC's location in Narrabri were discussed in the previous performance review and will not be repeated here, except to note that the organisation continues to have several staff in locations remote to the head office, and that these arrangements appear to be working well. Most if not all RDCs have progressively adopted more flexible working arrangements, and these are now seen as necessary to secure appropriate skills.

4.7 CORPORATE PERSONALITY AND CULTURE

The current ED has placed considerable emphasis on culture and staff wellbeing since his appointment and this appears to have been a successful endeavour. The culture within CRDC is clearly very positive. Managers who were interviewed for the review emphasised the transparency and non-hierarchical nature of the organisation, the high degree of trust among staff members, and the autonomy, safety, and flexibility of the workplace. Processes are described as less bureaucratic than they were. The R&D team is more forward thinking, and more focused on commercialisation of R&D outcomes.

However, managers reported that CRDC is continuing to evolve in these respects and that there is room for further improvement. As noted in section 4.6, implementation of the new strategic plan, with its emphasis on bigger-picture thinking and a program approach to R&D, will require a different mindset to the one CRDC has traditionally adopted.

The perceptions of CRDC's external stakeholders reflect quite closely the internal view. With a few exceptions, stakeholders regard CRDC as easy to work with, collaborative, and agile. Interviewees compared CRDC very favourably against the larger RDCs responsible for related agronomic enterprises.

5. PLANNING AND REPORTING

5.1 OVERVIEW

The drivers of CRDC's planning and reporting requirements have changed somewhat over recent years. Initially, the requirements for planning and reporting were highly prescribed by a range of documents, especially the Funding Agreement 2015-2019. That Funding Agreement had whole sections dedicated to planning (section 10) and reporting (section 11). In contrast, the current SFA has very little detail in relation to these requirements.

There are three principal documents of interest for this review. They are:

- # The five-year strategic plan (referred to as the 'R&D Plan' in the PIRD Act and SFA);
- # Annual operational plans (AOPs); and
- # Annual reports.

The period for this review covers two strategic plans, four AOPs and three annual reports. There is also an overarching Consultation Plan prepared to guide the development of the soon to-be-released CRDC Strategic RD&E Plan 2023-2028.

5.2 CONSULTATION PLAN

CRDC is currently developing its Strategic R&D Plan 2023-2028. The company released a very comprehensive 'Consultation Plan for the Development of the CRDC 2023-2028 Strategic Plan' in November 2022 which actually back dates to September 2021 when CRDC held a horizon scanning workshop. The consultation plan details the process for development of the strategic plan, including its formal endorsement by the CRDC board (April 2023), endorsement by CA (May 2023) and submission to the Minister and DAFF (May 2023). The aim is to have the new strategic plan officially launched by the board and the Minister in June 2023.

5.3 STRATEGIC RD&E PLAN

There are two documents of interest from a strategic planning perspective for this review. They are:

- # Strategic RD&E Plan 2018-2023; and
- # Strategic RD&E Plan 2023-2028.

As noted above, the level of prescription in regard to strategic R&D plans was far greater in the Funding Agreement 2015-2019 than it is in the current SFA. Indeed, the main sections in the SFA relating to planning and reporting are:

'7.1 CRDC must maintain, implement and regularly review a framework of good corporate governance to ensure proper use and management of the Funds and the Voluntary Contributions. In maintaining the governance framework, CRDC should draw on best practice as appropriate'; and

'9.2 The performance principles are:

- a. to engage stakeholders to identify RD&E priorities and activities that provide benefit to the industry;
- b. to ensure RD&E (and marketing) priorities and activities are strategic, collaborative and targeted to improve profitability, productivity, competitiveness and preparedness for future opportunities and challenges through a Balanced Portfolio;
- c. to undertake strategic and sustained cross-industry and cross sectorial collaboration that addresses shared challenges and draws on experience from other sectors;
- d. for governance arrangements and practices to fulfill legislative requirements and align with contemporary Australian best practice for open, transparent and proper use and management of funds; and
- e. to demonstrate positive outcomes and delivery of RD&E (and marketing) benefits to Levy Payers and the Australian community in general, and show continuous improvement in governance and administration efficiency.

CRDC's aim through the 2018-23 strategic plan is to contribute to creating \$2 billion in additional gross value of cotton production for the benefit of Australian cotton growers and the wider community by 2023. Various annual reports comment on that aim and note the difficulty in achieving this goal due to extended dry seasons from 2018 to 2020.

This review has found that the Strategic RD&E Plan 2018-2023 meets the requirements of the Funding Agreement 2015-19. Indeed, the plan states: *'This Strategic Plan has been prepared in accordance with the Primary Industries and Research and Development (PIRD Act) 1989, the Public Governance, Performance and Accountability Act 2013 (PGPA Act) and the 2015–19 CRDC Funding Agreement with the Australian Government.'*

The plan also states that *'Our Strategic Plan aligns with Australian Government and industry priorities. It supports the Australian Government's Science and Research Priorities, its Rural Research, Development and Extension priorities, and also addresses the Cotton Sector RD&E Strategy priorities'.*

The plan is well structured and has three goals and two enabling strategies. They are:

- ⊕ Goal 1: Increase productivity and profitability on cotton farms
- ⊕ Goal 2: Improve cotton farming sustainability and value chain competitiveness
- ⊕ Goal 3: Build adaptive capacity of the cotton industry
- ⊕ Enabling strategy 1: Strengthening partnerships and adoption
- ⊕ Enabling strategy 2: Driving RD&E impact

As noted in the previous performance review, the plan is well written and laid out, with excellent use of infographics, colour, images, and space to assist readability and identification of key components. There is a logical flow from identified trends impacting the industry to goals / enabling strategies, key focus areas, outcomes, and activities. A particularly impressive element is the identification in the plan of the key drivers likely to affect the cotton industry over the five-year life of the plan and beyond, and then the mapping of these drivers to the Australian cotton value chain.

Another particularly impressive component of the strategic plan is the objective measures, current benchmarks and 2023 targets for each goal and enabling strategy, an example of which is reproduced below for Goal 1 – increase productivity and profitability on cotton farms.

Table 3: Example performance measures from CRDC strategic plan

MEASURES	BENCHMARK	2023 TARGET
Assessment of average bales/ha	9.86 bales/ha (irrigated)	11.6 bales/ha (irrigated)
	4.0 bales/ha (dryland)	4.7 bales/ha (dryland)
Assessment of bales per unit input for irrigated cotton (water productivity and nitrogen use)	1.1 bales/ML (GPWI)	1.32 bales/ML (GPWI)
	10 kg of lint/kg of nitrogen	11.5 kg of lint/kg of nitrogen

ML = megalitres, GPWUI = Gross Production Water Use Index
Source: Strategic R&D Plan 2018-2023

It is noted in this example that the targets are more industry-level targets rather than being totally attributable to CRDC, although CRDC outputs will have some influence. It is also noteworthy that such targets are very seasonally impacted.

The current strategic plan also describes how it supports the Australian Government's Science and Research Priorities, its Rural Research, Development and Extension priorities, and how it also addresses the Cotton Sector RD&E Strategy priorities. It details sources of funds and expenditure over the five-year planning cycle. The current plan also links quite well with Cotton Australia's Strategic Plan 2018-2023 ('Viable, Valued, Advanced') and the industry's Vision 2029 plan. At some stage CRDC may wish to revisit Vision 2029, in conjunction with CA.

Finally, the one-page summary of the strategic plan is a good high-level overview document and follows a recommendation from the previous performance review of CRDC.

The new 'Clever Cotton' Strategic RD&E Plan 2023-2028 is also an impressive document. It sets out CRDC's vision for '*...a sophisticated, prosperous and sustainable Australian cotton industry that is strongly connected to its value chain.*' While its structure is similar to the previous plan, its look and feel is much more contemporary.

For the 2023-2028 plan, CRDC held both a horizon scanning workshop and a scenario planning workshop, and this is to be commended. The horizon scanning workshop brought together '*...stakeholders from across the cotton supply chain, providing a focused look at the environment in which the Australian cotton industry operates and future threats and opportunities*'. The scenario planning workshop, involving the board and management, sought '*...to identify possible future scenarios, generate an environmental scan, and identify key trends and drivers for the Australian cotton industry*'.

The new plan is structured around three pillars of Paddock, People, and Planet which provides a direct link to the three pillars of the Australian cotton industry's sustainability framework. They also link well with the goals of the 2018-2023 plan. The titles of the three pillars resonate strongly and give an instant feel as to the main areas of focus for the plan.

Industry consultation undertaken for this review indicated strong support for the process that CRDC took to revise its strategic plan and support for the revised plan.

Each of Clever Cotton's pillars has three themes, making nine investment areas in total. Each theme comprises an objective, impact statement, measures, and outcomes. These are detailed in the plan and are listed below:

- ✚ Pillar 1: Paddock: Our future fields
 - ◆ Data-driven decisions
 - ◆ Adaptive systems
 - ◆ Connected market intelligence
- ✚ Pillar 2: People: Central to our success
 - ◆ Design and innovation
 - ◆ Leadership and capacity
 - ◆ Adoption and impact
- ✚ Pillar 3: Planet: Our shared future
 - ◆ Natural capital
 - ◆ Carbon
 - ◆ Circular economy

The measures and outcomes listed in the plan are especially good as they provide a short description of the outcomes that CRDC is seeking to achieve, resulting in the desired impact. An example of this for Pillar 1 is listed below:

Measures:

- *Yield per hectare*
- *The value of data analysis and insights created from the management and production data captured in the industry database.*

Outcomes:

By 2028:

- *Data is collected, shared, managed and analysed to solve industry problems at both a farm scale and a regional scale*
- *Growers obtain greater productivity through improved analysis and insights of management and production data*
- *Input costs and resource constraints are reduced through improved understanding and more timely decision making*
- *Yield improvement is maintained at 3 per cent year on year*


If there was one improvement that could be made to the new strategic plan it would be to make greater use of objective outcomes, such as the yearly 3 per cent yield increase mentioned above. Perhaps this could be considered when CRDC reviews its M&E framework (see section 6.8).

5.4 ANNUAL OPERATIONAL PLANS

There were four AOPs prepared over the period of this review – 2019/2020 through to 2022/2023. Each AOP had an easy-to-read one-page summary prepared as well. The AOPs are clear and concise and provide an excellent overview of where CRDC will be investing over the coming financial year. CRDC is to be commended for the quality of these documents.

The four plans follow the structure of the Strategic RD&E Plan 2018-2023. Towards the front of each AOP there is a summary of the key components of the strategic plan, linking the two plans and providing a very clear 'line of sight' between the plans. Each plan also notes the expected progress by year-end towards the overarching goal at the end of the reporting period, as reproduced in Table 4 for 2019-2020.

Table 4: Example tracking towards strategic plan goals in the AOP

	STRATEGIC PLAN GOALS	PERFORMANCE CRITERIA	END OF PLAN TARGETS (2023)	2019-20 TARGETS
	GOAL 1: Increase productivity and profitability on cotton farms	Improved yield and quality	Increase in average bales/ha to 11.6 bales/ha for irrigated cotton, and 4.7 bales/ha for dryland cotton	Annual increase of 0.35 bales per hectare for irrigated cotton, and 0.14 bales per hectare for dryland cotton

Source: Annual Operational Plan 2019-20


Each of the four AOPs follows a similar structure:

- ⊕ Introduction;
- ⊕ R&D investment priorities: the Strategic RD&E Plan 2018-23;
- ⊕ CRDC structure and governance;
- ⊕ The year ahead: industry and financial outlook;
- ⊕ Investment portfolio (including an excellent display of portfolio balance);
- ⊕ Investments by CRDC priority area; and
- ⊕ Financial budget statements.

The documents also provide a very good linkage with the Government's National Primary Industries RD&E Framework as well as into the Cotton Sector RD&E Strategy.

The AOPs then work through what investment is expected to be made (or to continue) for each goal and who the collaborating partners are, an example of which (from the 2022/2023 AOP) is shown in Table 5.

Table 5: Example of investments per strategic plan goals in the AOP

	OUTCOME	KEY ACTIVITY	R&D INVESTMENTS 2022-23	COLLABORATIVE PARTNERS
 Goal 1: Increasing productivity and profitability on cotton farms	Improved yield and quality	Investigating and communicating the application of beneficial new on-farm technologies and scientific approaches	⊕ Continuing research to support the production of high-quality cotton.	Textile Technical Services
			⊕ A PhD assessing yield and fibre quality variability in cotton systems through data science for improved management.	University of Sydney
			⊕ 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.	CRC Northern Australia, GRDC

Source: Annual Operational Plan 2022-23

At the end of each AOP are detailed financial statements showing expenditure from the financial year prior, budgeted funds for the current financial year and forward estimates for the next three financial years.

CRDC is to be commended on the quality of its AOPs.

5.5 ANNUAL REPORTS

There were three annual reports produced over the review period: 2019/2020, 2020/2021 and 2021/2022. All are very long documents (over 150 pages), which is largely due to the requirement for the annual report to cover a very extensive list of content as set out in the PIRD Act, the PGPA Act, the PGPA Rule 2014 and the Funding Agreement 2015-2019. As mentioned earlier, there is no such prescriptive list of what the annual report should cover in the current SFA.

In relation to compliance, the annual report goes into considerable detail in an appendix to show how the contents of the report meet the requirements of the various governing documents (PIRD Act etc).

A key feature of the annual reports is that they measure progress against targets set in the strategic plan using a green, amber (blue) and red traffic light system. This achieves a couple of desirable outcomes. It allows the reader to assess, at a glance, the performance of CRDC, as well as providing a clear line of sight from the strategic plan through AOPs and then to the annual report. An example of this is provided in Table 6.

Table 6: Example of line-of-sight reporting in the annual report

OUTCOMES	PERFORMANCE INDICATOR	MEASURES	2018 BENCHMARK	2023 TARGET	2021/2022 PROGRESS
Improved yield and quality	Increase in yield over 5 years	Assessment of average bales/ha	9.86 bales/ha (irrigated) 4.0 bales/ha (dryland)	11.6 bales/ha (irrigated) 4.7 bales/ha (dryland)	
Improved input efficiency	Positive input /output ratios resulting from adoption of new practices	Assessment of bales per unit input for irrigated cotton (water productivity and nitrogen use)	1.1 bales / ML	1.32 bales / ML	
			10 kg lint / kg of nitrogen	11.5 kg lint / kg of nitrogen	
On-farm sustainable development is supported	New farming systems are sustainable and productive	Number of bales produced on new farming systems	-	2 million bales	

Source: Annual Report 2021-22

The ‘key’ to the green, blue, and red signal is:



The specific measure has been achieved.



On target to deliver against the measure.



Not on target to deliver against the measure.

The length of the annual report makes it a daunting document to read fully and consultation undertaken for this review indicates that few growers read them. We find this to be true for every RDC, regardless of the quality of the annual report. To its credit, CRDC publishes a very readable ‘CRDC performance report’ to accompany each annual report. The performance report details, across 10 pages, the progress CRDC has made against its strategic plan targets. It uses infographics very well and case studies to further summarise

progress being made. The performance reports are again impressive documents and may have been, in part, developed as a result of a recommendation made in the last performance review.

5.6 REPORT TO GOVERNMENT

CRDC prepares a detailed report for DAFF which specifically addresses how CRDC is meeting each of the key performance indicators for the performance principles in the SFA, as specified in the Guidelines for Statutory Funding Agreements produced by DAFF. This is a very thorough document.

5.7 OVERALL PERFORMANCE AGAINST PLANS

The most recent CRDC performance report (2021/2022) was used to assess overall progress (to date) of CRDC against its strategic plan targets (Table 7).

Table 7: Summary of CRDC tracking against strategic plan targets

GOAL	NUMBER OF KPIS ¹	NUMBER ACHIEVED	NUMBER ON TARGET TO ACHIEVE	NUMBER NOT ACHIEVED ¹⁰
GOAL ONE: Increasing productivity and profitability on Australian cotton farms	11	0	8	3
GOAL TWO: Improve cotton farming sustainability and value chain competitiveness	6	1	2	3
GOAL THREE: Build adaptive capacity of the cotton industry	8	2	3	3
ENABLING STRATEGY ONE: Strengthening partnerships and adoption	10	0	10	0
ENABLING STRATEGY TWO: Driving RD&E impact	5	0	5	0

KPIs = key performance indicators
Source: Performance Report 2021-22

¹⁰ Drought conditions across the cotton producing regions for a large part of the review period are at least in part responsible for these outcomes

Given the very difficult drought conditions across several years of this review, CRDC has done well to successfully achieve such a positive result against targets.

6. RD&E MANAGEMENT AND DELIVERY

6.1 RD&E PROCUREMENT PROCESS

There has been a change in the RD&E prioritisation, appraisal, and procurement process for CRDC since the previous external performance review. CRDC, like many other RDCs, has continuously examined and refined the methodology for identifying RD&E investments and activities to deliver results against industry-agreed priorities. It has moved from an entirely open-call procurement process to a hybrid model of open call and direct targeted investment. CA panels or advisory committees establish priority investment areas. Then, depending on the particular priority, either an open call is issued or CRDC identifies research partners with the capacity to deliver projects within that area.

This shift in RD&E procurement policy has both advantages and disadvantages. A disadvantage is that without a truly open call process, new R&D providers from outside the cotton industry may not be aware of CRDC, which could limit the pool of R&D providers, although it is noted that CRDC uses the grow^{AG} website to advertise selected EOIs to help address this concern. A major advantage is that it has taken away the significant development costs of R&D providers submitting expressions of interest (EOIs) that are not fit for purpose and not funded – for example, approximately 66 per cent of submitted EOIs were unsuccessful in 2022. In addition, it now allows R&D providers to submit proposals that more closely align with the CRDC's strategic and annual operating plans as well as its annual priorities.

The procurement process continues to be very structured (Table 8).

Table 8. Detailed timeline of CRDC RD&E investment and procurement process for 2023/24 investments

ITEM	DATE
CRDC to host discipline forums/research priority forums	May 2022
CRDC to prepare EOI documents	June-August 2022
Call for full research proposals (FRPs)	15 September 2022
Deadline for FRP submission	24 October 2022
CRDC R&D team to review FRPs	October-November 2022
CA panels to review FRPs	November-December 2022
Preliminary budget recommendation made to CRDC board	February 2023
Recommendations made to CRDC board	March 2023
CRDC board decision	April 2023
Preliminary advice given to applicant	April 2023
Approval of Parliamentary Budget Statement by Minister	May 2023
Final advice to applicant. Contracts sent	May-June 2023

ITEM	DATE
Projects commence	1 July 2023

Source: CRDC website (<https://crdc.com.au/researchers/applying-funding>)

The first phase of the process is the engagement with the CA panels and the various advisory structures that assist in setting priorities. Due to Covid, engagement in 2020 and 2021 was problematic, which resulted in CA providing surveys to members to assist in identification of RD&E needs. This situation also prompted CRDC to set up direct engagement forums on key topics with interested parties to enable industry to have direct inputs.

In addition to the panel structures, CRDC staff now use several direct and indirect ways of ensuring that priorities are identified and formally tabled. This includes direct grower, consultant, and industry engagement with the regions the CRDC staff reside in, direct communication with regional extension officers (REOs) of CottonInfo, direct talks with regional CA officers and attendance at field events, conferences, and other forums. Most stakeholders interviewed believed that these multiple forms of engagement are very effective in the identification of the most appropriate priorities.

After this formal and informal phase of consultation is completed, CRDC staff develop a request for EOI providing information that identifies the issues to be addressed, an indication of the project outcome and a clear description of the outputs and activities required from the project. The request is released, and researchers are invited to submit a full research proposal (FRP) in response. For certain requests for EOI where there is an open call process in place, the requests are listed on the CRDC web and sent out through various channels such as grow^{AG}, whereas for others, researchers are directly invited to submit FRPs. There is a clear set of guidelines for completing the FRPs and budgets on the CRDC website.

In November, after an internal R&D management review, FRPs with merit are sent to CA panel members for review and specifically for commentary on industry suitability and impact.

Following feedback from CA panel members, CRDC research managers construct an 'investment recommendation report' for the April CRDC board meeting. The investment recommendation report is then provided to the board. The report is extensive, well-constructed and provides details on:

- ⊕ The project evaluation process followed including the request for EOI development, feedback from the CA panel members and rationale for investment;
- ⊕ Number and value of FRPs received against the requests;
- ⊕ The number of FRPs evaluated and the number recommended for board approval; and
- ⊕ The recommended portfolio and its balance across various parameters including strategic plan goals.

All FRPs are reviewed by the external IP consultant for IP issues and risks. This provides the board with very clear guidance on IP risks.

In addition to the recommendation report, the board also receives a report which contains a summary of each FRP, the issues, outcomes, and investment rationale for each project, and whether it is recommended for funding or not. Members of the R&D team are made available to respond to directors' questions as needed. The process of board project review continues to be very rigorous and transparent.

In 2022, 44 FRPs were received against 13 EOIs with 13 being recommended to the board for funding. In that year an additional partnership with the Cooperative Research Centre for Developing Northern Australia (Northern Australia CRC) was also approved. The fact that approximately one-third of the submitted FRPs were supported shows that there remains a significant transaction cost for R&D providers. Some level of 'wastage' is inherent in any competitive tender system. (We note that in 2018/19, 32 of 72 FRPs were recommended for funding – representing a higher success rate than in 2022, but with far more rejected proposals in absolute terms.)

In 2023, CRDC commenced the transition to the new investment framework that will support the new strategic plan. This framework allows each of the research managers to develop an investment plan for each theme within the strategic plan. These investment plans, once approved by the board, will form the basis of procuring specific research investments. The new framework is to be commended and addresses one of the recommendations made in the last performance review that CRDC should consider some rationalisation of projects and a focus on programs within the RD&E portfolio.

Ex-ante benefit-cost analysis (BCA) is not used by CRDC as part of its project appraisal process, as was identified in the prior performance review. Senior staff members have concerns that the assumptions underpinning *ex-ante* analyses are frequently arbitrary and can take the focus away from the merit of the proposals and onto the assumptions behind the *ex-ante* analysis. *Ex-ante* analysis, however, offers significant benefits, by:

- ⊕ Providing a focus and a clearer guide on the relative economic benefits expected from each program and/or project, rather than the intuitive supposition afforded without *ex ante* analysis;
- ⊕ Guiding decisions on the relative return on investment of prospective projects competing for funding;
- ⊕ Demonstrating the potential impacts of high value RD&E to encourage co-investment and/or collaboration;
- ⊕ Identifying the information / data required that should be collected by researchers during the conduct of funded projects as vital input into subsequent *ex-post* impact assessments; and
- ⊕ Improving the monitoring, evaluation, and reporting processes.

Given these advantages, a system of *ex-ante* BCAs to support the investment decision system would be a positive addition to CRDC's current processes. As well, CRDC may find *ex-ante* analyses more attractive as it transitions to an R&D procurement process more focused on investment plans. For reference, the Australian Pork Limited (APL) Innovation Plan 2020–2025 is an illustration of a well-designed investment plan.

RECOMMENDATION 1: CRDC SHOULD CONSIDER THE APPLICATION OF *EX-ANTE* BENEFIT-COST EVALUATIONS TO ENSURE APPROPRIATE ALLOCATION OF INVESTMENTS ACROSS THE RD&E PORTFOLIO AND WITHIN INVESTMENT PLANS FOR EACH THEME.

Research providers interviewed for this review were very complimentary about their relationship with CRDC. Several commented that CRDC was still the best of the RDCs to work with. However, whilst overall feedback from interviews on CRDC RD&E procurement was very positive, there are areas for consideration and/or improvement that were highlighted by several interviewees:

- # Growers and some R&D providers still felt that CRDC was insufficiently agile in the investment cycle, citing a lag of 12 months from project ideation to contracting. Interviewees noted that CRDC is one of the RDCs most exposed to climatic variation, creating a need for agility and flexibility in RD&E. (At the same time, most R&D interviewees believed that CRDC had done an excellent job in managing RD&E investments and partnerships during the drought of 2019-2020 – which suggests these attributes are already present in CRDC’s RD&E management.)
- # A few growers remained concerned that very short-term tactical RD&E relating to in-season challenges was difficult to progress in a timely fashion. They appreciated the value of the ‘grass-roots projects’ that are relatively small in nature and are deliberately designed to provide rapid response to short-term emerging issues, but still felt that RD&E may be moving away from the local in-field issues.
- # There was some comment about the small number of staff and the availability of resources to manage an increasing complex portfolio of activities. Interviews with stakeholders indicated that whilst there was a highly dedicated and engaged R&D team, making contact, and getting responses at times was difficult. This is further discussed in section 6.3 and a recommendation made. We also heard that relationships with some of the key R&D providers had declined. Many of the projects are short term (two years and less) and of moderate size which has caused issues in retaining research staff capacity and capability, particularly technical staff to manage field projects. We think the shift to longer-term investment plans is an opportunity to lessen this problem.
- # Some researchers indicated that opportunities for truly transformative ideas had potentially declined with the mixed open and targeted RD&E procurement process, particularly those blue-sky, ‘horizon 3’ projects that are still quite abstract in terms of potential benefits to growers. They indicated that it is unlikely that such projects would proceed through the current CA panel review processes. This was in part confirmed by some growers who thought that CRDC invested more heavily in the strategic area than required. Obviously, portfolio management is difficult when there are tensions between long-term innovation vs direct on farm impact. However, CRDC should include a direct mechanism that targets those horizon 3 projects, within the investment plans of the next strategic plan. An example would be either open or targeted calls for R&D that focuses on blue-sky innovative R&D.
- # There was overall strong support for the move towards investment plans for each theme in the next strategic plan, particularly with R&D providers who indicated that program-orientated procurement could reduce transaction costs and increase longer-term investment partnerships. The move towards sustainability and climate responsiveness in the new strategic plan is important, although some R&D providers are concerned about the potential loss of core productivity R&D. It was noted that CRDC manage transitions well and that most R&D providers expressed strong confidence in CRDC’s ability to convey changes in R&D themes and release R&D priorities quickly and efficiently.

RECOMMENDATION 2: CRDC SHOULD ACTIVELY COMMUNICATE TO ALL R&D PARTNERS THE MOVE TOWARDS INVESTMENT PLANS AND A FOCUS ON LARGER, LONGER-TERM PROGRAMS OF ACTIVITY WITHIN THE RD&E PORTFOLIO.

6.2 INDUSTRY CONSULTATIVE PROCESSES

As described in section 6.1, CRDC utilises a series of advisory panels convened by CA and comprising growers from across the various regions. The CA panels meet in May for an 'R&D priority forum' co-hosted by CRDC and CA. The panels present their recommendations to the forum and CRDC staff participate in the forum to provide guidance to the panel participants. The recommendations of the forum are provided to CRDC by CA in a formal document.

A major strength for CRDC and quite unusual among rural industries is the fact that RD&E prioritisation follows a well-structured procedure with the industry representative organisation. Despite this, growers, CA, and CRDC are worried that the time allotted for devising and prioritising requests for EOI is constrained and that perhaps more time should be set aside in the May conference. This type of industry participation is strongly dependent on the quality of the partnership between CRDC and CA, which is positive, but there is a need for commitment from both organisations to maintain that process as effective, efficient, and with as much genuine grower engagement as possible.

Many of the people who were interviewed for this review commented that the panel members – mostly growers – continue to have difficulty in thoroughly familiarising themselves with the science behind the various FRPs. Growers said that, rather than evaluating the FRPs' scientific value, their job on the CA panels is to provide a ground-truthing and assessment of on-farm viability. The opinion from R&D providers was that growers and consultants tend to prioritise shorter-term, farm-based projects above longer-term, more strategic expenditures, particularly in areas that are not strictly production-oriented. This opinion was supported by several growers.

Given the move to investment plans for themes, ensuring that growers have a strong sense of engagement with CRDC's strategic and annual operational planning will be highly dependent on the form of grower engagement that CRDC adopts for the future. It is apparent that CRDC and CA will have to revitalise the consultative process, including the R&D prioritisation and FRP review for the future, including how investments link to the board-approved investment plans. It is also evident that the next strategic plan is much more focussed on broader industry challenges and opportunities which will require potential training for growers to become effective in evaluation of R&D in those themes.

Another issue identified was the continuity of project development and review across years. A challenge for the advisory panels is to capture the ideas and inputs from year to year and ensure that projects build on previous investments and outcomes. Some interviewees also felt that CRDC might be developing a degree of inertia in looking for the next phase of industry engagement, simply because of its current success. Different sorts of engagement are required for different types of R&D. Grower panels work well for on-farm, but may not be the optimal structure to deal with highly novel or futuristic R&D.

Having specialist panels aligned to each of the pillars in the new plan would ensure continuity of planning as well as providing increased diversity in R&D evaluation. These groups could be provided with additional market intelligence and experiential learning to enhance their effectiveness.

RECOMMENDATION 3: CRDC SHOULD ENGAGE WITH COTTON AUSTRALIA AND OTHER KEY STAKEHOLDERS TO RE-DESIGN THE RD&E CONSULTATIVE PROCESS TO ENSURE IT IS FIT FOR PURPOSE AS CRDC IMPLEMENTS THE NEW STRATEGIC PLAN.

As described in section 6.1, CRDC staff have developed a comprehensive framework for engaging with industry stakeholders. One of the organisation's key strengths is that most of the R&D staff at CRDC are based in regional areas, have a strong affinity for cotton production and grower requirements, are aware of seasonal challenges, and some have direct formal knowledge of cotton R&D project initiation due to previous experience as researchers.

6.3 PROGRAM MANAGEMENT AND REPORTING

As noted in section 4.6, the R&D Investment team comprises a GM and six R&D managers, two of whom are full-time, two are part-time and two are contracted. Collectively the team possesses a very good mix of R&D skills, strong extension and adoption awareness and private sector experience. The ED is also very competent in all aspects of RD&E through his role as the previous GM for R&D. A significant and positive change is that the project administrators are embedded within the R&D Investment team, resulting in strong contact and better project management than previously, when they were part of Business and Finance. The allocation of portfolios among R&D managers aligns with the individuals' skills, backgrounds, and interests, and appears to work effectively. We note that the GM himself directly manages several projects in addition to his team leadership role.

Our interviews confirmed that the team is well connected to and has a solid understanding of the Australian cotton industry. They are highly motivated to achieve industry impact and are very conscious of the importance of extension and adoption. They have strong and collaborative working relationship with the CottonInfo REOs and management. Just as importantly, they have been highly engaged in the development of the new strategic plan and have a strong sense of ownership and empowerment.

The R&D Investment team is small, considering the large number of projects it administers (213 in 2021/22) and the short duration of many projects, meaning high turnover with consequent high transaction costs. Furthermore, CRDC engaged with 97 R&D providers in 2021/22. As discussed in section 4.6, there are challenges with workload balance, staff leave and generally with communications with R&D providers. Moving towards the program structure of the new strategic plan may help in reducing some of the current workload but, on the other hand, the new strategic plan may also place significant additional burden on staff – at least in the short term.

RECOMMENDATION 4: CRDC SHOULD CRITICALLY REVIEW ITS CURRENT CAPACITY AND CAPABILITY IN R&D MANAGEMENT AND DEVELOP A STAFFING PLAN TO ALLOW IT TO DELIVER ON THE AMBITIONS OF THE NEW STRATEGIC PLAN.

An issue raised by several interviewees for this review was the balance between governance and procedure, and R&D progress. Internally, CRDC is extremely proud of its dedication and adherence to sound public governance. It is frequently used as an example of excellent RDC governance. However, several interviewees – growers as well as R&D providers – said that sometimes this emphasis on compliance is perceived as bureaucratic and onerous, with some of the more minor management difficulties being given as an example of how they prevent time for greater R&D linkages or interaction with growers. An appropriate balance needs to be struck between providing good governance – which is essential – and over-management.

Recently CRDC has transitioned to a new project management system called Fluxx which appears to be a major step forward in project management and R&D engagement. Both CRDC staff and external R&D providers report being very pleased with the new system. Milestones, including ‘stop/go’ and ‘pivot’ milestones, are used to minimise project risks.

6.4 PORTFOLIO DIMENSIONS AND BALANCE

It is apparent that CRDC has taken a very different approach to portfolio balance since the last review. There has been a strong focus on shifting the investment balance towards future, whole-of-industry challenges and opportunities. There has been direct investment in resources to explore novel opportunities outside the normal remit of R&D providers and to actively seek investments that logically link to commercial outcomes and benefits. The fact that CRDC has had to manage the extremes of drought and then transition quickly to a state of high production and water availability demonstrates that it has an effective process for agile management of its R&D portfolio.

The current strategic plan (2018-2023) states that CRDC will allocate \$125 million over five years across the three goals and two enabling strategies. The allocations across those goals and strategies within the strategic plan and the actual allocations across the five years are shown in Table 9.

Table 9: Allocation of RD&E investment by goal and enabling strategy

GOAL/STRATEGY/ ALLOCATION OF RD&E INVESTMENTS	GOAL 1: INCREASE PRODUCTIVITY AND PROFITABILITY ON COTTON FARMS	GOAL 2: IMPROVE COTTON FARMING SUSTAINABILITY AND VALUE CHAIN COMPETITIVENESS	GOAL 3: BUILD ADAPTIVE CAPACITY OF THE COTTON INDUSTRY	ENABLING STRATEGY 1: STRENGTHENING PARTNERSHIPS AND ADOPTION	ENABLING STRATEGY 2: DRIVING RD&E IMPACT
Strategic plan	69%	13%	10%	6%	2%
2018/19	68%	15%	6%	9%	2%
2019/20	75%	10%	5%	8%	2%
2020/21	80%	8%	5%	5%	2%

GOAL/STRATEGY/ ALLOCATION OF RD&E INVESTMENTS	GOAL 1: INCREASE PRODUCTIVITY AND PROFITABILITY ON COTTON FARMS	GOAL 2: IMPROVE COTTON FARMING SUSTAINABILITY AND VALUE CHAIN COMPETITIVENESS	GOAL 3: BUILD ADAPTIVE CAPACITY OF THE COTTON INDUSTRY	ENABLING STRATEGY 1: STRENGTHENING PARTNERSHIPS AND ADOPTION	ENABLING STRATEGY 2: DRIVING RD&E IMPACT
2021/22	73%	9%	5%	10%	3%
2022/23 ¹	49%	10%	9%	20%	3%

¹ Figures do not add up to 100% as R&D management (7%) and contingency (2%) are additional
Source: Strategic plan, various annual reports and AOPs

In general, allocations across the years have matched the intent of the strategic plan, although the allocation to goal 3 has been lower than forecast. The notable exception is the current financial year (2022/23), where the intended allocation to goal 1 is significantly reduced and the allocation to enabling strategy 1 is considerably higher. This reflects a shift in focus towards partnerships and adoption and away from on-farm productivity.

In respect to portfolio balance, CRDC states in the strategic plan that it actively considers the distribution of projects across a number of parameters, namely:

- ⊕ RD&E strategies;
- ⊕ The type of research, including basic, applied, blue-sky, development and delivery;
- ⊕ In-project risks;
- ⊕ Researcher experience and capacity;
- ⊕ Research providers;
- ⊕ Timeframe to outcomes; and
- ⊕ The likely return on investment for projects and programs.

In its annual reports, CRDC provides clear reporting against the Australian Government’s Science and Research Priorities and Rural RD&E Priorities. In both cases there has been a good balance of investment. In the 2021/22 annual report CRDC also reported the portfolio balance across economic, environment and social (triple bottom line) domains with allocations of 84 per cent, 11 per cent and 5 per cent respectively, demonstrating a clear focus on grower profitability.

We note that CRDC has changed the definitions of research types, with ‘blue sky’ being replaced with ‘innovation’. It would be appropriate for CRDC to define these new terms in in future AOPs.

A key document produced by CRDC is the annual R&D investment list. The latest list, for 2022-23, details all CRDC investments for the year including the key focus area and goal, the project title and description, a project code, the lead researcher and when the project commenced and will be completed. This annual listing provides a very transparent summary of all CRDC investments. Consultants to CRDC indicated that the list is important as it provides direct information on the primary research contact and when a final report is likely to be available.

A final note about portfolio balance is that growers respond to and recognise investments in on-farm RD&E more readily and are often keen to engage in trials of technology, management practices etc. The value of this in-kind investment is often overlooked when quantifying the investments made in RD&E. In CRDC's case, growers contribute significant resource and effort to the on-farm RD&E investment and that in-kind should be recognised where appropriate.

6.5 RD&E COLLABORATION

One of CRDC's key strengths has been its focus on achieving significant RD&E collaboration and, through that collaboration, substantial co-investment and leverage of its investment dollar. Clearly, CRDC has achieved the SFA performance principle which requires CRDC '*...to undertake strategic and sustained cross-industry and cross sectoral collaboration that addresses shared challenges and draws on experience from other sectors*'.

CRDC's Strategic RD&E Plan 2018-2023 has a stated target that 40 per cent of its investments will include cross-sectoral partnerships and notes that 40 per cent of CRDC investments were in cross-sectoral RD&E at the commencement of the plan. Currently that figure stands at 42 per cent, which is very high and reflects the commitment of the staff and board to collaboration. CRDC's view is that 100 per cent of CRDC investment is made in partnership with the cotton industry. This is exemplified by the statement from the Chair in the 2021/22 annual report that '*...there isn't a single research project we invest in that isn't delivered in partnership with our growers, collaborators and cotton researchers*'.

CRDC is well known for being a key partner in cross-sectoral initiatives. These include several projects funded under the Australian Government's Rural R&D for Profit program:

- ⊕ Smarter Irrigation for Profit Phase 2 (in which CRDC is the lead);
- ⊕ More Profit from Nitrogen (lead);
- ⊕ Area Wide Management for Cropping Systems Weeds (partner);
- ⊕ Biorefineries for Profit Phase 2 (partner);
- ⊕ Forewarned is Forearmed (partner); and
- ⊕ Boosting Diagnostic Capacity for Plant Production Industries (partner).

CRDC also leads the Cotton Landcare Tech Innovations 2021, under the National Landcare Program Smart Farming Partnership.

CRDC has been an active partner and contributor to several cross-sectoral initiatives managed by AgriFutures Australia, including:

- ⊕ The Emerging National Rural Issues program;
- ⊕ The Community Trust in Australia's Rural Industries program; and
- ⊕ The grow^{AG} platform, on which CRDC has several commercial opportunities listed.

CRDC is a member of, and contributor to projects managed by, Agricultural Innovation Australia (AIA), including one to develop a common approach to sector-level greenhouse gas accounting for Australian agriculture. CRDC is also a project partner in the Northern Australia CRC to the value of \$1 million.

The largest cross-sectoral investment over the review period has been with GRDC. With a \$5.5 million investment, the weather and networked data (WAND) project developed a warning system that identifies the presence of hazardous temperature inversions based on real-time weather data and complex mathematical modelling. This technology will assist to reduce the risk of spray drift by lessening the chance of spraying into potentially dangerous drift conditions, resulting in reduced crop damage, improved labour and equipment productivity, and increased chemical efficacy. The technology has been commercialised through the private Australian agtech company Goanna Ag and will be in use during the growing season of 2022/2023.

During stakeholder interviews, this project was frequently raised as an excellent example of CRDC and GRDC working together, something that many growers anticipate, value, and commend due to the close production synergies between cotton and grain crops and the fact that most cotton growers also produce cereal crops.

An important change since the last review is that the growers and consultants interviewed have a very clear and appreciative understanding of the position that CRDC takes with regards to collaboration. They believe that, as CRDC is a relatively small RDC with a limited and potentially variable levy revenue (seasonally driven), collaboration is key to achieving outcomes from the next strategic plan.

6.6 MANAGEMENT OF INTELLECTUAL PROPERTY AND COMMERCIALISATION

CRDC maintains an Intellectual Property (IP) Policy Handbook (see section 4.4). The IP Policy itself is a simple statement that *'CRDC is committed to managing IP to further the dissemination and adoption of the results of its investment in research and development for the benefit of the Australian cotton industry and community while effectively managing risks'*. More significant is the overarching philosophy of CRDC's IP management, as articulated in the IP Management Plan: *'CRDC's primary aim in investing in research is to provide a benefit to the Australian cotton industry. The maximisation of commercial returns is a secondary aim, which the parties to research projects agree will not be pursued to the detriment of the primary aim'*.

The major element of the policy handbook is a series of 'Accountable Authority Instructions' describing internal controls used by CRDC to meet its obligations under the PIRD Act and PGPA Act. The first of these is an IP Management Framework, which includes the IP Policy, IP&C Strategy, IP Management Plan, IP Register (of significant or commercially valuable IP), Delegations listed in the Delegation of Authority Table, the IP terms and conditions of the CRDC Research Deed, and agreements for projects not covered by the CRDC Research Deed.

The IP Management Plan details the procedures and lines of accountability to be followed in IP management. The IP&C Committee (section 4.2) forms an important bridge between management and the board, reviewing commercialisation and IP exploitation plans, reviewing and monitoring CRDC's open innovation pipeline, and recommending potential partnerships or equity investments, among other things.

As noted in the previous performance review, a key focus area of enabling strategy 1 (Strengthening partnerships and adoption) of the 2018-23 strategic plan has been to increase commercialisation of R&D, improve adoption pathways and assist researchers to become more commercially focused. There were specific targets for three process measures:

- ⊕ Number of projects with commercialisation potential;

- # Researcher satisfaction with CRDC commercialisation support; and
- # Percentage improvement in duration from conception to market entry.

According to the Performance Report 2021-22, CRDC is on track to achieve these targets by the conclusion of the plan.

In the new strategic plan (2023-2028), the third theme of the 'People' pillar is 'Adoption and impact'. There are no commercialisation process measures as there were in the predecessor plan, Commercialisation is more implicitly embedded in the new plan, through the emphasis on a systems and co-design approach to RD&E, with CRDC as a facilitator of partnerships between growers, researchers, and the commercial sphere.

6.7 EXTENSION AND ADOPTION

One of the highlights of the interviews conducted for this review was that, universally, stakeholders and growers believe that adoption of CRDC-funded R&D outcomes and investment in innovative technology and practices has led the cotton industry to where it is today. There is a strong appetite for adoption. The small size of the industry (in grower numbers), relatively progressive culture, capability to invest at scale and with capital, and high gross margins per hectare from cotton relative to other crops, all contribute to an environment that is very conducive to R&D adoption and hence acceptance of extension materials and information.

CottonInfo is the primary vehicle for cotton industry extension and adoption. CottonInfo was formed in 2012 and is an unincorporated joint venture between three parties: CRDC, Cotton Seed Distributors (CSD) and CA. The partners renewed the memorandum of understanding governing the program in 2021, ensuring the partnership until at least 2025. CottonInfo was designed to convey information directly to growers and consultants within the major cotton-growing regions. It is fully industry funded and has filled a gap that emerged in extension after CRCs and state agencies ceased doing such activities. CottonInfo has an extensive team comprising 20 people with the following structure:

- # A program manager and communications manager who report directly to CRDC and are funded by CRDC;
- # Seven REOs, who are based within the cotton growing regions and collectively service 14 regions. These REOs are funded by CSD and are responsible for a range of activities within regions including field days, forums, and technical assistance with projects;
- # Ten technical specialists, funded through direct CRDC projects, who provide high-level advice and direction in the key areas of cotton production including biosecurity, climate, crop nutrition, disease management, energy use efficiency, fibre quality, integrated pest management, natural resource management, pesticide application efficiency, soil health, stewardship, water management and weed control; and
- # A myBMP (Best Management Practices) team manager who manages a 'voluntary farm and environmental management system' which provides self-assessment mechanisms, practical tools, and auditing processes to ensure that Australian cotton is produced according to best practice. myBMP is overseen by CA.

Whilst the program manager has a general oversight role, for staffing matters each member of the CottonInfo team reports directly to their funding body (e.g., in the case of the REOs, CSD), not to the CottonInfo program manager. To assist cohesion between the partners, there is a management committee for CottonInfo, and the

position of chair of the CottonInfo management committee is rotated across the three organisations. CottonInfo has a dedicated strategic plan and AOPs that link to partner activities and priorities. As noted in the previous review, there is a strong relationship between R&D providers and the CottonInfo REOs, with many of the REOs having direct roles in applied R&D projects.

CottonInfo is a source of numerous extension materials including an e-newsletter, regional newsletters produced by each of the REOs, case studies, fact sheets, and several in-depth manuals including the Australian Cotton Production Manual and the Cotton Pest Management Guide.

CottonInfo is generally held in high regard by industry. Growers interviewed for the review believe that information provided is good for general R&D awareness and that services within the regions are valuable – although regional services vary with the expertise of the individual REO. The CRDC grower survey of 2022 showed that most growers (84 per cent) had had some level of engagement (receiving information or contact) with CottonInfo. Furthermore, 94 per cent of respondents believed that CottonInfo was a trusted information source. CottonInfo scored well for providing information on insects, weeds, diseases, resistance and biosecurity, nutrition and soils, and water and moisture management, which are all related to core KPIs of CRDC.

Our interviews and the feedback comments in the grower survey highlighted the fact that REOs and their relationships within the regions drive CottonInfo impact. Cotton Grower Association (CGA) chairs or presidents who were interviewed believed that CottonInfo was a very worthwhile collaboration for CRDC. Interviewees also noted that the emerging northern regions will require greater support in the forthcoming years and that potentially some of CottonInfo's resources will have to be allocated to these regions to ensure long term growth in the industry.

There seems to be an emerging sentiment questioning whether CottonInfo is fit for purpose for the next phase of challenges faced by the industry. Some R&D providers and consultants believe that more technical training is needed particularly in the areas of regeneration, environmental management, and biosecurity. CottonInfo management appears to be well aware of this need for reinvigoration and has actively made changes such as the recruitment of a technical lead for digital agriculture and the appointment of a dedicated communications lead to service future industry needs, taking communications support from 0.5 to 1 FTE.

In addition to CottonInfo, CRDC provides a range of extension materials and resources that cover a spectrum of media types. 'Spotlight on Cotton R&D' is a quarterly high-quality magazine that is available in print and online format and is a direct publication of CRDC. 'Spotlight' is a widely known and referenced resource and is an important extension vehicle for the cotton industry. It is highly respected by growers and stakeholders for the information and insights it contains and provides a very comprehensive suite of articles on R&D projects and trials, case studies, technology changes and people and their practices. Several interviewees clearly identified 'Spotlight' as being one of the continuing success items for CRDC.

Another important extension resource is the 'Inside Cotton Library' hosted on the CRDC website. A customisable search function allows users to systematically find information in this online repository of all CRDC corporate publications, CottonInfo publications and final R&D project reports and associated materials. Although growers indicated that they have access to R&D reports and information through this facility, they do rely on information being translated through either 'Spotlight' or CottonInfo. Consultants were more likely to value their access to final reports.

CRDC promotes news, events and articles on its website relatively frequently. These items complement other forms of communications to both growers and other industry stakeholders and provide quick and easily digestible information on key topics. Our interviews indicated that in general growers and industry stakeholders strongly appreciate and value communication and extension activities that CRDC undertakes.

6.8 MONITORING AND EVALUATION

In October 2018, CRDC published its monitoring and evaluation (M&E) framework as required under clause 10.3 of the Funding Agreement 2015-2019. The plan provides a good summary of definitions and what M&E will be undertaken, although it is quite high-level. It stands in some contrast to the previous M&E framework (2013-18), which was the most detailed such document we have come across from any RDC. The current framework is more succinct and has an easier-to-read layout, both of which are commendable improvements. However, it would benefit from some additional detail. For example, there is little information on how, when or by whom intermediate and long-term outcomes such as improvements in yield, quality and input efficiencies will be measured, and how the board will be kept apprised of progress towards them.

While there is no explicit requirement to produce an M&E framework in the current SFA, M&E is the subject of one of its performance principles, i.e., '*To demonstrate positive outcomes and delivery of RD&E benefits to levy payers and the community in general*', and this principle is elaborated in Guidelines for Statutory Funding Agreements produced by DAFF, which includes as KPIs:

- ⊕ *Impact (cost-benefit) assessment of a broad cross-section of RD&E [and marketing] investments undertaken annually;*
- ⊕ *Demonstrated consideration of and response to outcomes of monitoring and evaluation processes; and*
- ⊕ *Transparent communication to stakeholders (including government) on the impacts and benefits of the RD&E [and marketing] activities.*

Whilst the SFA says little in relation to M&E, a robust M&E framework is a critical element of RDC governance and warrants particular attention. The development of the new strategic plan offers the opportunity for CRDC to review and strengthen its M&E framework.

RECOMMENDATION 6: CRDC SHOULD INCLUDE GREATER DETAIL IN THE MONITORING AND EVALUATION FRAMEWORK TO ACCOMPANY THE NEW STRATEGIC PLAN, FOR EXAMPLE TO CLARIFY HOW IT WILL TRACK PROGRESS TOWARDS OUTCOMES.

7. STAKEHOLDER ENGAGEMENT

7.1 OVERVIEW

In June 2022, CRDC released its stakeholder consultation plan. The plan indicates that CRDC has a very structured, yet open approach to seeking information on RD&E priorities. It lists contact details for direct submissions, contacts through the REOs or directly to R&D managers through a dedicated email address. There is a table that summarises the timeline and sequence of RD&E prioritisation and feedback including the RD&E ideation and procurement process (see section 6.1).

CRDC has a rigorous and consistent approach to surveying growers and stakeholders. There are two important surveys, the annual grower survey and the triennial stakeholder survey which are conducted by a consultant with considerable experience in survey design and analysis in relation to RDCs. These two surveys provide CRDC and the broader industry with clear information on a range of important cotton industry initiatives and practices. Notably the key focus of the surveys has changed to allow CRDC to obtain crucial data on current and emerging issues and challenges. However, the surveys also include repeated questions that provide important longitudinal analysis on the performance of CRDC and CottonInfo, allowing the board and management to benchmark progress. The survey results are made public and as such provide a very transparent assessment of CRDC.

Growers and other stakeholders indicate that they appreciate the information contained within the surveys and believe that they offer an important 'external' mechanism to provide feedback on CRDC if required.

The October 2022 CRDC stakeholder survey provided performance assessment from various stakeholders (n=60), with solid improvements noted across a range of areas compared to the 2019 survey. Overall satisfaction of CRDC was a highlight at 8.2/10, with engagement scoring 8.0/10 and trust 8.6/10 (a very impressive 9.3/10 among the grower segment). Further discussion of the results of the 2022 stakeholder survey is provided in section 8.8.

7.2 ENGAGEMENT WITH INDUSTRY

7.2.1 COTTON AUSTRALIA

CA is the peak body for Australian cotton growers. It is declared as a representative organisation in relation to CRDC under section 7 of the PIRD Act. CA represents up to 1500 cotton farms across Australia. Its primary role is to develop policy and advocate for the cotton industry to Commonwealth and state governments. CA also provides grower services, biosecurity, industry best practice management (myBMP) and promotion and communication between the cotton industry and broader Australian community.¹¹

¹¹ <https://cottonaustralia.com.au/about/>

In contrast to its predecessor, the current SFA does not make any reference to the industry representative body. The specific obligation of the Funding Agreement 2015-19 for CRDC to meet with its declared representative organisation have been replaced by performance principle 9.2(a) which states that CRDC must *'...engage stakeholders to identify RD&E priorities and activities that provide benefits to the industry'*. However, CA remains the declared industry representative organisation and CRDC has obligations towards it under the PIRD Act.

Regardless of the wording of the SFA, as CA is the industry body that represents the interests of the cotton industry as well as being a core partner in CottonInfo and myBMP, it is logical that CRDC maintains a strong and collaborative relationship with CA. CRDC continues to use the CA panels to identify and prioritise RD&E opportunities and to review submitted FRPs. There appears to be very clear lines of separation between the activities of the two organisations.

As both organisations co-invest in a myBMP, CottonInfo and leadership development, there is inevitably some tension in the direction that those activities take. Some interviewees believed that CA expects CRDC to do more promotion of myBMP as part of industry stewardship and there are elements within CA that believe that they should have more 'say' in CRDC's investments. The time made available by CA for CRDC consultation with the CGAs is limited, hence our recommendation about revisiting the panel process (see section 6.2). Despite these relatively minor differences, the close collaboration between the two organisations results in effective delivery of key extension and adoption programs as well as meeting the obligations of the performance principles. There is some confusion about which body is the source of a particular service or publication, although this does not appear to present any real issues.

7.2.2 COTTON GROWER ASSOCIATIONS

CA's grower membership base is distributed across 15 CGAs. The CGAs are primarily located around the major water catchment regions in which cotton is grown in eastern Australia from northern Queensland through to southern New South Wales. The CGAs are administered directly by CA and delegates from each CGA are elected to the CA R&D advisory panels which provide RD&E advice to CRDC.

There are strong relationships between the CGAs and CRDC. Our interviews indicated that the ED and GM R&D Investment of CRDC continue to have very strong engagement with most of the CGAs and have used the CGAs as part of the development and review process of the new strategic plan. CGA chairs and presidents who were interviewed spoke highly of the CRDC engagement and specifically mentioned the collaboration with GRDC as a new and welcomed highlight. The chairs acknowledged that engagement on RD&E priority setting requires CRDC to have strong and effective working relationship within the regions which takes time and resources, with most suggesting that more time is required to cement those relationships, particularly those in emerging and northern regions. Having the direct presence of certain R&D managers within the regions was also seen as a strong feature of CRDC.

7.2.3 LARGE CORPORATE GROWERS

A small number of large corporate cotton-growing companies were interviewed as part of this review. In contrast to the last review, these interviews showed that CRDC was perceived to be providing value to these large businesses particularly in areas such as environmental management and technologies like 'WAND' (described in section 6.5). These businesses were also very complimentary of the direction that CRDC is taking

with the new strategic plan. However, as expected, large corporates interviewed tended to suggest that CRDC is not investing sufficiently in agtech and blue-sky R&D where significant transformational outcomes might be achieved. They did welcome the increased collaboration with GRDC.

The large cotton corporates interviewed receive most of their farm agronomic information and therefore decision-making advice either from private consultants or from in-house expertise. Whilst not explicitly stated, it appears that the large corporates have direct and effective relationships with the ED, GM R&D Investment and R&D managers, ensuring their needs are understood and considered.

7.2.4 COTTON SEED DISTRIBUTORS

CSD is an industry-owned organisation that is the sole provider of cotton seed in Australia. CSD established a strategic partnership with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and CRDC in 1987 to develop cotton varieties for the Australian industry, with CSD having the exclusive rights to those varieties. In 2007, a formal commercial partnership between CSIRO and CSD, known as Cotton Breeding Australia, was established to develop varieties with CSD co-owning IP with CSIRO and having exclusive rights to commercialising those varieties both nationally and internationally. In 2018, the partnership with CSIRO was extended to 2029.

Because CSD manages variety development, a very important component of the RD&E portfolio for any plant-based industry, CRDC does not fund any research in this area. It does however work closely with CSD on related matters such as crop protection and management of pest resistance.

In addition to seed sales, CSD plays an important role in extension through a network of 'extension & development' (E&D) agronomists who assist in a range of activities relating to varietal selection and seedling development. A grower must sign an agreement with CSD each season in order to purchase seed and access CSD services. CSD partners with CRDC and CA in the extension vehicle CottonInfo (see section 6.7).

Given its important role in the cotton industry and its revenue from grower agreements and royalties, CSD is becoming increasingly important in information transfer through its regional network of extension & development agronomists, who assist in a range of activities relating to varietal selection, seedling development and early-stage agronomic practices. The appointment by CSD of a key position within the Northern Australia CRC is an example of this increased presence in extension. The relationship between CSD and CRDC continues to be extremely strong with an excellent relationship between the boards, the chief executives and R&D management. CSD was very complimentary of CRDC and their RD&E collaborations. This is important, as CSD is one of the key partners in CottonInfo. It is also essential as varietal improvement and release is a core CSD function and requires close collaboration with CRDC on R&D priorities associated with crop protection and the management of diseases and pests of cotton.

7.3 ENGAGEMENT WITH CROP CONSULTANTS AUSTRALIA AND PRIVATE CONSULTANTS

Crop Consultants Australia (CCA) is a non-profit association of agronomists and consultants from the public and private sectors. As they provide services to cotton growers, CCA members act as a valuable bridge between growers and CRDC. In addition to providing services for a variety of operations, such as the collection of eggs for pest resistance testing and participation in the creation of technical resources, CCA is a significant

collaborative partner with CRDC. The CCA newsletter often contains extracts of information from CRDC on R&D outcomes which provides CRDC with an indirect mechanism of engagement with cotton consultants.

CCA polls its members to compile a yearly qualitative assessment on the cotton season. Each year, CRDC provides funding for this survey to help with the RD&E evaluation by providing current and longitudinal knowledge of on-farm practises and attitudes.

The survey of 2021/22 involved 58 CCA members representing 413 growers or approximately 52 per cent of Australian cotton production. Some key results were:

- ✚ 85 per cent of respondents indicated that CRDC investment in cotton R&D is good or excellent, with 90 per cent being supportive or very supportive of research and investment activities;
- ✚ 83 per cent of respondents indicated that CRDC provides useful, credible information;
- ✚ 79 per cent of respondents indicated that CRDC is driving continuous improvement in the industry; and
- ✚ 57 per cent of respondents indicated that CRDC listens to industry about R&D needs and priorities, with a further 34 per cent rating CRDC's performance in this respect as okay.

The survey also provided key information on the value of CottonInfo to consultants with the following observations:

- ✚ 95 per cent of respondents received CottonInfo information or team contact; and
- ✚ 53 per cent of respondents sourced CottonInfo resources frequently and 46 per cent occasionally.

Suggestions for improvement in the qualitative commentary included greater collaboration, more in-field trials, a focus on the real-time issues and targeted updates for consultants.

Our interviews confirmed that consultants value CRDC and the information it provides. A few are members of CGAs and the advisory panels. Importantly there was strong support for the new strategic plan, but with a comment that localised, on-ground R&D is still very important to most grower clients. It is also critical that CottonInfo REOs have good relationships with the consultants in the regions.

7.4 ENGAGEMENT WITH RD&E PROVIDERS

For this review we conducted a number of interviews with a range of R&D providers from CSIRO, state agencies in QLD, NSW and WA, several university representatives and a few private companies. In almost all cases CRDC was identified as being the best or one of the best RDCs to partner with. Key features of partnerships included approachability, flexibility, good planning, very good communications and strong personal relationships. Communications and planning during the drought were cited as a major strength of CRDC management. There was strong belief that the new strategic plan offered the opportunity to expand on and improve an already strong portfolio of R&D, particularly longer-term investments.

As noted in section 6.3, the main issue identified by R&D providers was simply the small number of employees on the R&D team and their workload, which may inhibit partnerships in some crucial areas. Almost all R&D providers think that CRDC requires more personnel with R&D skills to handle the demands of the new strategic plan (hence our recommendation in section 6.3). Another minor difficulty is the funding and succession planning of CottonInfo's technological development, with a reliance on a small number of important R&D

personnel being mentioned as a potential growing problem, especially as those personnel are transferred into management or other jobs.

There was one exception to the strong support noted above. The relationship between CRDC and one major RD&E provider appears to have declined sharply over the last four years, with investments being reduced from approximately \$4 million per annum to less than \$1 million per annum. Both parties agreed that the relationship needs improving particularly given the important role played by this provider in cotton R&D. The major challenge appears to be changes in funding models and expectations of co-investment and leverage, with federal and state agencies tending to place more emphasis on cost recovery of industry-good R&D investments. A key response to this from CRDC has been the increased collaboration with GRDC which many R&D providers see as an opportunity to obtain greater value from R&D investments.

The Cotton Innovation Network (CIN), which was noted as a strong mechanism of engagement with core R&D providers in the previous performance review, appears to have declined in both impact and interest. Whilst R&D providers and CRDC continue to be members of CIN, it is evident that the CIN was not providing that objective and cohesive approach to R&D ideation, collaboration and coordination sought by the partners in its formation. However, there is still a strong sentiment among other members (including DAFF) that the CIN offers value, particularly in planning investment programs in the future, and that CRDC as the secretariat to the network should reinvigorate it with some new challenges around the implementation of the next strategy. The CIN could be an important vehicle for CRDC to establish multiparty R&D investments in the future.

RECOMMENDATION 7: CRDC SHOULD CONSIDER THE REVITALISATION OF THE COTTON INNOVATION NETWORK, WITH A FOCUS ON BUILDING MULTIPARTY INVESTMENT PROGRAMS OF RD&E.

The 2022 stakeholder survey provides further independent assessment of the relationship between CRDC and R&D providers (n=31). In the survey, CRDC received ratings of 8.3/10 for being fair in dealing with organisations and 8.2/10 for being flexible to changing government, social, economic and environmental conditions. These support earlier observations that CRDC is a strong R&D partner.

The 2022 stakeholder survey also included a section on the commercialisation experiences with CRDC. Scores for satisfaction varied from 6.0 for results accomplished to 6.3 for CRDC-managed commercialisation processes and activities. Mixed viewpoints on the commercialisation procedures with CRDC were expressed in our own interviews. There was a view that CRDC might be more focussed on IP than the actual delivery of outcomes and impacts. This view was primarily levelled against the external consultants who are potentially not as connected to industry as internal CRDC personnel.

Given that external consultants are frequently time-constrained and may have less 'industry awareness', leading to occasionally lengthy timelines, some respondents indicated that having commercialisation managed by external consultants may not be achieving the results required. We understand that CRDC is currently looking into ways to streamline the process and is open to new approaches. An example is direct investment in emerging ag-tech businesses.

7.5 ENGAGEMENT WITH GOVERNMENT

Officers of DAFF were very complimentary of the relationship between government and CRDC. The Department meets annually with the Chair, ED and two of the GMs, and these discussions are reported to provide the Department with an open and honest account of CRDC's progress towards its strategic objectives. DAFF staff believed CRDC staff kept them well advised of any issues on an ongoing basis and also valued the networking opportunities provided by DAFF's participation in the CIN.

7.6 ENGAGEMENT WITH OTHER RDCS

Within the RDC network, CRDC has a solid reputation as a proactive and productive partner. As noted in section 6.5, it actively engages in several cross-sectoral activities, heads a number of them, and is a member of the Council of Rural R&D Corporations (CRRDC). The CRDC invests in various initiatives through AIA and contributes R&D and commercial endeavours to grow^{AG}. In our experience dealing with other RDCs, the CRDC executive are held in the highest regard as they are often cited in cross-sectoral planning and activities.

8. DELIVERY OF BENEFITS

8.1 INTRODUCTION

To demonstrate the benefits to stakeholders from its investment of levy funds, CRDC commissions independent economic impact assessments of its RD&E programs, along with technical and economic case studies. The impact assessments consider the economic, social, and environmental outcomes of CRDC's activities and projects and report these to levy payers, government, co-investors, and other industry stakeholders. The impact assessments also provide important input to inform improvements in CRDC's ongoing investment program.

As explained in more detail in section 6.8, CRDC maintains an M&E framework to support the Strategic RD&E Plan 2018–2023. Under the M&E framework and in addition to its impact assessments, CRDC, in partnership with CottonInfo, provides examples of the impact of R&D outcomes through technical and economic case studies. These case studies include gross margin analysis of research projects on the use of nitrogen and of water.

8.2 EX-ANTE EVALUATION OF PROSPECTIVE INVESTMENTS

As discussed in section 6.1, CRDC does not use *ex-ante* BCA as part of its project evaluation process. This was also noted in the previous performance review. CRDC management considers that such BCAs are too subjective in the absence of firm data used in assumptions. Other RDCs, such as APL, do use *ex-ante* BCAs with some, albeit mixed, success.

Ex-ante BCAs provide significant advantages. We acknowledge that the data required is often uncertain and that the analysis process imposes a cost. In our opinion, though, a system of *ex-ante* BCAs to support investment decision-making would be a positive addition to CRDC's current processes. A recommendation to this effect is made in section 6.1.

8.3 EX-POST IMPACT ASSESSMENTS OF RD&E

As part of its M&E framework, CRDC had impact assessments prepared by independent consultants AgEcon to report against the Strategic RD&E Plan 2018–2023. The assessments provide input to CRDC's annual reporting to the Australian Government, reporting to stakeholders, and CRDC's contribution to the performance assessment of RDCs compiled by the CRRDC.

In 2022 and 2023, AgEcon conducted the impact assessments on CRDC-funded projects completed (i.e., where a final deliverable had been submitted and subsequently accepted by CRDC) between 1 July 2018 and 30 June 2022. AgEcon delivered the impact assessment reports between September 2022 and March 2023. It is noted that these impact assessments were conducted towards the end of the planning period under the 2018-2023 strategic plan, rather than each year as envisaged in the M&E framework. CRDC advises that it decided to move to one all-encompassing set of impact assessments due to delays to laboratory and field experiments caused by both extensive drought in the 2018 – 2020 period and the Covid pandemic in 2020 and 2021.

The impact assessments were prepared on a total of 24 projects funded by CRDC.

One set of impact assessments were conducted on 13 randomly-selected projects with a total investment value of \$5 million (the 'random sample' set). CRDC provided AgEcon with an initial population set of 341 individual project investments with a total value of \$49.0 million. Four criteria were applied to cull the number of eligible projects to 60 projects. The four selection criteria were that projects:

1. Were completed between 1 July 2018 and 30 June 2022;
2. Included CRDC levy funds;
3. Contributed to core RD&E that supports for Cotton Strategic RD&E Plan; and
4. Had a total CRDC-managed investment value of more than \$80,000.

The second set of impact assessments were conducted on an additional, targeted 11 individual projects with a total investment value of \$5.7 million (the 'targeted' set).

The combined investment value of the random selection and targeted sets was \$10.7 million, representing 38% of the total investment of \$27.8 million on the 60 projects which were eligible for selection, but only 22% of the total investment of \$49.0 million for the initial population of 341 individual projects. The initial criteria for selection of the projects for the random sample may have been a little restrictive.

A cluster approach was used to group the selected projects into clusters with similar objectives for assessment. There were seven clusters for the random sample set of assessments and three clusters for the targeted set of assessments. Table 10 provides a summary of the ten project clusters, as well as a brief description, the number of projects and the nominal CRDC investment up to 30 June 2022.

Table 10: Project clusters for impact assessment

PROJECT/CLUSTER NAME	DESCRIPTION	NUMBER OF PROJECTS	CRDC INVESTMENT ¹ \$ (NOMINAL)
RANDOM SET			
Smart sensing and automation	Demonstrate cost effective smart automation irrigation technology with commercial partners Padman Automation	2	\$428,695
Canopy temperature sensing	Commercialise plant-based sensing technology (through Goanna Ag) and refine recommendations to support improved irrigation	2	\$1,204,783
Integrated pest management	Understand the impacts of early season mirid damage and fruit retention on yield	2	\$1,693,820
Community resilience	Understand the challenges and response options for social resilience in the cotton sector and its communities	1	\$492,047

PROJECT/CLUSTER NAME	DESCRIPTION	NUMBER OF PROJECTS	CRDC INVESTMENT ¹ \$ (NOMINAL)
Bt resistance	Understand the threat of Bt resistance in <i>Helicoverpa armigera</i> and improved resistance monitoring tools	2	\$764,021
Integrated weed management	Support a diverse approach to weed control with reduced reliance on glyphosate to protect and prolong its usefulness	1	\$174,935
Sustainability	Formalise the cotton industry's sustainability framework and provided accurate and transparent sustainability metrics	3	\$482,680
TARGETED SET			
Spray hazard tower network	Deliver a commercially available spray drift hazard prediction system	4	\$845,385
Silverleaf whitefly decision support tool	Deliver a commercially available decision support tool and phone-based app to support silverleaf whitefly management	4	\$1,768,333
Nitrogen management	Understand new N products, N interactions in cotton systems, and the potential for sensors to support improved DSTs	3	\$1,698,731

¹ CRDC investment for the targeted cluster sets are up to 30 June 2022. For the spray hazard tower network cluster, funds are committed but unspent for five years after 30 June 2022.

8.4 MEASUREMENT METHODOLOGY

The methodology followed by AgEcon for the impact assessments conducted for CRDC is sound and robust, producing conservative estimates of the economic benefits of projects. AgEcon followed a clear, set routine in conducting the impact assessments in line with the CRRDC guidelines. The process for randomly selecting projects in the random sample set of assessments was thorough and in line with both CRRDC guidelines and the DAFF Guidelines for SFAs.

Most of the assessments are compared with a counter-factual – that is, what would have occurred if the project was not done. This acknowledges that the world does not stand still. In each case, the counter-factual is based on a subjective assessment of the likelihood that the outcomes of the project/cluster concerned would be achieved without CRDC investment. Two assessments (the sustainability cluster and the community resilience cluster) did not include counter-factuals given the nature of the projects.

Each of the assessments report on key economic investment measures: present value of benefits (PVB), present value of costs (PVC), net present value (NPV), benefit-cost ratio (BCR), internal rate of return (IRR) and modified internal rate of return (MIRR) for various time periods after the last year of investment (0, 5, 10, 15, 20, 25 and 30 years). Each assessment also reports on the sensitivity of the results to several key

assumptions. In addition, each cluster report includes a table of confidence ratings (high, medium, or low) of the coverage of benefits and of the assumptions.

One issue with the impact assessments is that the comments provided about the distribution of benefits amongst industry sectors are simply a broad statement noting that¹² (for example):

'The CRRDC Guidelines focus on first round impacts, which calculate shifts in the supply and demand curves with no price effect. When considering these second-round price effects, cost increases associated with glyphosate resistance would result in the potential for increased industry supply putting upward pressure on prices depending on the slope of the supply and demand curves. However, given the high level of Australian cotton exports, and the low level of Australian production in a global context, the price effect would be minimal.'

While this statement is accurate, a more considered assessment of the distribution of the benefits (such as between cotton growers and ginners), that takes into account the supply and demand elasticities, would be more valuable. Cotton growers, ginners, merchants, and shippers are likely to be interested in the approximate portion of the impacts that may accrue to each sector. An example of such commentary can be seen in the AgriFutures Australia report 'Impact assessment of investment in the AgriFutures Rice Program'¹³.

Furthermore, commentary on likely distribution of benefits between groupings of producer sizes and between production methods (irrigated and dryland) would also be helpful, although this would be more difficult than between sectors of the supply chain.

RECOMMENDATION 8: CRDC SHOULD ASK ITS IMPACT ASSESSMENT RESEARCHERS TO PROVIDE MORE DETAILED COMMENTARY ON THE LIKELY DISTRIBUTION OF BENEFITS FROM PROJECTS / CLUSTERS BETWEEN SECTORS OF THE AUSTRALIAN COTTON INDUSTRY, NOTABLY BETWEEN COTTON GROWERS, GINNERS, MERCHANTS, AND SHIPPERS.

We note that the previous independent performance review in 2018 made a similar recommendation.

¹² The report on the nitrogen management cluster notes 85% of the benefits accrue to growers as on-farm savings in N application and 15% of the total benefits were from a reduction in N₂O emissions generating broader socio-environmental benefits

¹³ AgriFutures Australia, Impact assessment of investment in the Agrifutures Rice Program, report prepared by Poimena Analysis, March 2021. <https://agrifutures.com.au/product/impact-assessment-of-investment-in-the-agrifutures-rice-program/>

8.5 DEMONSTRATED BENEFITS

AgEcon provided detailed reports on each of the ten clusters as well as a summary report on the random sample set of seven clusters and a final report summarising the aggregate results from all ten clusters. The aggregate investment results for the projects funded by CRDC in the random sample set of thirteen projects and the full set of 24 project assessments are shown in Table 11. Further detail by project cluster is shown in Table 12.

In aggregate, the impact assessments show strongly positive returns on CRDC's investment (Table 11). The aggregate BCR for the random sample set was 3.75:1 while the aggregate BCR for the full set of projects and clusters was 6.17:1. The aggregate BCR for the full set of projects and clusters is well above CRDC's target BCR of 5:1. However, the aggregate BCR for the random sample set is below the CRDC target of 5:1.

Table 11: Summary of ex post impact assessments of CRDC-funded projects

ECONOMIC MEASURE	CLUSTER SET	
	Random sample set (13 projects in 7 clusters)	Full set (24 projects in 10 clusters)
Present value of benefits (\$m)	\$50.48	\$205.32
Present value of costs (\$m)	\$13.47	\$33.29
Net present value (\$m)	\$37.01	\$172.03
Benefit-cost ratio	3.75	6.17
Internal rate of return (%)	24%	33%
Modified internal rate of return (%)	10%	12%

Notes: Measures over 30 years discounted at 5%, deflated to 2021/22 dollar terms based on total investment

Sources: AgEcon (March 2023), CRDC Economic Impact Assessments 2022 – Final Report and AgEcon (September 2022), Cotton Impact Assessments 2022 – Random sample summary report

As Table 12 shows, there are three clusters in the random sample set where the BCR is above the 5:1 target, ranging from 5.09:1 for the Bt resistance cluster to 7.40:1 for the canopy temperate sensing cluster. The latter generated a net present value (NPV) of \$20.02 million (third highest of all ten clusters), over half of the total NPV of \$37.01 million for the random sample set and 11.6% of the aggregate NPV for all clusters.

Two other clusters had BCRs below the 5:1 target: 2.29:1 for integrated pest management and 1.99:1 for smart sensing and automation.

For many of the random sample clusters there were environmental and social benefits which could not be quantified. This was particularly the case for the community resilience cluster and sustainability cluster where

the benefits could not be quantified, even though both had significant unquantifiable benefits which were listed in the reports, and so BCR and other investment metrics could not be estimated.

Of the three clusters in the targeted set, two of the clusters generated very high returns:

- # The spray hazard tower network cluster generates an estimated NPV of \$106.3 million with a BCR of 12.54:1. This cluster generated over 60% of the aggregate NPV for the 10 clusters assessed.
- # The silverleaf whitefly decision support tool cluster had an NPV of \$28.14 million (16.4% of the total) and a BCR of 6.61:1.

In addition to the positive BCR and NPV results in aggregate, the aggregate MIRR of between 10 per cent for the random sample set and 12% for the full set of 10 clusters indicates a strong rate of return on the investment overall. The MIRR by cluster ranged from 5 per cent to 15 per cent (leaving aside the two clusters for which MIRR could not be estimated). These are relatively robust results, even if the random sample set and some clusters did not achieve CRDC's BCR target of 5:1.

Many of the projects in which CRDC invests involve environmental and/or social benefits such as those which were listed but could not be quantified in the impact assessments by AgEcon. There are established methodologies in economics for the valuation of such non-market attributes, including willingness-to-pay techniques, which can establish values for some, if not all, environmental and social impacts. CRDC should consider a project which addresses this. A first step would be to undertake a meta-study of existing literature on non-market valuations associated with the environmental and social attributes of the cotton industry. An example of such a meta-study was prepared by Agtrans Research and NCEconomics for the Fisheries Research and Development Corporation (FRDC).¹⁴

The 2021 report from the Year 2 Focal Study by VoconiQ (part of the Community Trust in Rural Industries project funded by AgriFutures Australia)¹⁵ would provide some input into this literature review as it provides ratings of community perception of the cotton industry with respect to the environment (notably water use efficiency) and social contribution.

RECOMMENDATION 9: CRDC SHOULD CONSIDER A PROJECT TO CONDUCT A LITERATURE REVIEW OF NON-MARKET VALUATION STUDIES OF ENVIRONMENTAL AND SOCIAL ATTRIBUTES OF THE AUSTRALIAN COTTON INDUSTRY AS INPUT INTO FUTURE ASSESSMENTS OF THE ENVIRONMENTAL AND SOCIAL IMPACTS OF CRDC-FUNDED PROJECTS.

¹⁴ FRDC, 'Non-Market Impact Valuation for Fisheries RD&E – Phase 1: An Investigation and Gap Analysis of Non-Market Impact Valuation Studies for Australian Fisheries and Aquaculture RD&E'.

¹⁵ VoconiQ, "Report: Items with means from the Year 2 Cotton Focal Study", April 2021.

Table 12: Detail for ex-post evaluations of CRDC projects completed between 1 July 2018 and 30 June 2022 by cluster

ECONOMIC MEASURE	RANDOM SAMPLE SET						TARGETED SET			
	Smart sensing and automation	Canopy temperature sensing	Integrated pest management	Community resilience	Bt resistance	Integrated weed management	Sustainability	Spray hazard tower network	Silverleaf whitefly decision support tool	Nitrogen management
PVB (\$m)	\$2.60	\$23.15	\$10.75	NR	\$10.83	\$3.15	NR	\$115.51	\$33.15	\$6.18
PVC (\$m)	\$1.31	\$3.13	\$4.70	\$0.94	\$2.13	\$0.57	\$0.69	\$9.22	\$5.01	\$5.60
NPV (\$m)	\$1.29	\$20.02	\$6.05	-\$0.94	\$8.70	\$2.58	-\$0.69	\$106.30	\$28.14	\$1.10
BCR	1.99	7.40	2.29	NR	5.09	5.50	NR	12.54	6.61	1.10
IRR (%)	11%	100%	13%	NR	20%	15%	NR	57%	29%	6%
MIRR (%)	7%	14%	8%	NR	10%	7%	NR	15%	11%	5%

Notes: Measures over 30 years discounted at 5%, deflated to 2021/22 dollar terms based on the total investment
 NR=not reported

Source: AgEcon (March 2023), CRDC Economic Impact Assessments 2022 – Final Report

8.6 CASE STUDIES

As noted previously, in addition to the formal impact assessments prepared by AgEcon, CRDC also prepares and provides examples of the impact of R&D outcomes through case studies in conjunction with CottonInfo. These case studies include economic and farm management analysis of research projects on:

- # Improving the utilisation of nitrogen and reduce run-off of nitrogen into environmental water; and
- # Improving water use efficiency.

These case studies summarise the key findings from research and include the impacts on gross margins for cotton farms to demonstrate the broad farm level benefits from the research. While not providing formal, industry-wide impact assessments, these case studies aid in extension of research through highlighting the economic benefits. They also provide input into the formal impact assessments.

8.7 COMMUNICATING THE BENEFITS

Under the SFA's performance principles, CRDC is required '*...to demonstrate positive outcomes and delivery of RD&E benefits to levy payers and the community in general...*'. The results from the impact assessments demonstrate that CRDC's RD&E activities are delivering economic, social, and environmental value to the industry and to the wider community. This may not be evident to all in the industry, in part due to a lack of understanding about the benefit-cost methodology leading to scepticism about the results. This is always a challenge for RDCs, so a focus needs to be on clear communication of the methodology and the results.

The previous independent performance review in 2018 recommended that CRDC develop and publish a short annual performance evaluation report. CRDC has produced this annual performance report each year since 2018/19. These reports provide an update on CRDC's progress against each of its targets in the strategic plan. Included in this set of targets is a minimum BCR of 5:1. Another target is to undertake five RD&E impact reports by 2023, and this has been exceeded with the delivery of the impact assessment reports on the ten individual project clusters as well as the summary reports on the random sample set and the final, summary report.

Given that the impact assessments covering funded projects completed between July 2018 and June 2022 were only finalised and delivered between September 2022 and March 2023, CRDC has not yet had time to communicate the results to levy payers. CRDC advises that it is considering 1-2 page 'fact sheets' for each of the impact assessments prepared by AgEcon. These fact sheets would be checked by AgEcon to validate their accuracy. They would then be made available on the CRDC website and promoted in CRDC's quarterly magazine 'Spotlight'. The aggregate summary results from the impact assessments will be included in the annual performance report for 2022-23 as well as in the CRDC's Annual Report 2022-23.

We strongly support CRDC's proposed method of communicating the results from the impact assessments, in particular the short fact sheets. CRDC should ensure that these fact sheets are written in layman's terms using graphics to improve accessibility to levy payers. Where appropriate, CRDC could include practical case studies to explain the results.

While annual impact assessments have not been prepared, the review team notes that the case studies that CRDC has prepared in recent years provide a reasonable, interim method of communicating the benefits of CRDC's RD&E investments to levy payers.

8.8 LEVY-PAYER PERCEPTIONS OF VALUE

Evidence for levy-payer perceptions of the value delivered by CRDC is available in the stakeholder survey carried out for CRDC in 2022¹⁶. The survey included a number of questions about attitudes towards CRDC by growers, industry participants and researchers and the value that CRDC is delivering. Some of the key results for 2022 (compared with 2019) are summarised in Table 13.

Table 13: Ratings of CRDC performance in October 2022 survey

ATTRIBUTE	2019 ¹	2022 ¹
Overall satisfaction with partnership		
Grower	8.5	8.2
All	8.4	8.2
Knowledge made available to growers through the R&D		
Grower	8.6	8.7
All	8.5	8.7
Value of the industry and market information provided by CRDC		
Grower	8.7	8.7
All	8.5	8.2
The return growers get from the levies paid		
Grower	8.6	7.8
All	8.6	7.8
Input into identifying and shaping the R&D priorities		
Grower	8.7	7.6
All	7.7	7.3
CRDC delivers on its promises		
Grower	8.5	8.3
All	8.2	8.5
Value of written communication and materials received from CRDC		
Grower	n/a	8.2
All	n/a	8.1
Value of direct contact with CRDC		
Grower	n/a	8.9
All	n/a	8.6
How successful CRDC has been in reaching the Strategic Plan deliverables? ²		
Grower	n/a	85%
All	n/a	70%

Notes: 1 Average score of rating between 0 (extremely dissatisfied) and 10 (extremely satisfied)

2 % responding 'successful' or 'very successful'

n/a=not asked/not available

Source: Intuitive Solutions, 'CRDC Stakeholder Survey' October 2022

¹⁶ Intuitive Solutions 2022, CRDC Stakeholder Survey, October 2022

The responses provide a positive reflection on CRDC, albeit with some softer results than from the 2019 survey. The weaker results are on ‘the return growers get from the levies paid’, which have eased from an overall satisfaction rating of 8.6 to 7.8 and ‘input into identifying and shaping the R&D priorities’ which was at 7.3, down from 7.7 in 2019. Even so, from our experience, we believe that other RDCs would be very pleased with these results. The results from the questions related to communication with growers and to CRDC’s success in reaching the strategic plan deliverables are particularly strong.

Stakeholder perceptions, as evidenced by interviews conducted for this, were also very positive. As noted in section 5.3, feedback on the development of the current and the new strategic plans, and the procurement of RD&E generally, was very positive. Industry members were highly appreciative of the R&D outcomes delivered by CRDC and generally very proud of the RD&E capacity and engagement the industry enjoys. It was often cited as one of the key strengths of the industry and one that should be protected.

9. IMPLEMENTATION OF RECOMMENDATIONS OF THE 2018 PERFORMANCE REVIEW

Under section 12.1 of the Funding Agreement 2015-19, which was valid at the time of the completion of the previous performance review, CRDC was required to develop a response to the review report and a proposed implementation plan, including dates and milestones, for the review recommendations. This was required to be delivered within three months of the board's acceptance of the final report. CRDC was also required to provide the response to DAFF within 30 days of board acceptance, to report to the Commonwealth on implementation progress in its regular meetings, and to publish the report and CRDC's response to it on the CRDC website.

CRDC prepared a response and implementation plan, which was provided to DAFF and published on the website as required. Progress against the implementation plan was systematically reported to DAFF at the annual meetings (see section 7.5).

We note that the new SFA has different provisions for follow-up of the performance review. Instead of publishing a formal response and implementation plan, CRDC must meet with the Commonwealth to '*...discuss any areas of underperformance identified in the independent review and agree on an approach for CRDC to address any such areas of underperformance [and] CRDC must implement any agreed actions and comply with any reasonable directions issued by the Commonwealth in relation to addressing areas of underperformance*' (Section 9.6(d-e)). In our view, this is a better and more flexible way to manage the findings of any such reviews.

The recommendations of the 2018 performance review and CRDC's response to those recommendations are listed in Table 14. The table also includes commentary on the implementation of the recommendations during the current review period.

Table 14: Recommendations from 2018 performance review and CRDC response

RECOMMENDATION	PRIORITY	CRDC MILESTONE	COMMENT
1 CRDC should engage with CA to re-design the RD&E consultative process so that it delivers better advice to CRDC and provides greater satisfaction to industry participants. This may include additional or extended RD&E forums, an independent technical panel, provision of panels with succinct project assessments to assist decision-making and/or more training of panel members.	Important	<i>Redesigned and agreed consultation process to be developed and published on CRDC website by May 2020, as part of CRDCs continuous improvement process, with a view to having the redesigned process inform the 21/22 investments.</i>	The agreed consultation process broadly mirrors that previous process and therefore is subject to the same concerns. Those concerns largely revolve around the time available for ideation and review of RD&E proposals. A recommendation has been included in the current review (section 6.2).
2 CRDC should consider whether some rationalisation (fewer, larger projects) and a focus on programs within the RD&E portfolio, to allow certain industry priorities to be more aggressively addressed, would deliver greater net benefit to the industry than is currently being achieved.	Important	<i>Revised portfolio/program structure to be developed with industry and approved by the CRDC Board. Given the cultural aspects of this change and the need to work with industry to deliver an effective system, CRDC aim to have a refocused portfolio that includes several program areas to address key industry priorities by 1 July 2021. The revised portfolio structure will align with the current 2018-23 RD&E strategic plan.</i>	This is being progressed. The new strategic plan provides the opportunity to develop investment plans focussed on the three pillars of activity. Investment plans will enable CRDC board, management, and R&D collaborators to move towards larger program-based RD&E procurement. There is a recommendation in this review to further support this initiative (section 6.1).
3 The CRDC Board should institute a more regular schedule of Board performance reviews, including periodic external reviews.	Better practice	<i>A Board Performance Review will be added to the Board calendar in response to the recommendation for March 2019.</i>	This has been implemented. The board has undertaken two such reviews, in 2019 and 2022, and both were externally facilitated.

RECOMMENDATION	PRIORITY	CRDC MILESTONE	COMMENT
<p>4 CRDC should develop a register of all of its policies, procedures, plans, registers and other significant documents, showing when each was last reviewed, the approval process for the review and when the next review is due.</p>	<p>Better practice</p>	<p><i>Audit Committee to review new register by May 2019. Board to review and approve new register by June 2019.</i></p>	<p>This has been implemented, as described in section 4.4.</p>
<p>5 CRDC should improve its engagement with and delivery of RD&E outcomes to large and corporate growers, which should include consideration of an extension program directly targeted at professional private consultants.</p>	<p>Better practice</p>	<p><i>CRDC currently has joint RD&E initiatives with CCA and will continue to build upon these initiatives to ensure research outcomes remain relevant to Corporate entities. CRDC and CottonInfo management will directly engage with the large corporates to better define their R&D information requirements and preferred engagement pathway during 2019. CCA representative engagement in quarterly meetings of the CottonInfo Management Committee.</i></p>	<p>This has been implemented. The small number of corporate growers interviewed for the review were broadly very supportive of CRDC activities and investments. CRDCs relationship with CCA is very strong and collaborative, although private consultants should still be viewed as an important target audience.</p>

RECOMMENDATION	PRIORITY	CRDC MILESTONE	COMMENT
<p>6 CRDC should consider developing and publishing succinct stand-alone, industry-focussed summaries of the strategic plan, annual operating plan and annual report as well as a short annual performance evaluation report describing achievement against key performance indicators and results from impact assessments, including qualitative, non-measured benefits.</p>	<p>Better practice</p>	<p><i>Succinct summaries of documents to be published as documents are published. Timeline: • Strategic Plan – December 2018; • Annual Report – Nov/Dec 2019, then annually; • Performance. Report – with the Annual Report in Nov/Dec 2019, then annually.</i></p>	<p>This recommendation has been met. CRDC produces an excellent annual performance report to accompany its annual report. It also produces a summary of each AOP. CRDC also produced a summary of the 2018-23 strategic plan. The new strategic plan is just being finalised and a summary document of that plan is also anticipated, as a 'snapshot' is included in the draft document and would readily meet the suggested summary.</p>
<p>7 CRDC should streamline its reporting of performance against targets across the strategic plan, annual operating plan, annual report and standalone performance reports, and make all relevant documents including detailed impact assessments available on the CRDC website in a separate, clearly identified 'Performance Evaluation' section, in order to improve performance reporting.</p>	<p>Better practice</p>	<p><i>Development of Performance Evaluation section on CRDC website – Dec 2018. Streamlined performance reporting timeline: • Annual Operational Plan – June 2019, then annually; • Annual Report – Nov/Dec 2019, then annually; • Performance. Report – with the Annual Report in Nov/Dec 2019, then annually.</i></p>	<p>This recommendation has largely been met. As noted above, CRDC produces annual performance reports. There is good line of sight between strategic plans, AOPs and annual reports. CRDC has also implemented a 'traffic light' system to monitor progress against key targets. The latest impact assessments have only been completed very recently. CRDC plans to include the reports from the assessments on its website</p>

RECOMMENDATION	PRIORITY	CRDC MILESTONE	COMMENT
<p>8 CRDC should increase the value of its impact assessments by improving the collection of documented evidence on the adoption and impact of projects, as recommended by Agrans, and by including commentary on the distribution of benefits between regions and/or sectors if practicable.</p>	<p>Better practice</p>	<p><i>Team space established for Agrans – completed. CRDC will review the opportunity, benefit and budget required to undertake partial equilibrium modelling with a suitable party.</i></p>	<p>This recommendation has been partially met as some progress has been made. Recent impact assessment reports include some additional commentary on distribution of benefits. More could be done on this and is a recommendation in this latest performance review (section 8.4).</p>

10. CONCLUSIONS AND RECOMMENDATIONS

CRDC is a high-performing RDC. It has successfully navigated a four-year period in which cotton production in Australia has varied from a 30-year low to a historic high, with the knock-on effects of this variability on levy revenue. Its governance processes are very sound and attention to compliance and risk is particularly strong. The company has strong planning and reporting procedures and is preparing to implement a new, audacious and far-sighted strategic plan. The project procurement process has evolved to a mix of open call and direct targeted investment, and this brings a number of advantages over the previous approach employing open call only. The move towards a more program-oriented R&D portfolio will reduce some of the management burden and should free up R&D investment resources.

Management is very well regarded by cotton growers and RD&E providers, with many of the latter believing that CRDC is the best of the RDCs to work with. The culture at CRDC has improved since the last performance review in 2018 and is highly constructive with a strong focus on staff wellbeing. Collaboration with other industry participants and other RDCs is a feature of CRDC's approach and appreciated by levy payers. Of particular note, the increased engagement with GRDC in major investments such as the 'WAND' is seen as extremely beneficial to growers. CRDC is well engaged with and highly supported by the cotton industry and has delivered demonstrable benefits to its stakeholders.

There is no evidence of CRDC having failed to fulfil, or being at risk of not fulfilling, its strict obligations under the SFA.

The main challenge for CRDC now will be the effective implementation of the new strategic plan. We especially note the need to effectively deploy the resources of an apparently stretched R&D Investment team to deliver on the ambitions of the new plan, and to ensure the R&D prioritisation process with CA remains fit for purpose. There are opportunities to upgrade the M&E framework and the methodology applied to the impact assessments undertaken to quantify the benefits delivered by CRDC investments. An additional challenge will be maintaining the external investment quantum as RD&E agencies try to recover increasing costs of research.

Eight recommendations are made as a result of the review. These are listed below, and each is rated either:

- ⊕ Critical: should be implemented as a matter of urgency in order for CRDC to meet its legal and regulatory obligations (0).
- ⊕ Important: actions that are expected to deliver significant benefits to the organisation and industry (2).
- ⊕ Better practice: expected to deliver incremental performance improvements (6).

No recommendations are rated as 'critical', while two are rated 'important' and six rated as 'better practice'.

RECOMMENDATION		SECTION	RATING
1	CRDC should consider the application of <i>ex-ante</i> benefit-cost evaluations to ensure appropriate allocation of investments across the RD&E portfolio and within investment plans for each theme	6.1	Better practice

RECOMMENDATION		SECTION	RATING
2	CRDC should actively communicate to all R&D partners the move towards investment plans and a focus on larger, longer-term programs of activity within the RD&E portfolio	6.1	Better practice
3	CRDC should engage with Cotton Australia and other key stakeholders to re-design the RD&E consultative process to ensure it is fit for purpose as CRDC implements the new strategic plan	6.2	Important
4	CRDC should critically review its current capacity and capability in R&D management and develop a staffing plan to allow it to deliver on the ambitions of the new strategic plan	6.3	Important
5	CRDC should include greater detail in the monitoring and evaluation framework to accompany the new strategic plan, for example to clarify how it will track progress towards outcomes	6.8	Better practice
6	CRDC should consider the revitalisation of the Cotton Innovation Network, with a focus on building multiparty investment programs of RD&E	7.4	Better practice
7	CRDC should ask its impact assessment researchers to provide more detailed commentary on the likely distribution of benefits from projects / clusters between sectors of the Australian cotton industry, notably between cotton growers, ginners, merchants, and shippers	8.4	Better practice
8	CRDC should consider a project to conduct a literature review of non-market valuation studies of environmental and social attributes of the Australian cotton industry as input into future assessments of the environmental and social impacts of CRDC-funded projects	8.5	Better practice

APPENDIX 1: DOCUMENTS REVIEWED

CORPORATE AND GOVERNANCE

- ✦ CRDC Funding Agreement 2015-19
- ✦ CRDC Statutory Funding Agreement 2020-30
- ✦ Primary Industries Research and Development Act 1989, January 2023
- ✦ Public Governance, Performance and Accountability Act 2013
- ✦ Public Governance, Performance and Accountability Rule 2014
- ✦ Best Practice Guide to Stakeholder Consultation. CRDC. Undated
- ✦ CRDC Funding Agreement 2015-19. Agreement to vary
- ✦ CRDC Stakeholder Consultation Plan, June 2022
- ✦ Guidelines for Statutory Funding Agreements
- ✦ Companion to Rural Research and Development Corporations Funding Agreement
- ✦ RDC Knowledge Transfer and Commercialisation Guide. 2021.
- ✦ Attachment B: Register of Governance Documents, Audits and Reviews. March 2023
- ✦ Charter of Corporate Governance, June 2020
- ✦ CRDC Remuneration Review Procedure. July 2019
- ✦ Delegation of Authority Table. November 2022
- ✦ Finance & Administration Policy Handbook. November 2022
- ✦ Fraud Risk Register. February 2022
- ✦ Human Resource Management Policy Handbook. August 2022
- ✦ IP Management Plan. June 2020
- ✦ Intellectual Property Policy Handbook. June 2020
- ✦ Risk Management Plans. February 2022
- ✦ Risk Management Policy Handbook. February 2022
- ✦ Risk Register. 2022
- ✦ Work Health & Safety Policy Handbook. 2017
- ✦ Work Health & Safety Policy. March 2023
- ✦ CRDC Review Consultation list – 2023
- ✦ Proposal for 2022 Board Performance Review
- ✦ Independent performance review CRDC: final report. October 2018
- ✦ Response and Implementation Plan. Independent Performance Review of the Cotton Research and Development Corporation 2013-2018. January 2019
- ✦ CRDC Board evaluation discussion. Directors Australia. April 2019

- ✚ CRDC Board performance review. April 2023
- ✚ CRDC Board Skills & Diversity Report. April 2023

AUDITS

- ✚ ANAO Closing Letter. August 2022
- ✚ ANAO Independent Auditor's Report. September 2022
- ✚ Report for the CRDC. External Penetration Test. Ionize. July 2022
- ✚ Internal Audit – Fraud controls. June 2022. Nexia Australia
- ✚ Internal Audit – Grant Management System. June 2022. Nexia Australia
- ✚ Internal Audit – PSPF Maturity Assessment. June 2022. Nexia Australia

STRATEGIC AND OPERATIONAL PLANS, ANNUAL AND RELATED REPORTS

- ✚ Strategic RD&E Plan 2018-2023
- ✚ Draft Strategic RD&E Plan 2023-28
- ✚ Strategic RD&E plan webinar 2023-2028
- ✚ Cotton Australia Strategic plan 2018-2023
- ✚ CRDC Annual operating plans 2019-20, 2020-21, 2021-22, 2022-23
- ✚ CRDC Annual Operational Plan summary: 2019-20, 2020-21, 2021-22, 2022-23
- ✚ CRDC Annual reports 2019-20, 2020-21, 2021-22
- ✚ CRDC Performance Reports 2019-20, 2020-21, 2021-22
- ✚ CottonInfo Annual operating plans 2020-21, 2021-2022, 2022-2023
- ✚ Emergent Futures, Cotton industry vision 2029, March 2010
- ✚ CRDC performance review for department 2020-21, 2021-22

RD&E MANAGEMENT

- ✚ Researcher's handbooks 2022-23
- ✚ CRDC investment recommendation report 2021-22 February 2021 and attachments
- ✚ CRDC investment recommendation report 2022-23 April 2022
- ✚ CRDC investment recommendation report 2023-24 February 2023 and various attachments

EXTENSION AND COMMUNICATION

- ✚ 2019-2020 Communications strategy 2018-23
- ✚ Stakeholder Consultation Plan for engaging on Research, Development and Extension priorities 2022.
- ✚ CRDC Spotlight on Cotton R&D – various editions 2019 to 2023

- ✚ Cotton pest management guide 2022-2023
- ✚ CRDC and CottonInfo, Australian cotton production manual, 2022
- ✚ CRDC Australian Cotton Sustainability Update 2021
- ✚ CottonInfo enewsletter. CRDC under the microscope March 2023
- ✚ CottonInfo enewsletter. Wand update and spray drift campaign January 2023
- ✚ Voconiq 2021 Items with means from the Year 2 Cotton Focal Study
- ✚ Voconiq Community trust in rural industries. Cotton Fact Sheet

MONITORING AND EVALUATION

- ✚ AgriFutures Australia, Impact assessment of investment in the Agrifutures Rice Program. Report prepared by Poimena Analysis, March 2021.
- ✚ CRDC, Monitoring and evaluation framework 2019-2023
- ✚ CRDC, Economic Impact Assessments 2022. Final report. AgEcon
- ✚ Cotton Impact Assessments 2022. Random sample summary report. AgEcon
- ✚ CRDC Impact Assessments 2022. AgEcon. Annex 1 to 10.
- ✚ FRDC, Non-Market Impact Valuation for Fisheries RD&E – Phase 1: An Investigation and Gap Analysis of Non-Market Impact Valuation Studies for Australian Fisheries and Aquaculture RD&E
- ✚ More profit from Nitrogen. Cotton case study 1 & 2
- ✚ More profit from Nitrogen. Cross sector case study 1 & 2
- ✚ Smarter irrigation for profit – case studies

INDUSTRY SURVEYS AND STATISTICS

- ✚ Intuitive Solutions, Grower survey 2019
- ✚ Intuitive Solutions, Grower survey 2021
- ✚ Intuitive Solutions, Grower survey 2022
- ✚ CRDC and Crop Consultants Australia, Qualitative report on the 2021-22 cotton season: A survey of consultants, 2022
- ✚ CRDC: Partner Relationship Review. February 2020
- ✚ CRDC: Partner Relationship Review. Summary report 2022
- ✚ Intuitive Solutions, Stakeholder Survey. October 2022
- ✚ ABARES, Agricultural commodities, March 2023
- ✚ ABARES. Farm performance: broadacre and dairy farms, 2020–21 to 2022–23. March 2023

DOCUMENTS FROM ORGANISATIONS IN OTHER INDUSTRIES

- ✚ APL. Innovation plan 2020-2025



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