

CRDC ANNUAL REPORT 2014-2015



Investing in RD&E for the world-leading Australian cotton industry



Australian Government
**Cotton Research and
Development Corporation**

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Executive Director

Cotton Research and Development Corporation.

2 Lloyd Street (PO Box 282)

Narrabri NSW 2390

Australia

Phone: 02 6792 4088

Fax: 02 6792 4400

Email: crdc@crdc.com.au

Website: www.crdc.com.au

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

***Front cover photo:** Dr Rose Brodrick of CSIRO was one of seven CRDC-funded researchers who took part in an Irrigation Technology Tour in February 2015, showcasing the latest irrigation scheduling and automation field- scale irrigation research to cotton growers. Dr Brodrick was investigating irrigation strategies in a limited water environment during 2014-15. Photo courtesy Melanie Jenson.*

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Published: December 2015

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Investing in RD&E for the world-leading Australian cotton industry



Australian Government
**Cotton Research and
Development Corporation**

LETTER OF TRANSMITTAL



Australian Government
**Cotton Research and
Development Corporation**

2 Lloyd Street (P O Box 282)
NARRABRI NSW 2390
Tel: 02 6792 4088
Fax: 02 6792 4400

9 October 2015

The Hon. Barnaby Joyce MP
Minister for Agriculture and Water Resources
GPO Box 858
Canberra ACT 2601

Dear Minister

It is with great pleasure that I submit the Corporation's Annual Report for 2014-15, prepared in accordance with the provisions of the *Primary Industries Research and Development Act 1989*, section 46 of the *Public Governance, Performance and Accountability (PGPA) Act 2013*, and *Funding Agreement 2015-2019*.

The activities of the Corporation are reported against the objectives, strategies, outputs and outcomes of the CRDC Strategic Research and Development Plan 2013-18 and are consistent with CRDC's 2014-15 Annual Operational Plan and Portfolio Budget Statement.


Under Section 46 of the PGPA Act, CRDC Directors are responsible for the preparation and content of the Annual Report being made in accordance with the Public Governance, Performance and Accountability (Consequential and Transitional Provisions) Rule 2014. The report of operations was approved by a resolution of the Directors on 9 October 2015.

Yours sincerely

Dr Mary Corbett
Chair
Cotton Research and Development Corporation

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Section 1

Executive Summary

Report from the Chair
and Executive Director

Year in Review: CRDC R&D
achievements,
organisational highlights
and Strategic Plan
snapshot

Overview of the Australian
cotton industry

REPORT FROM THE CHAIR AND EXECUTIVE DIRECTOR

The Cotton Research and Development Corporation (CRDC) invests in research, development and extension (RD&E) for the benefit of Australia's cotton growers (levy payers), the cotton industry and the wider community.

2015 marks 25 years of CRDC: 25 years of driving continuous improvement and transformation in our cotton industry. Over the past 25 years, CRDC has invested more than \$280 million into RD&E on behalf of the industry, delivering a \$1.9 billion benefit back to Australian cotton growers on their farms.

In 2014-15, CRDC invested \$22.826 million in 239 RD&E projects on behalf of Australia's cotton growers and the Australian Government, continuing our long-standing commitment to deliver real outcomes for growers and enhance the industry's performance.

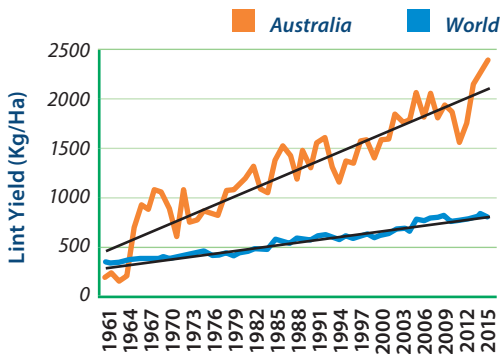
Our focus is on improving the productivity and profitability of our growers and ensuring the industry is sustainable into the future: for current and future generations. Thanks to cotton RD&E, led by CRDC and delivered in cooperation with our research partners, Australian cotton growers have reduced their environmental footprint, while achieving the highest yields in the world.

In fact 2014-15 saw growers achieving record high yields across many valleys. The average industry lint yield is estimated to have reached a record 2.4 tonnes a hectare, which is three times the world average, and leading growers reportedly producing an incredible 3.4 tonnes per hectare.

Importantly, as the Australian cotton industry's yields have increased, so too has the gross value of Australian cotton production. Remarkably a continuation of the current rate of increase supported by industry growth in new regions and raingrown systems could result in a doubling of the gross value of Australian cotton production within the next five years.

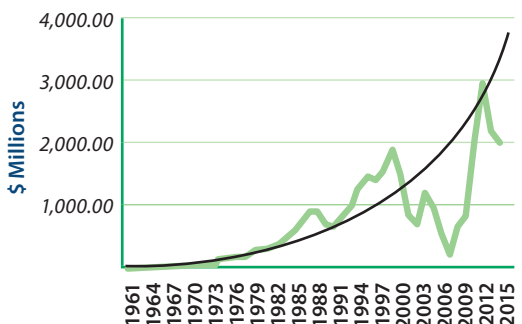
Australian cotton growers produce enough cotton to clothe 500 million people, and they do so sustainably, as world leaders in resource efficiency. It is this focus on sustainability that has underpinned CRDC's activities and achievements during 2014-15.

Graph 1: The Australian cotton industry's yield increases from 1961 to 2015, compared with the global cotton industry.



Source: ABARES 2015, Agricultural commodities report: March quarter 2015

Graph 2: The gross value of Australian cotton production from 1961 to 2014.



Source: ABARES 2015, Agricultural commodities report: March quarter 2015

REPORT FROM THE CHAIR AND EXECUTIVE DIRECTOR

At a grower level, ensuring the continued sustainability of the industry and its R&D investment, given challenging seasonal conditions, has been a primary focus. The area planted to cotton declined by almost half – some 46 per cent – during 2014-15, largely reflecting dry seasonal conditions during the planting window and reduced supplies of irrigation water. Despite record yields cotton lint production is estimated to be around 500,000 tonnes (down from 886,000 tonnes) due to this reduced planting.

Weather was but one of a number of challenges faced by the industry during the year, with fluctuating cotton prices and international market changes providing external pressure, prompting CRDC to invest in a unique world-leading project in agriculture to assess the resilience of the cotton industry at multiple scales.

This project uses the concept of ‘resilience thinking’ to explore the future of the cotton industry across the entire value chain from production to marketing and processing, providing a theoretical and practical platform for the industry and growers to explore, prepare for and manage future challenges and opportunities.

A study conducted as part of this project has found that the cotton industry is characterised by a positive attitude, a sense of optimism and an ability to respond well to threats and future challenges. Unsurprisingly, the study identified the major challenges in the future for cotton as managing water and a variable climate.

Despite these challenges, 2014-15 was also a year of major advances for the cotton industry, underpinned by the industry’s investment in RD&E – from resistance management preparation for the impending release of Bollgard 3[®] technology to major initiatives in the marketing of Australian cotton.

At an industry level, CRDC and key industry stakeholder Cotton Australia achieved a major milestone in November 2014 with the release of the industry’s first *Australian Grown Cotton Sustainability Report*.

This report continues the industry’s outstanding commitment to proactively seeking independent appraisal of its environmental management and performance, ensuring we continuously recognise and respond to environmental concerns. The Sustainability Report takes this commitment one step further, broadening this independent assessment to

also include social and economic criteria, so that the cotton industry can present a holistic picture of its performance – and, importantly, benchmark it for future assessment.

This is also important at a customer level: ensuring the industry is well placed to demonstrate its social licence credentials for continued customer confidence and access to markets in an era of heightened focus on an industry’s triple bottom line footprint.

Ensuring the cotton industry’s sustainability into the future has been another key consideration for CRDC during 2014-15.

“The Australian cotton industry is internationally recognised as innovative, dynamic and hugely successful...”

The Australian cotton industry is internationally recognised as innovative, dynamic and hugely successful – a success that is due, in part, to its willingness to invest in world-class RD&E and rapidly adopt emerging science, innovations and technology.

However, the environment in which our industry operates is rapidly changing. Increased volatility in production, prices and climate, combined with rising input costs, staff shortages, and cotton’s declining share of the global fibre market all suggest that the future for the industry is going to be increasingly complex and uncertain.

The challenge for the industry is to continue adapting to these changes and to remain profitable, sustainable and competitive in 20 years’ time, and beyond. As a result, the CRDC Strategic R&D Plan 2013-18 contains three futures themes: profitable futures, sustainable futures and competitive futures. These three themes collectively form the CRDC Cotton Futures program, which seeks to transform the industry through blue-sky research.

During 2014-15, CRDC progressed the development of the Cotton Futures program, working with key stakeholders to identify priority areas for investment, commissioning feasibility studies into potential transformational research outcomes and has budgeted further investment of \$8.5 million to this research

area between now and 2017-18. It's an ambitious and challenging area for RD&E, but one that will be critical in ensuring the industry's future success.

We know, as our growers do, that RD&E is critical to the success of the Australian cotton industry. A recent CRDC-funded cotton grower practices survey found that 91 per cent of Australian cotton growers consider RD&E as driving continuous improvements in the Australian cotton industry.

And we believe, as our growers do, that RD&E outcomes are not truly valuable unless they reach their intended audience. Critically, ensuring the outcomes of CRDC's RD&E projects are delivered to growers has been a key focus for CRDC during 2014-15, with extension forming a key component of CRDC's industry involvement.

The industry's extension program, CottonInfo, completed its third season during 2014-15, with support from joint venture partners CRDC, Cotton Australia and Cotton Seed Distributors Ltd. This joint venture is an excellent example of collaboration for wider industry benefit, and, most importantly, is helping to extend knowledge and information to growers to help them improve their on-farm practices.

The results from the 2015 Irrigation Technology Tour – by way of example of CottonInfo's work in connecting growers with research – conducted by CottonInfo with support from CRDC in February 2015, found that 97 per cent of attendees had an improved knowledge of the irrigation technologies and how they can be used on their farms as a result of the tour, and 60 per cent were likely to adopt the irrigation technologies on farm.

“Collaboration is a key to success in the Australian cotton industry, and we work in partnership with industry bodies and our research providers to deliver the best outcomes for cotton growers.”

Collaboration is a key to success in the Australian cotton industry, and we work in partnership with industry bodies and our research providers to deliver the best outcomes for cotton growers. Further to this we now look forward to working collaboratively to deliver the best outcomes to farmers across a range of industries following our successful Australian

Government Rural R&D for Profit programme first round projects, announced by the Minister for Agriculture in May 2015.

We strongly believe that there are enormous benefits in the Australian Government continuing its partnership to co-invest in rural RD&E, working hand in hand with the industry, which is why we submitted a response to the *Agricultural Competitiveness White Paper Issues Paper in 2014*, and look forward to assisting the Government implement relevant initiatives to the cotton industry from the *Agricultural Competitiveness White Paper in 2015*.

As we approach the start of the 2015-16 cotton season, we look forward to working with cotton growers and the Australian Government to ensure the valuable investment in RD&E achieves real outcomes for the Australian cotton industry.

Finally, on behalf of the CRDC Board, we wish to thank CRDC's former Directors Hamish Millar, Richard Haire and Lorraine Stephenson for their strategic guidance and governance. In October 2014 CRDC welcomed a new Board, and it is on behalf of our fellow Directors that we invite you to read the CRDC Annual Report for 2014-15.



Mary Corbett
CRDC Chair



Bruce Finney
CRDC Executive Director

Executive Summary

YEAR IN REVIEW: CRDC RD&E ACHIEVEMENTS 2014-15

Release of the first cotton industry sustainability report

The industry's first *Australian Grown Cotton Sustainability Report*, tracking the industry's social, economic and environmental footprint, was publicly released in November 2014. The report, launched jointly by CRDC and Cotton Australia, provides a snapshot of how the industry is performing against 45 sustainability indicators – from crop yield and quality, water use and riparian land management to education levels, employment, health and social capital.

The report is the first to be prepared according to Global Reporting Initiative guidelines, but continues the Australian cotton industry's unique 23 year commitment to independently assessing performance: since 1991, the industry has been conducting independent assessments of its environmental performance. The release of the Sustainability Report takes that commitment one step further: tracking and recording the industry's economic and social credentials, in addition to environmental.

Most importantly, the report has market access implications; helping the industry to demonstrate its sustainability to secure crucial international markets. It was a key item on the agenda at the International Cotton Advisory Committee (ICAC) meeting in Greece in November 2014, attended by CRDC.

The *Australian Grown Cotton Sustainability Report* is available at www.crdc.com.au/publications.

Cotton's first Herbicide Resistance Management Strategy released

The Australian cotton industry's first ever Herbicide Resistance Management Strategy (HRMS) was released in November 2014. The HRMS is a tool that has been formulated for weed management in irrigated and raingrown farming systems, including herbicide-tolerant cotton, to delay glyphosate resistance.

CRDC invested in this project to provide growers and agronomists with more support when making changes to weed control practices. Resistance is a significant

risk to the future sustainability of the Australian cotton industry and a critical area for CRDC R&D investment. The HRMS is available to download at www.crdc.com.au/publications.

Protecting against pests and diseases: Investment in biosecurity

Biosecurity plays a critically important role in ensuring the sustainability of the Australian cotton industry: managing the risk of pests and diseases entering, emerging, establishing or spreading to avoid production losses, management and eradication costs, and potentially the loss of important overseas markets.

CRDC continued its investment into this critical area, with research identifying a defoliating strain of *Verticillium dahliae* in QLD and NSW in 2015 thanks to proactive disease monitoring. This follows a significant virus detection in East Timor in 2014, with the identification of cotton leaf roll dwarf virus, the causal agent of Cotton blue disease – the screening of which was conducted under a CRDC-funded project.

For more on biosecurity, see Section 4: RD&E Portfolio.

Disease control on the agenda at FUSCOM

CRDC was involved in the delivery of the International FUSCOM conference in November 2014, bringing together Australia's pathology and virology research community, plant breeders, growers and consultants to share research information and coordinate efforts on disease control.

FUSCOM was first formed to focus on Fusarium wilt, however, since its inception, the focus has broadened to include other fungal and bacterial plant diseases. 2014 marked 20 years since the first fusarium research trials were planted in Australia, contributing beneficial research findings to the Australian cotton industry. Much progress has been made, however, as evidenced by the detection of a defoliating strain of *Verticillium*, the industry must continue to be ever vigilant to the risk of disease.

CRDC provided support for four international keynote pathology speakers to travel to Australia to present at FUSCOM on the topical issues of reniform nematode, Verticillium and Fusarium wilts, and seedling diseases.

Benchmarking cotton irrigation systems: centre pivot and lateral move

A CRDC-funded project to benchmark centre pivot and lateral move (CPLM) systems in the Murray-Darling Basin released its report during 2014-15, finding that the number of CPLM systems has significantly increased from 2001 to 2011, with two leading factors driving adoption: water and labour savings.

The report found that the average water applied by CPLM systems in 2011-12 was 30 per cent less than that applied using furrow irrigation, whilst maintaining similar yields. Meanwhile, the labour requirement indicated by growers for centre pivots and lateral moves was 25 per cent and 30 per cent respectively of that required for furrow irrigation.

The resulting report, *Review of Centre Pivot and Lateral Move irrigation installations in the Australian Cotton Industry*, makes recommendations for growers to consider regarding investment in CPLM systems and is available from the CottonInfo website: www.cottoninfo.com.au/publications.

For more on irrigation and irrigation benchmarking, see Section 4: RD&E Portfolio.

On-farm energy use: benchmarking for improved efficiencies

A core area of focus for CRDC during 2014-15 was on energy use on irrigated cotton farms, helping to understand the industry's energy use footprint, improve efficiencies, reduce energy costs, and inform future research. Energy is one of the fastest growing on-farm costs. In particular, electricity costs have increased by around 350 per cent since 2000 and diesel is a major on-farm expense, especially for irrigators.

To help growers cut costs and improve on-farm energy efficiency, CRDC, National Centre for Engineering in Agriculture (NCEA) and CottonInfo, with support from the Department of Industry and Science, completed the *Improving energy efficiency on irrigated cotton farms* project in 2015, which included on-farm energy audits for growers.

The resulting benchmarking report, *Farm level benchmarking report of direct energy consumption in Australian irrigated cotton production*, outlines the diesel and electricity used on cotton farms, based on the findings of 198 whole-farm energy assessments.

Most importantly, the report identified how growers can improve their profitability by improving energy efficiency. The full report, including a grower summary, is available from the CottonInfo website: www.cottoninfo.com.au/publications.

For more on energy use efficiency, see Section 4: RD&E Portfolio.

From laboratory to field: CRDC takes key researchers on farm

CRDC supported two initiatives designed to connect growers with research outcomes in early 2015 – the 2015 Cotton Irrigation Technology Tour and the energy efficiency focused Big Day Outs. The events were run by the industry's joint extension program, CottonInfo, of which CRDC is a joint venture partner.

The Irrigation Technology Tour took seven CRDC-funded researchers on to farms at Emerald, Moree and Nevertire for a series of irrigation technology field days, demonstrating new and emerging irrigation scheduling and management technologies. The events highlighted the advantages and practical benefits of each technology for optimising yield and water use efficiency. More than 200 growers and consultants attended the field days, providing valuable feedback on irrigation research.

The Big Day Outs were two on-farm field days at Gunnedah and St George aimed at improving grower energy use efficiency. Fifty growers and consultants attended the events, which featured a range of key speakers on energy use, including CRDC-funded

researchers, and involved a tour of the cotton farms on which they were hosted. The hosts of the event were both innovative growers who had invested in solar in response to concerns about rising energy costs.

For more on the Irrigation Technology Tour and the Big Day Outs, see Section 4: RD&E Portfolio.

People: our industry's most important resource

CRDC continued its long-standing commitment to investing in the industry's human capacity during 2014-15, supporting cotton industry participants in a range of people-focused programs. The impact of which is evidenced by the depth of capable and committed people within diverse roles driving the cotton industry forward.

These programs include the Primary Industries Education Foundation; the cotton ginning training program; the cotton industry young professionals program; the Cotton Production Course; the Field to Fabric scholarships; the Horizon scholarship program; CRDC summer, honours and PhD scholarships; the Australian Rural Leadership Program; Nuffield Farming Scholarships and the Peter Cullen Trust.

For more on CRDC's People program investments, see Section 4: RD&E Portfolio.

Showcasing RD&E at the 17th Australian Cotton Conference

CRDC was proud to support the Australian cotton industry's major biennial event, the 17th Australian Cotton Conference, as a foundation sponsor. The August 2014 event was the most successful in the Conference's history, with more than 1800 delegates – including some 600 cotton growers from across every cotton growing valley attending. For CRDC, the opportunity is to extend the outcomes of research and actively support the contribution the Conference makes to an industry culture of inclusiveness, cohesion and vision.

CRDC was actively involved in the Conference, with representation on the Committee, input into the agenda and speaker selection, a number of CRDC speakers, a stand in the Conference trade hall, support for the Conference's Next Gen forum, support and technical assistance for the development of the Conference app, and financial support for university students to attend the Conference.

CRDC also worked with the cotton research community in the lead up to the Conference to showcase RD&E through a collection of 62 research papers and e-summaries, which were on display throughout the Conference and remain available to the public at www.crdc.com.au/publications.

Investing in grassroots RD&E: CRDC's Grassroots Grants

CRDC's *Grassroots Grants* program encourages Cotton Grower Associations to apply for funding to support capacity building projects in their region. Up to \$10,000 in funding is available for CGAs to help fund a project aimed at increasing the engagement of growers in the industry, solving specific regional issues and improving their skills, knowledge base and networks.

Since the Grassroots Grants program commenced in 2011, it has supported 33 projects across the cotton growing valleys, including nine projects in 2014-15.

For more on CRDC's Grassroots Grants, see Section 4: RD&E Portfolio.

YEAR IN REVIEW: ORGANISATIONAL HIGHLIGHTS 2014-15

Minister for Agriculture announces new CRDC Board Directors

CRDC welcomed the appointment of five Directors to the CRDC Board in October 2014. The Minister for Agriculture, the Hon. Barnaby Joyce MP, announced that former Directors Cleave Rogan and Dr Michael Robinson, past Director Kathryn Adams, and new Directors Liz Alexander and Greg Kauter would be joining CRDC Chair Dr Mary Corbett and Executive Director Bruce Finney on the CRDC Board.

For more information on the CRDC Board and its Directors, see Section 5: CRDC People and Governance.

CRDC Strategy Forum identifies cotton RD&E priorities

CRDC hosted the inaugural Strategy Forum in Sydney in May 2015, bringing together cotton growers on Cotton Australia's grower advisory panels to help determine the industry's future research priorities.

The forum was the first step in CRDC's revised procurement process for the 2016-17 funding round, which aims to provide greater clarity to researchers about the specific needs of the industry, to assist them in developing research proposals to meet these needs. Under this revised process, the Strategy Forum will become an annual forum at the beginning of each CRDC funding round, to help identify and synthesise the key RD&E needs of the industry.

\$4 million for smart irrigation: CRDC-led project receives R&D for Profit programme funding

A CRDC-led project to improve the profit of 3,000 cotton, dairy, rice and sugar irrigators is one of 12 successful Rural R&D for Profit programme projects announced by the Minister for Agriculture in May 2015.

The project, *Smarter irrigation for profit*, is a partnership between the major irrigation industries of cotton, dairy, rice and sugar, led by CRDC in conjunction with Dairy Australia (DA), the Rural Industries Research and Development Corporation (RIRDC), Sugar Research Australia (SRA) and other research partners.

The project aims to improve the profit of each individual irrigator enterprise across the four industries by \$20,000-\$40,000 per annum, with the support of 16 R&D partners and up to 19 farmer-managed learning sites. It will receive up to \$4 million in funding under the Rural R&D for Profit programme. CRDC is also a partner in four other projects selected for funding under Round 1 of the programme.

For more on the Smarter irrigation for profit project, and the other projects successful under this round, see Section 2: CRDC Business.

Blue-sky thinking: Designing a future for Australian Cotton report

CRDC's Cotton Futures program seeks to transform the industry through blue-sky research, to ensure it remains profitable, sustainable and competitive in 20 years' time and beyond. It's an ambitious goal given that the future is unpredictable, so the challenge for CRDC is how and where to focus these investments – and CRDC has been seeking advice from experts within and outside the industry to help identify priority areas for R&D investment.

During 2014-15, CRDC continued this process with a series of futures forums. Four forums were held in late 2014 around the three futures themes – profitable futures, sustainable futures and competitive futures – bringing together stakeholders from both within and outside the industry. The resulting report, *Designing a Future for Australian Cotton*, published in December 2014, outlined the top 18 blue-sky research concepts which have the potential to add \$4 billion per annum to the gross value of Australian cotton production.

In 2015, CRDC announced the commencement of four feasibility studies into potential cotton futures projects, with additional projects set to commence in July 2015 under the Rural R&D for Profit programme and CRDC's future farm collaboration with the Grains Research and Development Corporation (GRDC). In total, CRDC has budgeted to invest \$8.5 million in cotton futures research projects from 2014-15 to 2017-18.

For more information on Cotton Futures and the feasibility studies, see Section 2: CRDC Business.

CRDC R&D Manager heads up global sustainability report

Following on from the release of the *Australian Grown Cotton Sustainability Report*, CRDC was instrumental in the release of a global sustainability report, the *Measuring Sustainability in Cotton Farming Systems: Towards a Guidance Framework* report, released by ICAC and the Food and Agriculture Organisation of the United Nations (FAO) in April 2015.

CRDC R&D Program Manager, Mr Allan Williams, co-authored the report on global sustainability through his role as Chair of the ICAC Expert Panel on Social, Environmental and Economic Performance of Cotton Production.

The report provides an overview of critical sustainability issues for cotton growing and recommends a set of indicators to assess and measure progress against these issues, based on a global review of current research findings. It references sustainability programs run by cotton growing countries around the world, including Australia's own *myBMP* program, which is an industry program supported by CRDC and Cotton Australia.

The *Measuring Sustainability in Cotton Farming Systems: Towards a Guidance Framework* report is available at www.crdc.com.au/publications.

Release of the World leaders in cotton: Achievements in Australian cotton RD&E 2008-13 report

This important report from CRDC outlines the achievements of the cotton industry's RD&E investment over 2008-13: the period of the previous CRDC Strategic R&D Plan. Released in August 2014, it highlights the major research developments and outcomes achieved during this time under CRDC's (then) three strategic priorities: value chain, farming systems and human capacity.

Overall, the report estimates that CRDC's \$49.8 million investment over the five years from 2008 to 2013 delivered a \$348 million benefit to cotton growers and a \$697 million benefit to society at large.

The *World leaders in cotton: Achievements in Australian cotton RD&E 2008-13* report is available at www.crdc.com.au/publications.

Signing of the CRDC funding agreement

The ongoing commitment to partnering in RD&E investment between Australian cotton growers and the Australian Government through CRDC was confirmed with the introduction of the 2015-19 Funding Agreement. The agreement was signed by the Minister of Agriculture and CRDC in June 2015. The agreement sets out expectations about CRDC's performance, transparency and accountability to levy payers, the Government and the public.

CRDC is one of six Research and Development Corporations (RDCs) to sign a funding agreement in 2015. CRDC's Funding Agreement is available at www.crdc.com.au/publications.

YEAR IN REVIEW: STRATEGIC PLAN SNAPSHOT 2014-15

The direction of CRDC's RD&E investment was established in the formation of the CRDC Strategic R&D Plan 2013-18, which outlines five investment programs: farmers, industry, customers, people and performance. 2014-15 marked CRDC's second year of investment under this Plan.

Farmers

In 2014-15, CRDC continued its focus on helping cotton growers to increase their productivity by the target of three per cent per hectare per year. CRDC's investments in the areas of successful crop protection and productive resource efficiencies are helping growers to protect their crops from pests, weeds and diseases, while making the most of their valuable resources, like water and energy.

Industry

CRDC achieved a major outcome towards the stated industry goal of making the Australian cotton industry the global leader in sustainable agriculture this year through the establishment of sustainability indicators and the release of the industry's first *Australian Grown Cotton Sustainability Report*, with Cotton Australia in November 2014. In addition, its investments in the areas of respected stewardship and responsible landscape management are helping to protect the long-term effectiveness of the technology and the valuable natural resources that underpin our industry's success.

Customers

Capturing the full value of Australian cotton is at the heart of the customers program, with the goal of doubling the premium for Australian cotton. Cotton faces enormous competition from the man-made fibre industry, so ensuring customer confidence in the integrity, quality and value of Australian cotton is important in cementing customer demand for cotton products – hence CRDC's investments in the area of assured cotton and differentiated products.

People

Investing in the industry's most important resource, its people, remains central to CRDC. In 2014-15, CRDC continued its investment into developing an industry of capable and connected people, through funding a wide range of people projects – from the Australian Rural Leadership Program to the CRDC Grassroots Grants – all designed to create a skilled, educated and progressive industry workforce, connected by dynamic networks.

Performance

Measuring and evaluating the performance of the industry and its RD&E is also important in ensuring continuous improvement. During 2014-15, CRDC continued its investment into best management practices, monitoring and evaluation and reviews, to ensure the performance of the industry and its RD&E is captured, reported and acted upon.

Highlights and key achievements of CRDC's 2014-15 RD&E investment are outlined in detail at Section 4: RD&E Portfolio.

Executive Summary

OVERVIEW OF THE AUSTRALIAN COTTON INDUSTRY

The Australian cotton industry is one of the success stories of Australian agriculture. A culture of innovation within the industry, supported by and embracing a well-organised RD&E framework, has been a major contributor to this success.

From small beginnings in the 1970s, Australia's cotton industry is now the third most valuable agricultural export commodity. Cotton is currently the major agricultural crop grown in many rural and remote regions of Queensland (QLD) and New South Wales (NSW).

Australian cotton is the highest yielding, finest, cleanest and greenest cotton in the world. On a global scale, Australia is not a large cotton producer – only around three per cent of the global crop is grown within Australia, by some 900 cotton growers on 1,250 farms in QLD and NSW, and for the last two years has been commercially trialed in Victoria (VIC).

However, Australia is one of the largest exporters of cotton, with nearly 100 per cent of the national crop exported, generating in excess of \$2 billion in export revenue annually. The industry generates significant wealth and provides an economic foundation to many regional and remote rural economies, employing up to 14,000 people.

Improved practices over the past 15 years have seen insecticide use reduced by 95 per cent and water use efficiency improved by 40 per cent, while improvements in fertiliser and energy use are driving an ongoing reduction in nitrous oxide emissions. The best cotton producers now achieve more than two bales of cotton per megalitre (ML) of water – almost double the industry average of just a decade ago. The industry is at the forefront of environmental management systems, and climate variability mitigation and adaptation.

Importantly, cotton is an industry taking responsibility for itself by undertaking practice changes to meet societal expectations. The introduction of the industry's best management practice program *myBMP*, the uptake of biotechnology to help reduce pesticide use, and the implementation of the industry's environmental assessment and resulting actions, are all examples of the cotton industry recognising the need for change, and working with the RD&E system to enact it.

In recent years, new cotton varieties, new farming technologies and favourable weather and market conditions, have facilitated an expansion in southern NSW cotton growing regions, reaching as far south as the Victorian border. At the same time, CRDC research projects are exploring the viability of growing cotton in the Burdekin region in tropical Queensland.



Section 2

CRDC Business

About CRDC

CRDC operations

Setting the research priorities

CRDC collaboration and cooperation



The Cotton Research and Development Corporation (CRDC) was established by the Australian Government to invest in research, development and extension (RD&E) for a more profitable, sustainable and dynamic cotton industry.

The CRDC invests in and manages a portfolio of RD&E programs to enhance the environmental, social and economic values associated with cotton production systems, for the benefit of the cotton industry, regional communities and the wider public.

CRDC is co-funded through an industry levy and matching Commonwealth contributions. In 2014-15, the Australian Government and cotton growers co-invested \$22.826 million through CRDC into 239 RD&E projects.

In 2015, CRDC celebrated its 25th anniversary, having been established in 1990 under the *Primary Industries and Research and Development Act 1989* (PIRD Act). This Act outlines the accountability of CRDC to the Australian Government and to the cotton industry, through its representative body Cotton Australia.

CRDC is based in Narrabri, NSW: the heart of one of Australia's major cotton growing regions and home to the Australian Cotton Research Institute.

Vision

A globally competitive and responsible cotton industry.

Mission

To invest in RD&E for the world-leading Australian cotton industry.

Purpose

Enhancing the performance of the Australian cotton industry and community through investing in research and development, and its application.

Corporate outcome

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

CRDC stakeholders

- Australian Government through the Minister for Agriculture
- Department of Agriculture
- Cotton Australia
- Cotton growers including Cotton Grower Associations

CRDC research partners

- Department of Agriculture
- Department of Agriculture and Fisheries (QLD)
- Department of Primary Industries (NSW)
- Other State Government departments
- CSIRO
- Cooperative Research Centres (CRCs)
- Cotton Grower Associations
- Cotton Innovation Network
- Cotton Seed Distributors Ltd
- Crop Consultants Australia
- Australian Association of Cotton Scientists
- Australian Farm Institute
- Australian Rural Leadership Foundation
- Other Rural Research and Development Corporations
- Universities:
 - Australian National University
 - Deakin University
 - Griffith University
 - Macquarie University
 - National Centre for Engineering in Agriculture (University of Southern Queensland)
 - Queensland University of Technology
 - University of Melbourne
 - University of New England
 - University of New South Wales
 - University of Queensland
 - University of Southern Queensland
 - University of Sydney
 - University of Technology, Sydney
 - University of Western Sydney
- Agribusinesses
- Supply chain and trade partners

CRDC Strategic R&D Plan 2013-18

CRDC, and its investment in research and development (R&D) on behalf of the Australian cotton industry, is guided by a five year Strategic Plan: the CRDC Strategic R&D Plan 2013-2018. This Plan is designed to help the industry achieve its long-term vision, and the Government its rural R&D priorities.

The Plan recognises the challenges to the Australian cotton industry's sustainable competitive advantage, and responds with a strong focus on improving the industry's profitability, sustainability and competitiveness.

The Plan recognises the critical importance of knowledge sharing and strong relationships between farmers, industry and customers.

Core programs

The importance of industry stakeholders has been recognised in the design of the plan, which consists of three core RD&E programs: Farmers, Industry and Customers. Complementing these programs are two integrating programs: People and Performance, which recognise the interdependencies of issues within the RD&E programs, as well as responding to stakeholder and corporate requirements for improvement to the efficiency and effectiveness of operations.

- **Farmers** – including successful crop protection, on-farm resource use efficiency, and innovations in cotton production.
- **Industry** – including stewardship, natural resource management, and identifying and responding to threats.
- **Customers** – including cotton quality, the recognised value of Australian cotton, and ensuring future demand for our cotton.
- **People** – including skilling and educating our industry workforce, creating networks and communication.
- **Performance** – including measuring and reporting on our industry's performance, and continuous improvement under best management practices.

Cotton futures

Within the CRDC Strategic R&D Plan 2013-18, CRDC has included three futures themes: profitable futures, sustainable futures and competitive futures. These themes provide a clear framework through which CRDC can invest in long-term innovations to address the industry's goal to remain profitable, sustainable and competitive in 20 years' time and beyond.

The futures themes ambitiously seek to transform the industry through blue-sky research. During 2014-15, CRDC continued to engage with the cotton industry, the wider supply chain, and the industry's customers to identify priority areas for investment through a series of stakeholder forums.

The resulting report, *Designing a Future for Australian Cotton*, published in December 2014, prioritised the top 18 research concepts: including agri-intelligence systems, autonomous farming, atmospheric water resources, carbon neutral farming, alternative cotton gin trash uses, and dissolving cotton. In 2015, CRDC announced the commencement of four feasibility studies into projects investigating supply chain optimisation, dissolving cotton, utilising cotton as a substrate for carbon fibre, and using cotton for 3D printing.

In addition, cotton futures projects will commence in July 2015 under the Rural R&D for Profit programme and CRDC's future farm collaboration with the Grains Research and Development Corporation (GRDC). In total, CRDC has budgeted to invest \$8.5 million in cotton futures research projects from 2014-15 to 2017-18.

Communicating research outcomes

CRDC is actively involved in the dissemination of research results, working through a range of mechanisms to promote research outcomes – principally supported by the industry’s joint extension program, CottonInfo (www.cottoninfo.net.au).

CottonInfo aims to ensure the effective communication of, and support for, the adoption of research results. CRDC established the CottonInfo joint venture with partners Cotton Australia and Cotton Seed Distributors Ltd in 2012.

The CottonInfo team aims to improve industry practice, improve research and development communication, and improve industry responsiveness. The team consists of regional development officers (on the ground support, based in the cotton growing valleys), technical specialists (specialists in specific research areas who provide a conduit to the wider cotton research community) and experts in the industry’s best management practice program, *myBMP* (who can assist growers to sign up for, and participate in, *myBMP*, providing a critical link between research extension and best practice).

Within this venture, CRDC is responsible for resourcing program management, communication and technical specialists, whose role is to translate research findings and outcomes into best practice for industry uptake.

Measuring performance

One of CRDC’s formal principles of operation is to strive to maximise the return on investment for all industry and public funds invested through CRDC into RD&E.

During 2014-15, CRDC released the *World leaders in cotton: Achievements in Australian cotton RD&E 2008-13* report, which outlines the impact of CRDC’s investments over this five year period: the period under CRDC’s previous Strategic R&D Plan.

During this time, CRDC, the National Program for Sustainable Irrigation, and the Cotton CRC commissioned cost-benefit evaluations of R&D investments in which CRDC was either the major investor or one significant investor. The evaluation estimated that CRDC’s minimum return on investment during this period was 7:1 for growers (that is, a \$7 benefit to growers for every \$1 invested) with a flow-on benefit of 14:1 for society at large (a \$14 benefit to society for every \$1 invested).

In total, it is estimated that CRDC’s \$49.8 million investment in the cotton industry during this period resulted in a \$348 million benefit to cotton growers, and a \$698 million benefit to society at large.

For the current Strategic Plan period (2013-18), a variety of monitoring and evaluation projects are funded under CRDC’s performance program, designed to ensure the impact of investment in RD&E can be captured and demonstrated.

One such evaluation – a CRDC analysis of a study by the Cotton Innovation Network showed the CRDC accounted for 32 per cent of total cotton RD&E investments in Australia and was involved in over 80 per cent of all cotton RD&E. Overall, public and private RD&E investment in the cotton sector is in the order of \$60 million annually – supporting an industry that typically generates in excess of \$2 billion per annum in export revenue and contributes to broader economic, environmental and social benefits.

Beyond the effectiveness of CRDC’s RD&E investments, CRDC is also committed to continuous improvement in the efficiency of its operations. By example, during 2014-15 a review of RD&E procurement methods informed the decision to change from open call to a new guided call process commencing in 2015-16. The guided call process will further improve engagement with industry stakeholders on R&D needs and priorities, better focus and communicate the scope of interest to research partners, and improve the productivity of CRDC staff in brokering and administering RD&E investment.

Cotton RD&E industry representative body

Cotton Australia is the gazetted cotton industry representative organisation under the PIRD Act. Established in 1972 (as the Australian Cotton Foundation), Cotton Australia merged with the Australian Cotton Growers Research Association in 2008 to provide a united voice for cotton growers across research, stewardship, natural resource management and cotton production issues.

Cotton Australia and its members provide advice to CRDC on research strategy and investments from the perspective of cotton growers. This is achieved through a number of advisory panels aligned with CRDC’s programs.

SETTING THE RESEARCH PRIORITIES

Cotton Sector RD&E Strategy

The Cotton Sector RD&E Strategy is one of 14 sectorial and 7 cross-sectoral strategies within the National Primary Industries Research, Development and Extension Framework (NPIRDEF) led by the Research and Innovation Committee. The Committee facilitates coordination among Australian and State Governments, CSIRO, Rural Research and Development Corporations, agriculture industries and universities to better harmonise roles in RD&E related to primary industries and assure that they work together effectively to maximise net benefits to Australia.

The Cotton Sector RD&E Strategy was formally approved in 2011. This strategy was a key resource for CRDC during the formation of the CRDC Strategic R&D Plan 2013-18. Progress of this plan is on-going and CRDC continues to facilitate a lead role in its implementation. The Cotton Sector RD&E Strategy sets out priorities for the cotton industry sector's RD&E organisations to cooperate on a national basis to address the national needs of the industry.

Strategic needs of the cotton industry:

- **Better cotton plant varieties** – lifts on-farm performance and product value.
- **Improved farming systems** – sustainable production delivers quality cotton.
- **People, businesses and communities** – proudly developing cotton and sustaining regional communities and environments.
- **Product and market development** – competitive advantage through differentiation.
- **Development and delivery** – maximising the potential of research through extension.

Cotton Innovation Network

Responsibility for the implementation of the Cotton Sector RD&E Strategy rests with the Cotton Innovation Network, while responsibility and authority for RD&E investment and provision of capability rests with the member organisations.

This network is independently chaired and comprises senior representatives from CRDC, the Department of Agriculture, Cotton Australia, Cotton Seed Distributors Ltd, CSIRO, the NSW Department of Primary Industries, the QLD Department of Agriculture and Fisheries and the Australian Council of the Deans of Agriculture. CRDC provides the secretariat and funds the services of an independent consultant to support the work of the network.

The Cotton Sector RD&E Strategy outlines how the key RD&E organisations will work together, through the Cotton Innovation Network, to improve the quality and efficiency of RD&E over the next 10 years by coordinating:

- **Strategy and investment across cotton and with other sectors** – to maximise focus and leverage.
- **Research pathways** – to define what RD&E is needed and ensure it is sound and aligned.
- **Development and delivery** – to ensure adoption of research is optimised.
- **Capability** – to ensure capacity is maintained and developed.

The Network has focused on developing a deeper and shared understanding of how these functions occur and opportunities for improvement. It has mapped what RD&E is needed currently and in the future.

CRDC's involvement extends to greater than 80 per cent of the effort, with all the major RD&E organisations playing a significant role in at least two priorities. This highlights the integrated nature of cotton RD&E and its critical reliance on the continued commitment and involvement of all parties.

The Strategy is working effectively to ensure cotton RD&E remains well focused and organised with a strengthening ability to collaboratively solve problems and sharpen RD&E in areas where the industry can do better. During 2015, CRDC is participating in a review of the Cotton Section RD&E Strategy with the Cotton Innovation Network to ensure that it remains relevant and appropriate.

Vision 2029: The industry’s vision for a sustainable future

In 2009, the Australian cotton industry developed a 20-year vision for the future that encompassed improved industry performance, collaboration and capacity, using a 20-year time frame to ensure a longer-term focus.

Vision 2029: Australian cotton, carefully grown, naturally world’s best

By 2029, the Australian cotton industry will be:

- **Differentiated** – world-leading supplier of an elite quality cotton that is highly sought in premium market segments.
- **Responsible** – producer and supplier of the most environmentally and socially responsible cotton on the globe.

- **Tough** – resilient and equipped for future challenges.
- **Successful** – exciting new levels of performance that transform productivity and profitability of every sector of the industry.
- **Respected** – an industry recognised and valued by the wider community for its contribution to fibre and food needs of the world.
- **Capable** – an industry that retains, attracts and develops highly capable people.

The Vision 2029 elements were central to the development of the CRDC Strategic R&D Plan 2013-18, and continue to play a key role in guiding CRDC’s investments, to ensure CRDC is contributing to their achievement. The following table outlines CRDC’s investment contribution towards the Vision 2029 elements in 2014-15.

Element	CRDC invested in the following during 2014-2015
Differentiated	<ul style="list-style-type: none"> ■ Market and supply chain intelligence. ■ Product, processing and supply chain innovation and improvements.
Responsible	<ul style="list-style-type: none"> ■ Solutions to production constraints, optimising inputs, processes and improving environmental performance. ■ Supporting a best-practice framework.
Tough	<ul style="list-style-type: none"> ■ Solutions to production constraints. ■ The capacity to adapt to climate impacts. ■ Protection from biosecurity threats.
Successful	<ul style="list-style-type: none"> ■ Improving product, production and people.
Respected	<ul style="list-style-type: none"> ■ Measuring and communicating performance.
Capable	<ul style="list-style-type: none"> ■ Determining future capacity needs. ■ Skills and leadership. ■ The industry CottonInfo team.

CRDC COLLABORATION AND COOPERATION

CRDC works in collaboration with cotton industry bodies and other Research and Development Corporations (RDCs) to achieve strategic outcomes for the industry and to leverage higher returns for its investments.

CRDC was highly effective in partnering in over 80 per cent of the RD&E projects conducted in the cotton sector in 2014-15. Cooperation extended from participation in national cross-sectorial collaborations on water and soils, the industry extension joint venture CottonInfo, and at the local level, the development of people in a farming employment starter kit with Dairy Australia.



CottonInfo

CottonInfo is the industry's joint extension program, designed to ensure the effective communication of, and support for, the adoption of research results. CRDC established the CottonInfo joint venture with partners Cotton Australia and Cotton Seed Distributors Ltd in 2012.

The CottonInfo team aims to improve industry practice, improve research and development communication, and improve industry responsiveness. The team consists of regional development officers (on the ground support, based in the cotton growing valleys), technical specialists (specialists in specific research areas who provide a conduit to the wider cotton research community) and experts in the industry's best management practice program, *myBMP* (who can assist growers to sign up for, and participate in, *myBMP*, providing a critical link between research extension and best practice).



Best Management Practices (*myBMP*)

myBMP is the Australian cotton industry's commitment to best practice in cotton production. It is a voluntary farm management system that provides self-assessment mechanisms, practical tools and resources allowing growers to both comply with regulation and to ensure that cotton is produced with best practice across a range of focus areas.

It is also the mechanism that combines science and agribusiness management to lift the industry's performance standards, address threats and anticipate future challenges and opportunities.

The Best Management Practices (BMP) program was launched in 1997 and redeveloped into the web-based program *myBMP* in 2010. CRDC and Cotton Australia are partners in *myBMP* and continue to develop the program to benefit the industry. Over time, BMP has extended from its focus from an environmental management system into a tool comprising 11 modules that touch on many areas of production and farm business. *myBMP* delivery has been integrated with the industry's joint extension program, CottonInfo.

Council of Rural Research and Development Corporations (CRRDC)

A great deal of collaboration and cooperation takes place through the CRRDC: a forum for supporting the Rural R&D Corporations (RDCs) in collectively maximising their ongoing contribution to a sustainable and profitable Australian agricultural sector.

This collaboration extends well beyond co-investment. Cooperation, coordination and communication are equally important to avoiding duplication in research and maximising the impact of research outcomes. The scale of this collaboration extends from large national research programs to small local projects and administration, to bring a national focus in dealing with climate variability, soil health, irrigation, crop protection, farm safety and human capacity.

CRDC continues to work with the CRRDC to investigate administrative efficiency gains within the RDCs and the rural R&D system as a whole.

The following table summarises CRDC collaboration with other RDCs. Many of these initiatives are covered in more detail in the RD&E project summary section of this report.

Collaboration with Rural Research and Development Corporations (RDCs) 2014-15

Program or group	Nature of collaboration																
Council of Rural RDC Chairs	<p>The Council is made up of leaders from all 15 RDCs. The Council as a whole meets twice a year and RDC working groups more frequently throughout the year, to discuss ways to collaborate with joint RD&E projects, communication activities, business operations, and coordinate other joint RDCs activities at the broadest level.</p> <p>The 15 RDCs include a mix of both Corporate Commonwealth and industry-owned corporations:</p> <table border="0"> <tr> <td>1. Cotton Research and Development Corporation (CRDC)</td> <td>8. Australian Wool Innovation Limited (AWI)</td> </tr> <tr> <td>2. Fisheries Research and Development Corporation (FRDC)</td> <td>9. Australian Pork Limited (APL)</td> </tr> <tr> <td>3. Grains Research and Development Corporation (GRDC)</td> <td>10. Dairy Australia Limited (DA)</td> </tr> <tr> <td>4. Rural Industries Research and Development Corporation (RIRDC)</td> <td>11. Forest and Wood Products Australia Limited (FWPA)</td> </tr> <tr> <td>5. Australian Egg Corporation Limited (AECL)</td> <td>12. Horticulture Innovation Australia (HIA)</td> </tr> <tr> <td>6. Australian Grape and Wine Authority (AGWA)</td> <td>13. Australian Livestock Export Corporation Limited (Livecorp)</td> </tr> <tr> <td>7. Australian Meat Processing Council Limited (AMPC)</td> <td>14. Meat and Livestock Australia Limited (MLA)</td> </tr> <tr> <td></td> <td>15. Sugar Research Australia Limited (SRA)</td> </tr> </table> <p>More information about RDC collaborative projects are available from www.ruralrdc.com.au</p>	1. Cotton Research and Development Corporation (CRDC)	8. Australian Wool Innovation Limited (AWI)	2. Fisheries Research and Development Corporation (FRDC)	9. Australian Pork Limited (APL)	3. Grains Research and Development Corporation (GRDC)	10. Dairy Australia Limited (DA)	4. Rural Industries Research and Development Corporation (RIRDC)	11. Forest and Wood Products Australia Limited (FWPA)	5. Australian Egg Corporation Limited (AECL)	12. Horticulture Innovation Australia (HIA)	6. Australian Grape and Wine Authority (AGWA)	13. Australian Livestock Export Corporation Limited (Livecorp)	7. Australian Meat Processing Council Limited (AMPC)	14. Meat and Livestock Australia Limited (MLA)		15. Sugar Research Australia Limited (SRA)
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Rural R&D for Profit Collaboration	CRDC worked collaboratively with the Council of Rural RDCs and representatives from each RDC to identify and prioritise strategic investment opportunities. These opportunities were then developed and submitted as a coordinated application to Round one of the Rural R&D for Profit programme.																
Communications Managers group	Using cross-RDCs communication opportunities to promote rural industries and RD&E achievements. Each RDC nominates their Communications Manager or representative to attend up to three group meetings each year to plan and provide input into collaborative RDC projects requiring communications support. The Communications Managers also collaborate on best practice and opportunities to share services.																
Business managers group	Cooperation with all RDCs to improve administration, contracts, program management systems and IP management in alignment with the Council of RDC's harmonisation project. CRDC and GRDC continued to cooperate on best practices and innovation in IT, finance and administration. CRDC, AGWA and RIRDC continue co-hosting arrangements for Clarity program managements systems.																
Information Systems Managers group	Cooperation between all RDCs to share ICT knowledge and experiences with the various systems and software used by the RDCs.																

CRDC COLLABORATION AND COOPERATION

Program or group	Nature of collaboration
Cross-Sectorial RD&E Strategies	CRDC worked collaboratively with other RDCs and partners of Climate Change Research Strategy for Primary Industries (CCRSPI) to review CCRSPI's key strategic themes as well as provide data to an audit of RD&E on climate variability. Similarly CRDC actively participated within and co-invested in the implementation of the Soils, Water Use in Agriculture and Plant Biosecurity RD&E strategies.
Development of a Life Cycle Inventory for Australian Agriculture – AusAgCI	CRDC contributed a joint program managed by RIRDC to establish a Life Cycle Inventory for Australian Agriculture. Other partners in the project include FWPA, DA, GRDC, HIA, MLA and SRA.
Primary Industries Health and Safety Partnership	CRDC renewed its co-investment in the Primary Industries Health and Safety Partnership with RIRDC, GRDC, SRA and FRDC. The five-year partnership 2012-17 aims to improve the physical and mental health of farming and fishing workers and their families and the safety of the environment and work practices in these industries.
Spray drift minimisation	As the areas under conservation farming practices and GM herbicide-tolerant crop technology increase in cotton/grain producing regions, so too does the potential for spray drift damage to susceptible crops. CRDC, GRDC and Cotton Australia continued to co-invest in a program to map the location of farms where cotton is grown and invested in parallel to deliver spray application management training workshops to growers and agronomic advisors in their respective industries.
Insecticide resistance monitoring and management	CRDC and GRDC continued to co-invest in research to monitor resistance in <i>Helicoverpa armigera</i> and <i>Helicoverpa punctigera</i> to a range of pesticides commonly used on both crops.
Shared weed management issues	CRDC continued to collaborate directly with GRDC on the important issue of glyphosate resistance management.
Education	<p>CRDC is collaborating broadly with rural RDCs and universities through the national Primary Industry Centre for Science Education (PICSE). This program is building on a decade of success in attracting high school students into science education and, beyond that, to careers in science that support agriculture. Other rural RDCs co-investing in PICSE are GRDC, FRDC, DA, RIRDC and HIA. The universities involved are the University of Tasmania, University of Western Australia, University of Southern Queensland, and University of the Sunshine Coast and Flinders University.</p> <p>During the year CRDC continued a partnership with RIRDC, GRDC, HIA, SRA, AGWA, APL and AECL to invest in an undergraduate scholarship program, known as Horizon Scholarships. The program is managed by RIRDC. In 2014-15, CRDC supported 13 undergraduate Horizon scholars.</p>
Evaluating R&D return on investment	With significant taxpayer dollars invested in industry RD&E through the 15 RDCs, the CCRDC Chairs developed a rigorous external review process in 2006 to determine the value of these RD&E investments to the industries involved and to the Australian taxpayers. The CRRDC Chairs' commission an external review of randomly selected research projects from RDCs every three years.

CRDC partnerships with Australian Government

CRDC works in partnership with the Australian Government on a number of grant projects.

During 2014-15, CRDC managed four ongoing projects under Australian Government grant programs, contributing a combined \$3.3 million (2013-17) in RD&E funding to the benefit of the Australian cotton industry.

In addition, the Minister for Agriculture announced the successful projects under round one of the Rural R&D for Profit programme in May 2015, with CRDC leading one project (and involved in four other projects) under this grant programme (commencing in 2015-16). The CRDC-led project, Smarter Irrigation for Profit, will receive up to \$4 million in RD&E funding, for the benefit of the industry.

Ongoing projects 2014-15:

1. Improving energy efficiency on irrigated Australian cotton farms (*Funded 2013-15; \$500,411 from the Australian Government's Energy Efficiency Information Grants program, administered by the Department of Industry and Science*).

CRDC received a grant to deliver a two-year project focused on improving energy efficiency on irrigated Australian cotton farms. This project, which concluded in June 2015, aimed to improve energy efficiency and reduce energy costs on irrigated Australian cotton farms, through developing and extending a cost-effective process for irrigated cotton farmers to assess their overall energy use.

The project undertook 213 energy assessments of irrigated cotton businesses and compiled these into an important legacy document: *Improving Energy Efficiency in Australian Irrigated Cotton Production Benchmarking Report*. This report provides the cotton industry a comprehensive analysis of energy consumption, efficiency and future focus areas to continue to improve energy efficiency on irrigated cotton farms across Australia.

2. Carbon Farming in the Australian Cotton Industry (*Funded 2013-17; \$1,374,700 from the Australian Government's Carbon Farming Futures Extension and Outreach program, administered by the Department of Agriculture*).

CRDC received a grant to deliver a five-year project focused on carbon farming in the Australian cotton industry. This project integrates the latest information on carbon, climate variability and emissions management into the cotton industry's extension efforts, with the aim of improving resource use efficiency and reducing land sector emissions.

The project focuses on increasing the cotton industry's understanding of emissions reduction possibilities and sequestration; the opportunities, benefits and trade offs under the Emissions Reduction Fund; upskilling cotton and grain industry advisers, extension networks and key influences; and consolidating current, cross-sectoral science and providing a clear direction for future research, through a full-time Carbon Technical Specialist within the CottonInfo team.

3. Indirect emissions of nitrous oxide from broad acre irrigated agriculture (*Funded 2013-16; \$677,884 from the Australian Government's Carbon Farming Futures: Filling the Research Gap program, administered by the Department of Agriculture*).

CRDC received a grant to deliver a three-year project focused on identifying the indirect emissions of nitrous oxide from broad acre irrigated agriculture (specifically cotton).

The project recognises that irrigation water used in cotton production can contain significant concentrations of nitrate and dissolved nitrous oxide, and so irrigation water, and sediments deposited in channels, may be significant sources of nitrous oxide emissions. As a result, the project seeks to identify the extent of nitrous oxide emissions from the irrigation water to determine whether it is significant, and what the appropriate management responses could be to mitigate those emissions.

The project has found that up to 2.5 per cent of applied nitrogen in irrigated cotton systems can be lost as nitrous oxide emissions through denitrification, and that nitrous oxide emissions may be substantially reduced by management practices to improve nitrogen use efficiency (NUE). Improving NUE will also reduce fertiliser losses, cut on-farm input costs, and increase farm profitability.

4. Determining optimum N strategies for abatement of emissions for different irrigated cotton systems (Funded 2013-17; \$769,535 from the Australian Government's Carbon Farming Futures Action on the Ground program, administered by the Department of Agriculture).

CRDC received a grant to deliver a three-year project focused on determining optimum nitrogen (N) strategies for abatement of emissions for different irrigated cotton systems.

This project is undertaking trials to demonstrate nitrogen fertiliser management strategies – including variable rate fertiliser applications, rotational cropping with legumes and matching fertiliser rates to crop demands on irrigated cotton farms, in three climatic zones in NSW and QLD. The aim is to determine their influence on improving nitrogen use efficiency, reducing nitrogen oxide emissions and enhancing carbon sequestration.

Projects announced during 2014-15, commencing 2015-16:

1. Smarter irrigation for profit (Funded 2015-18; up to \$4 million from the Australian Government's Rural R&D for Profit programme, administered by the Department of Agriculture).

The Smarter irrigation for profit project is a partnership between the major irrigation industries of cotton, dairy, rice and sugar, led by CRDC in conjunction with DA, RIRDC, SRA and other research partners.

This large-scale, ambitious project is designed to achieve a 10-20 per cent improvement in water productivity, efficiency and farmer profitability, while also improving cross-sector industry research collaboration. It will target 3000 irrigators across the four industries, aiming to improve the profit of each individual irrigator enterprise by \$20,000-\$40,000 per annum through the adoption of automated and precision application technologies. The project will commence in July 2015.

Collaborative projects involving CRDC, commencing 2015-16:

2. Stimulating private sector extension in Australian agriculture to increase returns from R&D (Led by DA; \$1,595,000 from the Australian Government's Rural R&D for Profit programme, administered by the Department of Agriculture).

3. Improved use of seasonal forecasting to increase farmer profitability (Led by RIRDC; \$1,829,249 from the Australian Government's Rural R&D for Profit programme, administered by the Department of Agriculture).

4. A profitable future for Australian agriculture: Biorefineries for higher value animal feeds, chemicals, and fuels (Led by SRA; \$3,090,564 from the Australian Government's Rural R&D for Profit programme, administered by the Department of Agriculture).

5. Consolidating targeted and practical extension services for Australian Farmers and Fishers (Led by RIRDC; \$815,000 from the Australian Government's Rural R&D for Profit programme, administered by the Department of Agriculture).



Section 3 Corporate Operations

Business financials

RD&E investment priorities

Strategic research priorities

Rural R&D priorities



CRDC's investment in RD&E is funded through an industry levy and matching Commonwealth contributions. In 2014-15, CRDC invested \$23 million in cotton RD&E throughout the industry supply chain. In 2015-16, this figure is likely to equal \$21 million.

Cotton production in 2014-15 is estimated to be 2.2 million bales which is below the previous five year average of 3.9 million bales. Forward estimates by industry and ABARES are for continued below average cotton production. The decline in production will result in revenue declining below forecast expenditure, resulting in a deficit in 2014-15 and forecast deficits in 2015-16 to 2017-18.

To achieve the strategic priorities of the 2013-18 R&D plan, the CRDC is budgeting for \$100 million of expenditure during the five-year strategic plan.

Revenue

Cotton farmers pay a levy of \$2.25 for each 227 kilogram bale of cotton. Cotton levy revenue is collected at the point of ginning, that is, when cotton has been picked and delivered to cotton gins. This occurs from March to September of each calendar year, therefore cotton levy revenue in any financial year is drawn from two consecutive cotton crops.

The Australian Government provides a matching contribution to levy revenue. The contribution is based on the lesser of 0.5 per cent of a three-year rolling average of gross value of production, or equal to the cumulative levy receipts or up to 50 per cent of the cumulative total eligible expenditure on RD&E.

The setting and collection of the industry levy is enabled by the *Primary Industries (Excise) Levies Act 1999* and the *Primary Industries Levies and Charges Collection Act 1991*. The Australian Government matching contributions in 2014-15 were capped at the value of levies collected, as it was lower than the 0.5 per cent of the three-year average gross value of production.

Revenue (Actuals)	2014-15 (\$m)
Industry levies	7.298
Australian Government	7.295
Royalties	1.707
Interest	1.597
Grants	0.925
Other	1.252
TOTAL	20.073

Total revenue for 2014-15 of \$20.073 million was \$0.371 million (1.8 per cent) below budget of \$20.444 million.

Total revenue of \$20.073 million for 2014-15 comprised:

- Industry levy revenue of \$7.298 million, which includes \$5.319 million (63 per cent) of the 2013-14 crop and \$1.976 million (39 per cent) of the 2014-15 estimated crop.
- Australian Government contribution of \$7.295 million. Australian Government matching of expenditure was capped at the value of levies collected.
- \$1.707 million in royalties from the sale of CRDC-funded CSIRO seed varieties.
- Interest revenue of \$1.597 million was 88 per cent above budget, due to the higher level of cash reserves under CRDC management generated by above budget revenues in prior years.
- External grants included Carbon Farming Initiative \$0.186 million, Action on the Ground \$0.186 million, Filling the Research Gap \$0.227 million, Energy Efficiency Information \$0.256 million, third party project contributions of \$0.067 million.
- Other revenue of \$1.252 million, which includes project refunds.

Expenditure and investment

Actual expenditure for 2014-15 was \$22.826 million, a decrease of \$1.352 million over the budgeted expenditure of \$24.178 million. CRDC's increased capacity to invest in RD&E continues to attract research and scholarship funding applications.

Actual (\$m)	2010-11	2011-12	2012-13	2013-14	2014-15
Cotton Crop Size (millions of bales)	3.956	5.28	4.49	3.90	2.20*
Total Revenue	14.824	25.353	30.915	27.479	20.073
Industry levies	4.576	9.532	11.801	10.997	7.298
Australian Government	5.677	9.529	11.523	11.239	7.295
Royalties	2.789	3.145	3.971	1.830	1.707
Interest	0.805	1.401	1.726	1.779	1.596
National Program for Sustainable Irrigation**	0.399	1.293	-	-	-
Grants	0.350	0.426	1.356	1.243	0.925
Other***	0.228	0.027	0.538	0.411	1.252
Expenditure total	9.812	13.717	19.301	21.293	22.826
Cotton RD&E activities	8.063	10.682	15.632	18.203	19.244
Total equity position	15.54	27.317	38.931	44.488	41.645

* ABARES estimate, Agricultural Commodities June 2015.

** The National Program for Sustainable Irrigation (NPSI) concluded 30 June 2012.

*** Includes project refunds.

Portfolio Budget Statement

The CRDC Portfolio Budget Statement released in May 2015 provided an estimate of CRDC's outcomes, outputs, performance and financial position for 2015-16 to 2018-19. The statement was consistent with the CRDC Strategic R&D Plan 2013-18 and the Annual Operational Plan 2015-16.

Outcomes and outputs 2014-15

CRDC has one Government outcome: 'Adoption of innovation that leads to increased productivity, competitiveness and environmental sustainability through investment in research and development that benefits the Australian cotton industry and the wider community.'

Outcome	2014-15
TOTAL Budgeted Revenue	\$20,444,000
TOTAL Actual Revenue	\$20,073,365
TOTAL Budgeted Cost of Outputs	\$24,178,000
TOTAL Actual Cost of Outputs*	\$22,825,621

* Total cost is shown rather than total price because CRDC is primarily funded through industry levies rather than on the basis of the price of its Outputs. Each research project and its funding contributes to the Outcome. Total research expenditure for the Outcome is calculated, with the remaining expenditure attributed to the Outcome on a pro rata basis.

Forecast revenue

Water availability and commodity prices are the significant factors in forthcoming cropping decisions. The average storage level of public irrigation dams serving the Australian cotton growing region was 39 per cent of capacity in June 2015, down from 46 per cent at the same time in 2014 but still above the 10 year average of 29 per cent. The reduced availability of water is expected to limit cotton production and CRDC's revenue. CRDC manages the impact of fluctuating revenues accumulating financial reserves in good years to sustain expenditure through drought periods.

Seasonal inflows into the main cotton irrigation dams can be expected to November 2015. Similarly, soil moisture profiles can be expected to improve, which could enable recovery of planting in raingrown areas.

CRDC has budgeted for a \$9.723 million operating deficit for 2015-16. This reflects revenue of \$10.856 million and expenditure of \$20.579 million. Industry levy revenue and Commonwealth contributions will continue to be drawn from two crop seasons, 2014-15 and 2015-16.

The size of industry levies and Commonwealth contributions is heavily reliant upon crop production, which is budgeted to be 2.0 million bales for 2015-16. CRDC expects that the Australian Government matching contributions will be based on matching industry levy revenue in 2015-16.

Forecast expenditure

Budgeted expenditure for 2015-16 is \$20.579 million, a decrease of \$2.247 million below the 2014-15 actual expenditure. The contraction in expenditure is a result of the significant reduction in cotton production in 2014-15 and 2015-16. The forecast expenditure for the next two years for RD&E is budgeted at \$17.084 million in 2016-17 and \$15.333 million in 2017-18.

Forecast deficits

CRDC is a statutory body enabled by the *Primary Industries Research and Development Act 1989* with the rights of a body corporate and has the right to retain surplus funds. However, as a corporate Commonwealth entity, CRDC must seek approval from the Minister of Finance for a deficit in any year. CRDC has sought and received approval for deficits of \$9.723 million in 2015-16, \$5.727 million in 2016-17 and \$2.118 million in 2017-18.

Corporate Operations

RD&E INVESTMENT PRIORITIES

As established in the 2103-18 Strategic R&D Plan, the CRDC actively seeks to achieve a balanced RD&E portfolio that considers the distribution of investment across:

- The five strategies: farmers, industry, customers, people, and performance.
- Types of research including basic, applied, blue-sky (futures) and extension.
- Within project risks.
- Timeframe to outcomes.
- Likely returns on investment.
- Economic, environmental and social outcomes.

It includes: RD&E that seeks to 'protect and defend' the production base from pest threats; RD&E focused on productivity increases while ensuring resource use efficiency; enhancing product value through the supply chain; building a capable industry; and an element of research discovery.

The CRDC invests in applied RD&E that improves productivity, biosecurity, natural resource management and manages climate variability concurrently given the interrelationships between the issues.

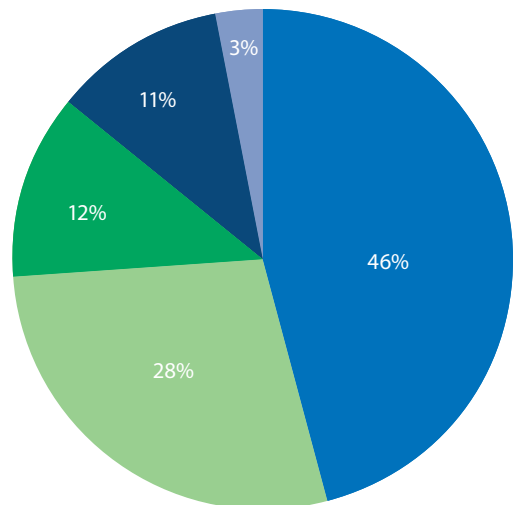
CRDC projects funded by CRDC program 2014-15

CRDC program	Farmers	Industry	Customers	People	Performance	TOTAL
Number of projects	70	48	21	88	12	239
Program expenditure (\$m)*	\$8.912	\$5.348	\$2.292	\$2.177	\$0.515	\$19.244
Program Percentage	46%	28%	12%	11%	3%	100%

* Excludes Cotton CRC projects and corporate research activities supporting RD&E planning and adoption. Some percentages have been rounded up or down.

CRDC projects funded by CRDC program 2014-15

Priority	
Farmers	46%
Industry	28%
Customers	12%
People	11%
Performance	3%
TOTAL	100%



Number of CRDC projects invested

CRDC projects	2010-11	2011-12	2012-13	2013-14	2014-15
Active projects	50	42	50	61	118
New projects funded	66	125	153	142	121
Projects completed	74	117	142	85	130
Continuing projects	42	50	61	118	109

The CRDC used the Strategic R&D Plan 2013-18 to guide its program investments in 2014-15. The Plan was developed with extensive industry, government and stakeholder consultation and was evaluated in the preparation of the Annual Operational Plan 2014-15. CRDC's investments addressed the Strategic Research Priorities, the Rural R&D Priorities of the Australian Government, industry priorities and the Cotton Sector RD&E Strategy.

Corporate Operations

STRATEGIC RESEARCH PRIORITIES

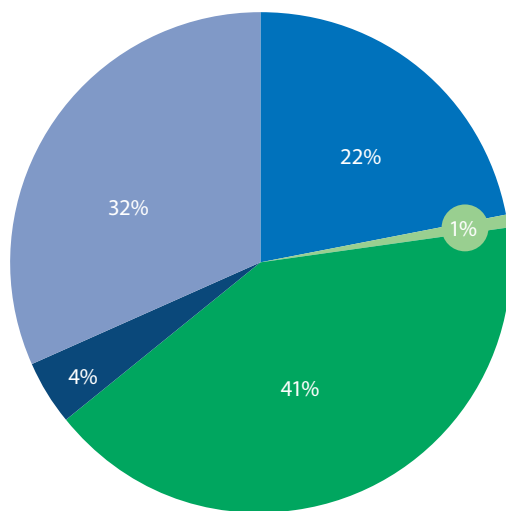
CRDC's investments in RD&E support the achievement of the Australian Government Strategic Research Priorities and Rural Research and Development Priorities. The alignment of CRDC program investments in 2014-15 can be viewed in detail at appendix 2 of this report.

On 26 May 2015, the Government announced nine new Science Research Priorities to replace existing Strategic Research Priorities. From 2015-2016 all CRDC-funded projects will be classified against the Science Research Priorities and CRDC's annual reports will outline how CRDC projects have addressed the priorities.

CRDC-funded projects by Strategic Research Priority in 2014-15

Strategic Research Priority (SRP)*	CRDC projects by Strategic Research Priority 2014-15
SRP 1 – Living in a changing environment	22%
SRP 2 – Promoting population health and wellbeing	1%
SRP 3 – Managing our food and water assets	41%
SRP 4 – Securing Australia's place in a changing world	4%
SRP 5 – Lifting productivity and economic growth	32%
TOTAL	100%

* Excludes Cotton CRC projects and corporate research activities supporting RD&E planning and adoption. Some percentages have been rounded up or down.



CRDC-funded projects by Strategic Research Priority in 2014-15

Priority	Percentage
Living in a changing environment	22%
Promoting population health and wellbeing	1%
Managing our food and water assets	41%
Securing Australia's place in a changing world	4%
Lifting productivity and economic growth	32%
TOTAL	100%

Corporate Operations

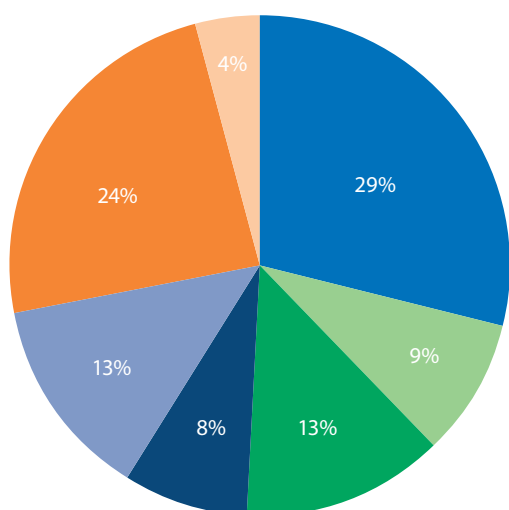
RURAL R&D PRIORITIES

As part of the *Agricultural Competitiveness White Paper* the Government developed clear, farmer-oriented priorities to target rural RD&E funding. The new priorities are advanced technology, biosecurity, soil, water, and managing natural resources and adoption of R&D. In support, CRDC submitted a response to the *Agricultural Competitiveness White Paper Issues Paper* in 2014, and will be implementing relevant initiatives for the cotton industry in 2015-16.

From 2015-2016 all CRDC-funded projects will be classified against the new Rural R&D Priorities and CRDC's annual reports will outline how CRDC projects have addressed the priorities.

CRDC-funded projects by Rural R&D Priority 2014-15

Rural Research and Development Priority (RRDP)	CRDC projects by Rural R&D Priority 2014-15
RRDP 1 – Productivity and adding value	29%
RRDP 2 – Supply chain and markets	9%
RRDP 3 – Natural resource management	13%
RRDP 4 – Climate variability and climate change	8%
RRDP 5 – Biosecurity	13%
RRDP 6 – Innovation skills (supporting priority)	24%
RRDP 7 – Technology (supporting priority)	4%
TOTAL	100%



CRDC-funded projects by Rural R&D Priority 2014-15

Priority

Productivity and adding value	29%
Supply chain and markets	9%
Natural resource management	13%
Climate variability and climate change	8%
Biosecurity	13%
Innovation skills (supporting priority)	24%
Technology (supporting priority)	4%
TOTAL	100%

Section 4

RD&E Portfolio

Government and industry priorities

Program 1: Farmers

Program 2: Industry

Program 3: Customers

Program 4: People

Program 5: Performance



GOVERNMENT AND INDUSTRY PRIORITIES

Primary Industries Research and Development (PIRD) Act 1989 – No.17, 1990 as amended by the *Rural Research and Development Legislation Amendment Act 2013*. Compilation start date: 13 December 2013, Includes amendments up to: Act No.146, 2013.

The objectives of this Act are to:

- a) make provision for the funding and administration of research and development relating to primary industries with a view to:
 - i) increasing the economic, environmental and social benefits to members of primary industries and to the community in general by improving the production, processing, storage, transport or marketing of the products of primary industries; and
 - ii) achieving the sustainable use and sustainable management of natural resources; and
 - iii) making more effective use of the resources and skills of the community in general and the scientific community in particular; and
 - iv) supporting the development of scientific and technical capacity; and
 - v) developing the adoptive capacity of primary producers; and
 - vi) improving accountability for expenditure on research and development activities in relation to primary industries; and
- b) make provision for the funding and administration of marketing relating to products of primary industries.

Australian Government	Industry
<p>Strategic Research Priorities *</p> <p>Living in a changing environment Identify strategies to develop resilient natural (ecosystems) and human environments (people, communities and their utilities and industry) that can all thrive in a changing environment.</p> <p>Promoting population health and wellbeing Build resilient communities and achieve a state of physical, mental and social wellbeing for all Australians.</p> <p>Managing our food and water assets Identify new food production practices and systems that can accommodate competing demands for soil and water while ensuring the long-term sustainability of these assets.</p> <p>Securing Australia's place in a changing world Identify ways to improve Australia's capacity to deliver national security and identify the means by which personal security in Australia will be safeguarded.</p> <p>Lifting productivity and economic growth Identify the challenges and opportunities in a changing world economy, particularly in the context of the economic rise of Asia, and help to build a resilient new economy so that Australia can thrive.</p>	<p>Rural R&D Priorities</p> <p>Productivity and Adding Value Improve the productivity and profitability of existing industries and support the development of viable new industries.</p> <p>Supply Chain and Markets Better understand and respond to domestic and international market and consumer requirements and improve the flow of such information through the whole supply chain, including to consumers.</p> <p>Natural Resource Management Support Effective management of Australia's natural resources to ensure primary industries are both economically and environmentally sustainable.</p> <p>Climate Variability and Climate Change Build resilience to climate variability and adapt to and mitigate the effects of climate change.</p> <p>Biosecurity Protect Australia's community, primary industries and environment from biosecurity threats.</p> <p>Supporting priorities:</p> <ul style="list-style-type: none"> ■ Innovation skills. ■ Technology.
	<p>Cotton Industry Priorities</p> <ul style="list-style-type: none"> ■ Invest in the skills, strengths and occupational health and safety of the human resources in the cotton industry and its communities. ■ Improve the sustainability of the cotton industry and its catchments. ■ Improve the profitability of the cotton industry. ■ Create and support a strong, focused and committed research program.

Cotton Sector RD&E Strategy five priorities: 1. Better plant varieties, 2. Improved farming systems, 3. People, business and community, 4. Product and market development and 5. Development and delivery.
Cross sectoral strategies include: climate change, soils, plant biosecurity and water use.

CRDC Strategic R&D Plan five programs: Farmers, Industry, Customers, People and Performance.

* On 26 May 2015 the government replaced the Strategic Research Priorities with nine new national Science and Research Priorities. From 1 July 2015 CRDC projects will address these new priorities.

RD&E Portfolio

PROGRAM 1: FARMERS

Outlined below is a selection of the key projects invested in by CRDC under the farmers program during 2014-15.

Program 1: Farmers			
Program	Farmers		
Outcome	Cotton is profitable and consistently farmers' crop of choice.		
Measure	Farmers increase productivity by three per cent per hectare per year		
Theme	1.1 Successful Crop Protection	1.2 Productive Resource Efficiencies	1.3 Profitable Futures
Strategy Outcomes	Cotton crops protected from pest, weed and disease threats.	Inputs for cotton production are optimised.	Innovations in cotton production.
Will be achieved by	1.1.1 Monitoring and investigating the ecological behaviours and responses of cotton pest, weeds and diseases. 1.1.2 Testing practices that deliver improved management of insect pests, weeds and diseases. 1.1.3 Improving capacity, knowledge and adoption of techniques to successfully protect the cotton crop.	1.2.1 Delivering benchmarks of on-farm resource use efficiencies. 1.2.2 Developing and proving decision systems and practices that deliver optimal resource efficiencies on cotton farms. 1.2.3 Developing new systems and tools to support farm decision-making processes. 1.2.4 Improving capacity, knowledge and adoption of techniques to optimise resource uses.	1.3.1 Investigating the application of new technologies and different scientific approaches which have the potential to deliver significant improvements and economic returns to the cotton farming system.
Measures of success	Farmers are able to improve their crop management practices based on sound science. <ul style="list-style-type: none"> 85 per cent of farmers adopting improved practices that reduce the reliance on pesticide inputs. 50 per cent of farmers adopting improved practices that reduce the incidence of insect pests, weeds and diseases affecting cotton on their farm. World-class science foundations for managing ecological adaptations in cotton insect pests, weeds and diseases. 	Farmers are able to increase their productivity: <ul style="list-style-type: none"> per hectare of land. per unit of nitrogen fertiliser. per ML water. per unit of CO₂ equivalent emitted. 	Farmers are profitable: <ul style="list-style-type: none"> Improving gross margins for Australian cotton production systems. On-farm innovations and partnerships established to drive profitability.

Key program investments

This section provides a snapshot of some of CRDC's investments during 2014-15 in this program area. The full list of CRDC's investments for this period can be found at appendix four: the RD&E portfolio.

Successful Crop Protection: Monitoring and investigating the ecological behaviours and responses of cotton pest, weeds and diseases – testing practices that deliver improved management of insect pests, weeds and diseases.

Significant advancements have been made in protecting cotton from insect pests, weeds and diseases, but new threats and challenges continue to emerge. The RD&E focus is on developing strategies and practices that support farmers in addressing these challenges.

CRDC's 2014-15 investment in this area included the following projects:

- *Diseases of Cotton XI*, with NSW DPI;
- *Fusarium wilt management in cotton*, with the Queensland Department of Agriculture;
- *Establishing southern cotton – IPM*, with NSW DPI;
- *Hard to control weeds in the northern cotton farming system*, with NSW DPI; and
- *Management options enhancing beneficial microbial functions in cotton soils*, with CSIRO.

The *Diseases of Cotton XI* project and the *Fusarium wilt management in cotton* project provide pathology diagnostic services, biosecurity preparedness and surveillance capacity for the cotton industry. These projects collaborate to conduct annual disease surveillance on commercial cotton farms, recording the presence or absence of exotic cotton diseases, as well as recording the incidence and severity of endemic disease and other pathology related issues.

The *Diseases of Cotton XI* project investigates the management of *Verticillium* wilt; the potential interactions between the pathogens *Verticillium dahliae* and *Thielaviopsis basicola*; and provides an independent evaluation of the effectiveness of existing and novel treatments for seedling disease and black root rot. The research team has assessed the potential of winter biofumigation crops for their potential to suppress black root rot and *Verticillium* wilt, and have determined they are not economically viable for an Australian cotton farming system.

The *Fusarium wilt management in cotton* project aims to reduce the impact of *Fusarium* wilt and other diseases on cotton production. With support from the *Diseases of Cotton XI* project, this project has investigated the diversity of *Verticillium dahliae* in cotton, and has discovered that there is more than one strain of *Verticillium dahliae* affecting Australian cotton, and that there is variation in the virulence within these strains.

Research into reniform nematodes is also undertaken as part of this project: looking to understand their distribution, threshold population, impact and management in cotton. It has been found that reniform populations are increasing in some fields in central QLD with significant yield losses being recorded; in some cases up to 40 per cent.

The *Establishing southern cotton – IPM* project aims to determine the applicability of pest recommendations developed for northern cotton to southern production areas, with their shorter growing season and higher solar radiation.

This project specifically looks at thrip species – their composition, evaluation of thresholds and management, and seasonal patterns of cotton invertebrate abundance – and involves the collection of crop phenology data to contribute to the OZCOT cotton model, which underpins many agronomic recommendations. In the project's first 12 months, trials were conducted at four sites in the Riverina.

The *Hard to control weeds in the northern cotton farming system* project looks to build industry capacity to address difficult-to-control and herbicide-resistant weeds in the cotton farming system.

It aims to improve the understanding of the factors that influence the efficacy of glyphosate and group A herbicides on key weeds. An experiment is currently underway to investigate the impact of tillage operations for pupae busting on weed ecology. The project will also conduct controlled studies to help understand the key drivers and processes in controlling awnless barnyard grass and other hard-to-kill weeds.

PROGRAM 1: FARMERS

A key component of the project is survey work across cotton growing regions to complement existing datasets collected by other weed scientists, with a particular focus on collecting herbicide resistance information. A total of 144 fields were surveyed during the 2014-15 season. The survey identified dominant weed species; the dominance of weeds in raingrown, overhead and flood irrigation systems; and the potential for reinfestation of fields from thick population of weeds in irrigation systems and along boundaries. Weed seeds collected will be tested for herbicide resistance and used for molecular studies through collaboration with a University of Queensland project.

The *Management options enhancing beneficial microbial functions in cotton soils* project investigates how microbial communities are impacted by on-farm management practices. Differences in microbial activity, diversity and nitrogen mineralisation potential have been found studying long-term experiments at the Australian Cotton Research Institute: these findings will help inform management decisions on rotation and stubble management.

A six-month controlled environment experiment was conducted to determine the effect of different types of compost materials on microbial activity, populations and nutrient turnover processes. Results from the first two months of the experiment have indicated that not all composts improved microbial activity although some changes in the catabolic composition (ability to utilise a wide range of carbon substrates) were observed.

The project is also working in collaboration with the state department pathology teams to link the observations on soil fungal communities with disease incidence and yield. Results to date indicate that soil type, environment and cropping history have a significant influence on the composition and diversity of soil fungal and bacterial communities in cotton soils. Results indicate that in addition to the pathogen, changes in soil fungal communities may play a notable role in soilborne disease incidences in cotton.

Productive Resource Efficiencies: Delivering benchmarks of on-farm resource use efficiencies.

Increasing resource pressures are pushing up prices for key on-farm inputs, like water, energy and fertiliser. CRDC's R&D investment helps to measure and evaluate the benchmarks of on-farm resource use efficiencies.

CRDC's 2014-15 investment in this area included the following key projects:

- *Irrigation benchmarking of lateral move and centre pivot systems in the Queensland Murray-Darling Basin*, with the Queensland Department of Agriculture and Fisheries; and
- *Assessing the impacts of new harvesting technologies on cotton*, with the National Centre for Engineering in Agriculture.

The *Irrigation benchmarking of lateral move and centre pivot systems in the Murray-Darling Basin* project provides an Australian examination of changes in design, operation and management of centre pivot and lateral move (CPLM) irrigation systems. The project compares data collected from cotton farms in NSW and QLD in 2011 with data collected in 2001 – covering 173 systems irrigating an area of 13,969ha.

The project found that the number of CPLM systems used within the cotton industry had significantly increased during this time, with two leading factors driving the adoption of CPLM systems: water savings and labour savings. The study found that the average water applied by CPLM systems in 2011-12 was 30 per cent less than that applied using furrow irrigation, whilst maintaining similar yields. Meanwhile, the labour requirement indicated by growers for centre pivots and lateral moves was 25 per cent and 30 per cent respectively of that required for furrow irrigation.

The resulting report, *Review of Centre Pivot and Lateral Move irrigation installations in the Australian Cotton Industry*, makes recommendations for growers to consider regarding investment in CPLM systems and is available from the CottonInfo website: www.cottoninfo.com.au/publications.

CASE STUDY: Increasing water use efficiency at Boggabri

Irrigated cotton makes up 70-80 per cent of the “Kilmarnock” business, however as irrigation water availability has reduced, Andrew Watson’s farming operation has had to increase water use efficiency in his farming operation.

Andrew (pictured) says the ‘millennium’ drought prompted him to make improvements in irrigation management and to install new infrastructure. Those changes have resulted in higher crop yields produced with less water.

With sufficient bore water to grow about 260ha cotton annually, Andrew has invested in overhead lateral move irrigation systems to increase water use efficiency on this area of cotton.

In 2013, Andrew’s first year using overhead irrigation, the lateral move system achieved a 17 per cent yield gain with 12 per cent water savings, compared to the furrow system. Andrew now has two years of wheat data and three years of cotton data under his lateral move sprinkler systems. In two out of the three years, water savings have been recorded.

“We’ve already seen a substantial water saving of one ML/ha, comparing furrow with lateral move irrigation (7.5 ML vs 6.5 ML),” said Andrew.

“Saving a megalitre of water is significant! We have seen a 15-17 per cent water saving in total in the 2014-2015 season. If I can save this kind of water every year, I’m well ahead in the long-term.

“Potentially we think we could produce the same amount of crop with 25 per cent less water compared to the furrow system.”

Andrew’s on-farm findings in water use efficiency savings using lateral move irrigators are reflected in the findings of the CRDC-funded *Review of Centre Pivot and Lateral Move irrigation installations in the Australian Cotton Industry* report.

For Andrew’s full case study, please visit www.cottoninfo.com.au/publication-type/case-studies. For the full Centre Pivot and Lateral Move report, please visit www.cottoninfo.com.au/publications.



PROGRAM 1: FARMERS

The *Assessing the impacts of new harvesting technologies on cotton* project seeks to assess the impacts of the round bale cotton picker (the John Deere JD7760) on the farming system, and to develop strategies to optimise its operating potential.

The study has particularly focused on managing the increased soil compaction and energy use of the JD7760, due to its 40 tonne operating weight (double that of the conventional cotton picker). The research has confirmed soil moisture as the major management issue regarding compaction impact of the JD7760. A number of in-field trials using controlled traffic farming systems, based on a 60 inch row-spacing, have demonstrated potential benefits with a controlled traffic system. The project is also investigating the effectiveness of different post-harvest tillage remediation options.

Productive Resource Efficiencies: Developing and proving decision systems and practices that deliver optimal resource efficiencies on cotton farms; Developing new systems and tools to support farm decision making processes.

Ensuring growers can achieve optimal resource efficiencies of key input resources is a key focus for the cotton industry's R&D. CRDC's investment focuses on developing, identifying and testing decision systems and practices to help growers improve their efficiencies.

CRDC's 2014-15 investment in this area included the following key projects:

- *Applying plant-based measurements for irrigation in water limited environments*, with CSIRO;
- *Indirect emissions of nitrous oxide from broad acre irrigated agriculture*, with CSIRO;
- *Monitoring greenhouse gas emissions from irrigated cropping systems*, with CSIRO;
- *Optimising water and nitrogen fertiliser management in cotton*, with NSW DPI;
- *The physiology of cotton crop nutrition, shade and waterlogging* (PhD project), with USYD; and
- *Resilient cotton-farming systems in irrigated Vertisols: soil quality, carbon and nutrient losses, cotton growth and yield in long-term studies*, with NSW DPI.

The *Applying plant-based measurements for irrigation in water limited environments* project has developed a

modified stress-time temperature threshold using crop canopy sensors for irrigated cotton to suit Australian conditions. This research has adapted a temperature stress threshold, BIOTIC, originally developed by the United States Department of Agriculture, based on the biological optimum for plant physiological functions.

The BIOTIC method was developed to trigger irrigation by minimising the time a crop is exposed to temperatures exceeding its biological optimum to a pre-determined temperature-time threshold. While this approach was well suited to drip or overhead irrigation systems, it could not be used for scheduling furrow irrigation.

As a result, the Australian research team have been working to adapt the system to enable the use of canopy temperature to improve irrigation scheduling using a stress-time threshold. The team developed algorithms and associated software to determine how much exposure to stress the crop can tolerate without losing yield before it needs to be irrigated. The researchers tested the stress-time threshold in Narrabri and Emerald this year and confirmed Australian cotton irrigators can use canopy sensors and the stress-time threshold to manage irrigation as successfully as an experienced irrigator.

The *Indirect emissions of nitrous oxide from broad acre irrigated agriculture* project is funded under the Australian Government's Carbon Farming Futures: Filling the Research Gap program, administered by the Department of Agriculture.

The project recognises that irrigation water used in cotton production can contain significant concentrations of nitrate and dissolved nitrous oxide, and so irrigation water, and sediments deposited in channels, may be significant sources of nitrous oxide emissions. As a result, the project seeks to identify the extent of nitrous oxide emissions from the irrigation water to determine whether it is significant, and what the appropriate management responses could be to mitigate those emissions.

The project has found that up to 2.5 per cent of applied nitrogen in irrigated cotton systems can be lost as nitrous oxide emissions through denitrification, and that nitrous oxide emissions may be substantially reduced by management practices to improve nitrogen use efficiency (NUE). Improving NUE will also reduce fertiliser losses, cut on-farm input costs, and increase farm profitability.

The *Monitoring greenhouse gas emissions from irrigated cropping systems* project aims to continuously measure the nitrous oxide emissions from a cotton-wheat-legume cropping sequence, to identify advanced crop management systems that reduce the cotton industry's carbon and nitrogen footprint.

In particular, the project will help answer three challenging questions for irrigated cropping systems: Are high inputs of N fertiliser sustainable or contributing to excessive GHG/nitrous oxide emissions? Are GHG emissions lower from legume-based cropping systems compared with traditional fertiliser-based systems? And, is it possible to produce high-yielding cotton in a carbon-neutral or carbon-positive manner?

This project will also calibrate the carbon and nitrogen components of the full carbon accounting model used by the Department of the Environment and APSIM Australia. Current knowledge is limited to validate these models to improve our understanding of the dynamics of carbon and nitrogen in irrigated cropping systems.

In addition, the project will develop information on how to improve the methodology of sampling nitrous oxide from fixed chambers; given the highly variable nature of these emissions, and their use in setting national policy, robust and agreed sampling protocols are critical.

The recently-commenced *Optimising water and nitrogen fertiliser management in cotton* project will collaborate with other nitrogen related research projects to build a comprehensive understanding of nitrogen loss pathways in cotton farming systems. The research will focus on the impact of various irrigation and nitrogen application strategies on nitrogen uptake, nitrogen use efficiency, fibre quality and yield.

The *physiology of cotton crop nutrition, shade and waterlogging* PhD project will provide experimental data to better understand crop responses to waterlogging, and develop practical management techniques to help crops recover from waterlogging stress.

Currently, the ability of an ethylene inhibitor, AVG, to mitigate the effects of waterlogging is being confirmed by the research, which is also developing insights into how it does so. An optimum rate (125g per hectare, applied 24 hours before waterlogging) has been identified.

The project has found that pre-waterlogging application of AVG increased fruit retention of waterlogged plants, with an approximate 15 per cent improvement in yield, due to a combination of improved fruit retention, total fruit numbers and boll weight. A comparison between a waterlogging-sensitive variety and waterlogging-tolerant variety highlighted that while ethylene accumulation in the leaves of both varieties was significant and similar, there was higher ethylene accumulation in the young squares of the waterlogging-sensitive variety, indicating a tolerance mechanism.

The *Resilient cotton-farming systems in irrigated Vertisols: soil quality, carbon and nutrient losses, cotton growth and yield in long-term studies* project investigates why theoretical estimates of soil carbon sequestration do not coincide with measured values of soil carbon.

The project particularly seeks to better understand the movement and fate of carbon in irrigated cotton farming systems, and fill in the gaps related to post-sequestration losses, and to investigate the effect of selected management practices on carbon sequestration, soil quality, water conservation, yield and profitability. Preliminary results suggest that in-field sediment and organic carbon enrichment is occurring as a result of irrigation.

Productive Resource Efficiencies: Improving capacity, knowledge and adoption of techniques to optimise resource uses.

Ensuring that information on improved resource efficiency is extended to growers is a key focus for the industry's RD&E effort.

CRDC's 2014-15 investment in this area included the following key projects:

- *Improving energy efficiency on irrigated Australian cotton farms*, with the National Centre for Engineering in Agriculture;
- *Carbon farming in the Australian cotton industry*, with Jon Welsh;
- *Cotton Irrigation Technology Tour*, with NSW DPI; and
- *Professor of soil biology*, with UNE.

The *Improving energy efficiency on irrigated Australian cotton farms* project, which concluded in June 2015, was a project funded by the Australian Government's Energy Efficiency Information Grants program, administered by the Department of Industry and Science.

PROGRAM 1: FARMERS

It aimed to empower irrigated cotton growers to improve energy efficiency and reduce energy costs through an industry-wide campaign that provided tailored energy efficiency information and tools to growers and their advisers. Over 1,000 irrigated cotton farms participated directly in energy efficiency activities and events under this project, with almost 30 written information resources developed and delivered to 850 irrigated cotton growers via thirteen field days, workshops and training sessions, including two large scale events, the energy-efficiency Big Day Outs.

In addition, the project captured 213 energy assessments of irrigated cotton businesses and compiled these into an important legacy document: *Improving Energy Efficiency in Australian Irrigated Cotton Production Benchmarking Report*. This report provides the cotton industry a comprehensive analysis of energy consumption, efficiency and future focus areas to continue to improve energy efficiency on irrigated cotton farms across Australia. This data highlights the significance of diesel as the dominant energy source in the Australian cotton industry and identifies irrigation efficiency as an area of particular focus to implement energy efficiency activities on irrigated cotton farms.

The *Carbon farming in the Australian cotton industry* project is funded under the Australian Government's Carbon Farming Futures Extension and Outreach program, administered by the Department of Agriculture.

The project integrates the latest information on carbon, climate variability and emissions management into the cotton industry's extension efforts, with the aim of improving resource use efficiency and reducing land sector emissions in the cotton industry.

Through the appointment of a carbon technical specialist within the cotton industry's extension team, CottonInfo, the project focuses on increasing the cotton industry's understanding of emissions reduction possibilities and sequestration; the opportunities, benefits and trade-offs under the Emissions Reduction Fund; upskilling cotton and grain industry advisers, extension networks and key influences; and consolidating current, cross-sectoral science and providing a clear direction for future research.

Of late, the project has delivered eight cotton and nitrogen workshops, three webinars and two energy-efficiency Big Day Outs for growers, with survey responses showing positive gains in grower awareness around the areas of nitrogen, natural resource management and seasonal forecasting.

The *Cotton Irrigation Technology Tour* short project, which ran from February to March 2015, delivered a series of three irrigation technology field days to growers across the cotton growing valleys, showcasing the latest irrigation scheduling and automation field-scale irrigation research.

The tour took seven leading CRDC-funded irrigation researchers out to growers to demonstrate new and emerging irrigation scheduling and management technologies – highlighting the advantages and practical benefits of each technology for optimising yield and water use efficiency in each environment.

The tour was comprised of three field days: one at Emerald in Central Queensland; one at Moree in the Gwydir Valley; and one at Nevertire in the Macquarie Valley. Technologies featured included IriSAT (weather-based irrigation scheduling); canopy temperature sensors (plant-based scheduling); dynamic deficit scheduling; EM38 soil moisture monitoring; VARIwise (site-specific surface irrigation and fertigation using adaptive control); and smart automation in furrow irrigation.

More than 200 growers and consultants attended the field days, providing valuable feedback on irrigation research. The post-event surveys indicated that 97 per cent of attendees had an improved knowledge of the irrigation technologies and how they can be used on their farms as a result of the tour; 95 per cent believed that R&D was very important to their business; and 60 per cent were likely to adopt the irrigation technologies on farm. In addition, feedback on specific areas of information sought by growers has resulted in follow up events featuring individual technologies and researchers.

The *Professor of soil biology* project sees the appointment of a soils system professor at the University of New England. The professor is tasked with developing an improved understanding of below ground agronomy, and supporting improvements in fertiliser use and management.

Specific activities within this role include: investigating the causes and implications of changes (reduction) in rooting depth in some cotton growing regions; the identification and impact of cotton root exudates; investigation of links between changes in populations of reniform nematode and damage to cotton crops; a review of nitrogen fertiliser management; and the role of microbiota in deep carbon storage. The professor also acts as the coordinator of the UNE 'Cotton Hub': designed to bring together UNE's cross-disciplinary work on the issues affecting cotton production.

CASE STUDY: Energy efficiency audit to deliver cost savings in the Downs

An energy efficiency audit of the new overhead irrigation system on Adam McVeigh's Darling Downs farm in southern Queensland has set him on the path to reducing emissions and making big savings in energy costs.

The audit, which was conducted through the cotton industry's *myBMP* energy and input efficiency module, has given Adam (pictured) the accurate, hard data he needs to make adjustments to the system to help control emissions and maximise energy efficiency.

"The great thing about it is to get a better understanding of the capabilities of the system and how we can fine tune it to get maximum efficiency," he said.

"The recommendations from the report are the really valuable part. There are some minor changes that can potentially reduce energy consumption, leading to 10 per cent savings in energy costs, which also helps lower the carbon footprint of the business by reducing emissions."

This audit was part of the *Improving energy efficiency on Australian cotton farms* project, conducted by the National Centre for Engineering in Agriculture (NCEA) and supported by funding from the Commonwealth Department of Industry and Science and CRDC.

For Adam's full case study, please visit www.cottoninfo.com.au/publication-type/case-studies.



PROGRAM 2: INDUSTRY

Outlined below is a selection of the key projects invested in by CRDC under the industry program during 2014-15.

Program 2: Industry			
Program	Industry		
Outcome	The Australian cotton industry is the global leader in sustainable agriculture.		
Measure	Industry can report against recognised sustainability indicators.		
Theme	2.1 Respected Stewardship	2.2 Responsible Landscape Management	2.3 Sustainable Futures
Strategy Outcomes	Industry protects its production technologies and its biosecurity.	Industry leads in managing natural assets.	An industry achieving its vision.
Will be achieved by	<p>2.1.1 Monitoring for and investigating changes in pest and weed susceptibility to biotechnologies and crop protection products used by the cotton industry.</p> <p>2.1.2 Exploring tactics and strategies that lower the risks of pesticides to the environment and resistance evolution in populations of key insect pests and weeds.</p> <p>2.1.3 Developing and supporting the industry's capacity to effectively steward key technologies and products.</p> <p>2.1.4 Supporting the industry's preparedness and ability to deal with biosecurity threats.</p>	<p>2.2.1 Defining the values and drivers relating to the management of natural landscapes and systems in cotton growing regions.</p> <p>2.2.2 Recording and demonstrating improved environmental performance of the cotton industry.</p> <p>2.2.3 Identifying and proving integrated management strategies which deliver environmental and productivity gains.</p> <p>2.2.4 Researching the connectivity between cotton farms and natural systems in the landscape.</p> <p>2.2.5 Supporting initiatives and partnerships to improve the knowledge and capacity to manage natural landscapes and systems in cotton regions.</p>	<p>2.3.1 Scoping and investigating critical threats and opportunities which may influence the long-term sustainability of the Australian cotton industry.</p> <p>2.3.2 Supporting innovative approaches to solve traditional industry issues and drive future sustainability.</p>

Program 2: Industry			
Program	Industry		
Outcome	The Australian cotton industry is the global leader in sustainable agriculture.		
Measure	Industry can report against recognised sustainability indicators.		
Theme	2.1 Respected Stewardship	2.2 Responsible Landscape Management	2.3 Sustainable Futures
Measures of success	<p>Industry is able to maintain its access to, and the effectiveness of, biotechnologies and crop protection products.</p> <ul style="list-style-type: none"> 100 per cent of cotton farmers are aware of the underlying risks of trait and agricultural chemical resistance. 100 per cent of insecticide use decisions are consistent with the Insecticide Resistance Management Strategy (IRMS). The cotton industry has the necessary science to provide informed input into the development of resistance management plans for biotech traits. The cotton industry demonstrates pesticide management practices that lower the risks posed to the environment and the evolution of resistance in target insect pest and weed populations. <p>Industry is capable of managing its biosecurity responsibilities.</p> <ul style="list-style-type: none"> The cotton industry is able to meet its biosecurity obligations. The cotton industry is prepared to effectively respond to biosecurity incursions. 	<p>Industry participation in the collective management of natural landscapes.</p> <ul style="list-style-type: none"> Regional delivery partnerships for every major cotton growing region. <p>Industry recognised for its leadership in environmental performance.</p> <ul style="list-style-type: none"> Recognition by national and global initiatives for biodiversity management. 1000km of riparian lands managed under best practice. One million hectares of floodplain vegetation managed under best practice. <p>Industry contributes to the improvement of landscape systems knowledge and science.</p> <ul style="list-style-type: none"> A comprehensive database documenting the extent and condition of the natural assets the industry utilises and manages. Two national science-based collaborations for the industry to inform surface and groundwater management. 	<p>Industry is capable of leading and adapting to change.</p> <ul style="list-style-type: none"> Innovations and partnerships established to drive cotton industry sustainability.

Key program investments

This section provides a snapshot of some of CRDC's investments during 2014-15 in this program area. The full list of CRDC's investments for this period can be found at appendix four: the RD&E portfolio.

Respected stewardship: Exploring tactics and strategies that lower the risks of pesticides to the environment and resistance evolution in populations of key insect pests and weeds; Monitoring for and investigating changes in pest and weed susceptibility to biotechnologies and crop protection products used by the cotton industry.

Stewardship refers to protecting the long-term effectiveness of the chemicals and technology used to control pests and weeds in the Australian cotton industry. Resistance is an outcome of exposing pest or weed populations to a strong selection pressure, such as an insecticide or herbicide. Genes for resistance naturally occur at low frequencies in most populations.

Once a selection pressure is applied, such as an insecticide or from a biotechnology trait, resistance genes can increase in frequency as resistant individuals are more likely to survive and produce offspring. If selection continues, the proportion of resistant individuals may increase in the population until reduced effectiveness of the toxin is observed in the field.

Ensuring that key insect pests and weeds do not become resistant to biotechnology or crop protection products is of critical importance to the industry.

In 2014-15, CRDC continued its support of this important research area through key projects, including:

- *Area-wide pest suppression in transgenic landscapes: implications for Insect Resistance Management (IRM)*, with CSIRO;
- *Managing Bt resistance and induced tolerance with effective refuge crops in preparation for Bollgard 3[®]*, with CSIRO; and
- *Molecular genetic methods to detect neonicotinoid resistance in cotton aphids* (PhD project), with NSW DPI.

The *Area-wide pest suppression in transgenic landscapes: implications for Insect Resistance Management (IRM)* project aims to increase the flexibility and value of the Resistance Management Plan (RMP): one that extends refuge options for the *Helicoverpa* spp. moths

(*H. punctigera* and *H. armigera*). The project will achieve this by establishing how the configuration of refuges and crops in cotton-grain landscapes influence the mechanisms responsible for delaying the evolution of resistance, and area-wide pest suppression. The project is specifically investigating how the size, proportion and location of crops (Bt and non-Bt) in the landscape alters the proportion of the *Helicoverpa* spp. population under selection, their reproductive potential and their ability to find mates.

The data collection for this project is now complete, providing a comprehensive data set of *Helicoverpa* spp. in cotton (over five years), sorghum (over three years) and pigeon pea (over two years). This final data set is being used for statistical analysis and simulation modelling. A general model for each *Helicoverpa* spp. has been developed and includes the incorporation of real-landscape data such as the amount of crops, mandated and unmandated refuge, and an evaluation of the role of planting windows in the development and delay of resistance.

The *Managing Bt resistance and induced tolerance with effective refuge crops in preparation for Bollgard 3[®]* project aims to improve the ability of refuges to counter the threat of resistance developing via genetic mutation, and the potential threat of crop failure via inducible tolerance. By accessing and countering these threats, while concurrently developing better refuge management and benchmarking techniques to improve refuge governance, the ultimate aim is to avoid the cost of losing Bt cotton efficacy.

The project is investigating how well refuges work in practice, and whether *Helicoverpa* can become tolerant of Bt as a consequence of successive generations being exposed to low doses of the Bt proteins, and can therefore survive without resistant genes.

The *Molecular genetic methods to detect neonicotinoid resistance in cotton aphids* PhD project aims to characterise causal mechanism of neonicotinoid resistance in the cotton aphid. Since the introduction of Bt cotton, secondary pests such as aphids and mites have become more prominent, requiring targeted insecticide control. These sprays have led to resistance in some species that have caused the chemical control to fail. The cotton industry seeks to manage insecticide resistance risk through the Insecticide Resistance Management Strategy (IRMS), which is underpinned by results from the insecticide and miticide resistance monitoring programs carried out each season.

CASE STUDY: In it for the long haul at Warren: the value of refuge crops

The use of insecticidal biotechnologies in Australian cotton is an integral part of the industry. In 2014 over 95 per cent of the cotton grown in Australia contained Bt technology. Protecting the use of this technology through good stewardship is critical to the cotton sector's future success.

Recognising the importance of Bt technology, Sinclair Steele, Farm Manager at Auscott – Warren (pictured), takes the view that while the management of refuge crops can create challenges, allowing the development of Bt resistance would create far greater complications for Auscott's farming system.

"We see establishing and managing a healthy refuge as an important part of our operation," said Sinclair.

"Our pigeon pea refuges are inoculated at planting, and residual herbicides are used to help ensure the refuge crops are healthy and weed free.

"The location of our refuges is also really important. Where possible, we plant the refuges upwind of the prevailing wind direction to minimise potential

Roundup Ready® herbicide drift onto the pigeon pea, and also to make sure the refuges aren't impeding Roundup sprays on our cotton fields.

"Having healthy, attractive refuges means we are doing our bit for resistance management."

CSIRO's resistance monitoring research, funded by CRDC, has shown that in both of the target species of *Helicoverpa* resistance to Cry2Ab is present, is higher than expected, and is probably increasing, according to CSIRO entomologist, Dr Sharon Downes.

This situation highlights that as the industry moves towards Bollgard 3, effective resistance management will continue to be critical to ensure the efficacy of the Bollgard technology is maintained.

"Refuge crops are a mandatory component of the Bollgard II Resistance Management Plan (RMP) and integral to the protection of the technology for future use," said Dr Downes.

For Sinclair's full case study, please visit www.cottoninfo.com.au/publication-type/case-studies.



PROGRAM 2: INDUSTRY

Recently there have been control failures against the insecticide group known as neonicotinoids, which are included in all cotton seed treatments and some foliar sprays. With the sustainable management of aphids in Australian cotton at risk, this project investigates molecular techniques to better understand and detect neonicotinoid resistance.

Respected stewardship: Supporting the industry's preparedness and ability to deal with biosecurity threats.

Biosecurity plays a critically important role in ensuring the sustainability of the Australian cotton industry: managing the risk of pests and diseases entering, emerging, establishing or spreading to avoid production losses, management and eradication costs, and potentially the loss of important overseas markets.

CRDC's 2014-15 investment in the area of biosecurity included these key projects:

- *Review of the Industry Biosecurity Plan for the cotton industry*, with Plant Health Australia;
- *Plant Biosecurity RD&E Strategy*, with Plant Health Australia; and
- *Networking remote diagnostics for the Australian cotton industry*, with the Plant Biosecurity CRC.

The *Review of the Industry Biosecurity Plan for the cotton industry* project was facilitated by Plant Health Australia, in consultation with the cotton industry, as part of its preparedness initiatives. The Industry Biosecurity Plan is a framework for coordinating biosecurity activities and investment, providing a mechanism to better prepare for, and respond to, incursions of pests that could have significant impacts on the cotton industry.

It aims to assist cotton growers to evaluate the biosecurity risks within their everyday farming and business activities; formally identify and prioritise exotic plant pests (not currently present in Australia); and focus on future biosecurity challenges. Once revised, the cotton Industry Biosecurity Plan will be sent to Cotton Australia for industry endorsement, before being provided to the Plant Health Committee for State and Australian Government endorsement.

The *Plant Biosecurity RD&E Strategy* is a component of the National Primary Industries RD&E Framework, an initiative of the Standing Committee on Primary Industries (SCoPI). The Strategy is a cross-sectoral strategy that establishes the future direction for

improving biosecurity RD&E for Australia's plant industries. CRDC and the other RDCs help to co-fund the Strategy, as an important collaborative effort to ensure Australia has world-leading science-based systems and capability for safeguarding our plant sector, including cotton, from biosecurity threats.

The *Networking remote diagnostics for the Australian cotton industry* project aims to facilitate remote or virtual pest identification: the first step in formulating pest management advice. It will provide a digital platform to facilitate in-field pest identification, and to record all pest information in a searchable database. The platform, Pestpoint, created by the Plant Biosecurity CRC, will allow users to create their own diagnostic networks, and capture and share pest observations with their networks or with selected diagnostic experts.

In the 2014-15 year, Pestpoint has been tested with the cotton industry. 29 people participated in the test group, including 16 Cotton Grower Services field agronomy staff from across the cotton growing valleys, and 13 specialists: pathologists, entomologists and weed scientists from CSIRO, NSW DPI, QDAF and QUT. Training workshops were conducted, with participants issued a portable wireless microscope paired with a mobile device and Pestpoint software.

Responsible landscape management: Defining the values and drivers relating to the management of natural landscapes and systems in cotton growing regions.

The Australian cotton industry recognises the need for sustainable and responsible landscape management and over the past decade has made significant gains in improving its environmental management. Industry research has shown the mutual benefits that can be gained from managing natural assets for both production and environmental outcomes.

CRDC's 2014-15 investment in this area includes the following key project:

- *Critical thresholds for riparian vegetation regeneration in the northern Murray-Darling Basin*, with Griffith University.

This project aims to address major knowledge gaps concerning the dynamics and resilience of riparian vegetation in cotton growing catchments of the northern Murray-Darling Basin.

The project seeks to predict the outcome on riparian vegetation in this region (including fringing and floodplain vegetation) of various land and water management and climate scenarios and to identify robust management interventions for maintaining biodiversity and key ecosystem functions and services.

To date, this project has focused on describing previously poorly known patterns of riparian vegetation recruitment in the northern Murray-Darling Basin and investigating potential drivers of these across multiple scales. Three field trips have been conducted, providing detailed information regarding physical habitat structure, groundcover composition and structure, tree population structure, lignum population structure and tree and lignum seedling abundance and distribution at 28 riparian sites across the MacIntyre, Weir, Balonne, Culgoa, Birrie, Bokhara, Narran and Barwon-Darling Rivers.

Two major mesocosm experiments have also been conducted. The first of these is examining the regenerative capacity of soils, litter and scats collected from the 28 sites. The second, which investigated interactive effects of litter, shade and flooding on vegetation regeneration from soil propagule banks, has been completed. Preliminary results indicate that canopy cover and litter loads are particularly significant drivers of riparian vegetation dynamics at local scales. Consequently any land management activities that impact on these, including clearing and grazing, have the potential to affect vegetation regeneration.

Responsible landscape management: Researching the connectivity between cotton farms and natural systems in the landscape.

The connectivity between cotton farms and the natural landscapes within which they operate is an area that CRDC invests in to help improve the available knowledge and science.

In 2014-15, CRDC's investment in this area included the following key project:

- *Quantifying the uncertainty associated with predicting CSG production impacts*, with the University of New South Wales.

This project examined the impact of the expansion of coal seam gas (CSG) production in the Surat Basin on groundwater levels in the upper Condamine alluvium and the eastern portion of the Great Artesian Basin.

The research aimed to highlight any potential concerns that would impinge upon the future availability of groundwater to the irrigation sector, and benchmark the groundwater quality, major ion chemistry, and groundwater and air methane concentrations in priority areas in the Condamine Alluvium.

A combination of groundwater and degassing air samples (methane (CH₄) concentration and isotopic composition, dissolved organic carbon (DOC) isotopes and tritium (3H)) were collected from irrigation bores and government groundwater monitoring boreholes, while a mobile methane survey took continuous air samples in and around areas of agricultural and unconventional gas production.

The study has found that, interestingly, the chemistry of groundwater from irrigation bores throughout the Condamine catchment indicates that recharge to aquifer depths from which groundwater is pumped occurs only following rainfall of at least 400 millimetres per month – yet this occurs on average once every four years. Such rainfall is usually associated with extra-tropical lows in spring and autumn, and the remnants of tropical cyclones in summer. Floodwater is the primary, and in some places only source of groundwater recharge.

Responsible landscape management: Supporting initiatives and partnerships to improve the knowledge and capacity to manage natural landscapes and systems in cotton regions.

CRDC also invests in initiatives and partnerships to improve the knowledge and build the capacity of growers and the wider industry in managing natural resources.

Natural resource management (NRM) extension can be challenging: although cotton growers are by their very nature stewards of the land, encouraging interest in NRM can be difficult as it does not have a direct production or profitability correlation. The impact of NRM, of ecosystem services, is not measured in terms of bales per hectare or dollars per megalitre, but rather a holistic improvement in the farm's natural environment, in carbon sequestration, in green gas emissions, and in natural pest suppression – among other benefits.

As a result, extending this critical topic area to growers, their families and the wider community remains a key priority. CRDC's investment in this area for 2014-15 included the following key project:

- *National Cotton NRM Technical Specialist*, with Stacey Vogel Consulting.

PROGRAM 2: INDUSTRY

The NRM technical specialist sits with the industry's extension team, CottonInfo, and provides the technical NRM skills and knowledge required to assist industry to meet CRDC's NRM goals.

The specialist's role under this project includes supporting and demonstrating the cotton industry's best practice management of riparian lands and floodplain vegetation; implementing an innovative approach using social networks to increase the engagement of cotton growers in NRM; and leading the continuous improvement of the industry's best practice recommendations for NRM. The technical specialist is using innovative and diverse methods to reach the target audience, including the development of an app about birds on cotton farms as a form of pest control.

Sustainable futures: Scoping and investigating critical threats and opportunities which may influence the long-term sustainability of the Australian cotton industry.

Agricultural production, including cotton production, is becoming an increasingly complex business. Major uncertainties about global economics and international markets, shifting national policies and social values, demographic changes, competition for key resources, rapid technological change and the impact of an increasingly variable climate dominated by extreme events mean agricultural industries must continually adapt to changing circumstances.

In 2014-15, CRDC invested in the following key project to help scope and investigate critical threats and opportunities:

- *Resilience assessment of the Australian cotton industry at multiple scales, with Bel Tempo.*

This commissioned project recognises that the cotton industry – like other agricultural industries – needs tools and approaches to help understand how it fits into the bigger picture, and to develop and maintain capacity to navigate the challenging times ahead.

“Resilience thinking” is one such approach that is now being widely adopted globally to help communities, industries and governments alike deal with uncertain futures. Its strength is in revealing new insights about what is most critical, what changes are occurring and what actions and strategies need to be prioritised. The resilience assessment of the cotton industry has held four industry workshops to identify the critical interactions (relationships) and thresholds (tipping points) that determine the viability and sustainability of the industry at different scales.

Analysis of this data is now underway to provide insights into how to strategically manage these interactions and better prepare growers and the industry for future challenges and unexpected events. This project uses resilience thinking to explore the future of the cotton industry across the entire value chain from production to marketing and processing, providing a theoretical and practical platform for the industry and growers to explore, prepare for and manage future challenges and opportunities.

A study conducted as part of this project has found that the cotton industry is characterised by a positive attitude, a sense of optimism and an ability to respond well to threats and future challenges. The study identified the major challenges in the future for cotton as managing water and a variable climate, and found there is strong support for ongoing R&D, with more than 60 per cent of respondents identifying ongoing contributions to R&D as critical in meeting future challenges.

CASE STUDY: Demonstrating whole farm sustainability at Mungindi

“Wyadrigha” is a 3,600 ha, carbon-neutral property owned by the Barlow family, growing irrigated cotton just east of Mungindi on the NSW-QLD border.

The property, owned and managed by Anthony Barlow (pictured), has two significant riparian zones, one along the Boomi River on the south-eastern end of the property, and the other on the Barwon River on the north-western side. The natural vegetation consists largely of coolibah and black box woodland, with healthy stands of river red gums in the riparian zones.

The health of these zones is important to the Barlows, who have been involved in several studies to benchmark the condition of their riparian country, exploring their role in integrated pest management and their value in creating a carbon neutral farm.

In a continuing theme among cotton growers, the preservation of these areas is seen as important to maintain the aesthetic value of the places they call home.

“These areas are part of the natural landscape that needs preserving,” said Anthony. “In my experience, riparian zones on irrigated cotton farms clearly can’t be farmed, and are rarely grazed these days, so they aren’t negatively affected by selective or over-grazing, or by erosion of river banks from stock creating pads down to the water.

“That is the case with our riparian zones. The area along the Barwon River in particular hasn’t been stocked for about 30 years.

“As a result, our riparian areas received a good report card and the report on habitat complexity was impressive. It was great to get a deeper understanding and knowledge of the native vegetation on our farm,” said Anthony.

Going forward, Anthony believes that if the cotton industry wants to promote sustainability, the benefits and measurements of environmental health have to be quantifiable.

“It is one thing to say we are managing our land well, but to have this quantified through a close-up study is a powerful tool for the industry,” he said.

Anthony has been working closely with CottonInfo NRM Technical Specialist Stacey Vogel in her work to support and demonstrate the cotton industry’s best practice management of riparian lands and floodplain vegetation.

For Anthony’s full case study, please visit www.cottoninfo.com.au/publication-type/case-studies.



PROGRAM 3: CUSTOMERS

Outlined below is a selection of the key projects invested in by CRDC under the customers program during 2014-15.

Program 3: Customers			
Program	Customers		
Outcome	The Australian cotton industry captures the full value of its products.		
Measure	Double the premium for Australian cotton.		
Theme	3.1 Assured Cotton	3.2 Differentiated Products	3.3 Competitive Futures
Strategy Outcomes	The integrity and qualities of Australian cotton set global benchmarks for customers.	Customers recognise the differentiated value of Australian cotton products.	The demand for Australian cotton products is positively transformed.
Will Be Achieved By	3.1.1 Improving Australian fibre quality testing standards and procedures and the capacity to measure and manage contamination. 3.1.2 Supporting the development and implementation of post-farmgate BMPs. 3.1.3 Developing and implementing a standardised reporting system for Australian cotton product quality and traceability. 3.1.4 Benchmarking Australian cotton against key international programs for product stewardship and sustainability.	3.2.1 Identifying opportunities for improvements in fibre quality and cotton products. 3.2.2 Demonstrating the value of different fibre classes and defining fibre quality parameters that secure a premium market. 3.2.3 Developing customer-based partnerships for the development of higher value and novel products, which differentiate Australian cotton.	3.3.1 Investigating existing and future markets for Australian cotton and communicating these findings to the Australian Cotton Industry. 3.3.2 Facilitating the development of new technologies and systems to improve the competitiveness of Australia cotton.
Measures of success	Customers have confidence in the integrity of Australian cotton: <ul style="list-style-type: none"> ■ Australia has the best ranking for non-contamination in the International Textile Manufacturers Federation (ITMF) survey. ■ Customers recognise and use Australia's BMP standards as their guarantee of quality assurance. ■ Australia uses standardised reporting systems for product quality and traceability for farmers, industry and customers. ■ Australia can respond to customer needs for reporting sustainability indicators. 	Customers value the qualities of Australian cotton: <ul style="list-style-type: none"> ■ New fibre classification systems established. ■ Partnerships established to demonstrate the potential for differentiating Australian cotton. 	Customers continue to demand Australian cotton products: <ul style="list-style-type: none"> ■ Provide the Australian cotton industry with knowledge of fabric innovations and future market opportunities. ■ Development of alternative and high-value cotton products.

Key program investments

This section provides a snapshot of some of CRDC's investments during 2014-15 in this program area. The full list of CRDC's investments for this period can be found at appendix four: the RD&E portfolio.

Assured cotton: Improving Australian fibre quality testing standards and procedures and the capacity to measure and manage contamination.

CRDC's investment in this area aims ensure that Australia maintains its global reputation for high-quality cotton, so as to help the industry capture the full value of its products. Programs that help to maintain and improve Australian cotton's fibre quality, and demonstrate the sustainability, transparency and traceability of the Australian cotton industry, are part of this investment program.

In 2014-15, CRDC continued its support of assured cotton through key projects, including:

- *Automated gin seed fingers – commercial application*, with CSIRO; and
- *Determining the shelf life of round modules and impact on cotton quality*, with CSIRO.

The *Automated gin seed fingers – commercial application* project aims to develop an automated seed finger system to reduce damage to cotton at the gin stand and increase ginning efficiency by reducing energy consumption – meeting the dual aims of improving Australian cotton's fibre quality, and improving the sustainability of the Australian cotton production system.

This project evolved from earlier research that assessed the impact of gin seed fingers on fibre quality. This research found that the position of the seed fingers can have a positive influence on quality and turn-out during ginning. As a result, the *Automated gin seed fingers – commercial application* project was developed, based on the premise that a new system may result in a greater number of higher quality bales from the same gin input, resulting in a better return for growers.

The project has progressed to developing and testing a prototype automated gin seed finger system with commercial gins (with a patent developed to protect the technology). Recent tests have found that the angle of the seed fingers impacts on both the power consumption of the gin and on residual lint levels on the seed, so the focus is on developing a system that can automatically adjust the angle of the seed fingers to optimise ginning performance.

The *Determining the shelf life of round modules and impact on cotton quality* project is a newly commenced project which aims to address fibre quality issues in round modules that could be caused by the storage duration and conditions prior to ginning. There is a concern that the plastic wrap on round modules can create favourable conditions for microbial degradation of the cotton (as a result of the solar heat radiation, the impermeable wrapper and the high moisture content often found in round modules), which can weaken the fibre and cause fibre quality deterioration, resulting in price discounts and yield loss for growers.

As a result, this project aims to establish the threshold of conditions that can cause damage, and propose potential solutions and risk-management guidelines for eliminating and reducing fibre damage during round module storage. Preliminary findings indicate that the orientation of the module during storage can influence its temperature and moisture levels, and that covering them with a tarpaulin can significantly reduce temperature and relative humidity fluctuations.

PROGRAM 3: CUSTOMERS

Differentiated products: Identifying opportunities for improvements in fibre quality and cotton products; Demonstrating the value of different fibre classes and defining fibre quality parameters that secure a premium market; Developing customer-based partnerships for the development of higher value and novel products, which differentiate Australian cotton.

Australian cotton growers are competing in a complex global market, with challenges coming from both within the global cotton industry (with Australian growers competing against subsidised overseas growers) and the wider global textile industry (where cotton's market share is diminishing against the ever-growing man-made fibre industry).

As a result, investments in this area look to both fully exploit current advantages of Australian cotton, while also opening up other opportunities for Australian cotton to be differentiated on the world market.

In 2014-15, CRDC continued its support of the differentiated products theme through key projects, including:

- *Cotton gin trash as a potential resource: re-assessing risk factors*, with QuickTest Technologies;
- *Design of thermal cotton/wool fabrics made from Australian fibre*, with Deakin University;
- *Ever-dry self-cooling cotton fabrics*, with Deakin University; and
- *Novel spinning technologies for fine and high quality Australian cotton yarns*, with Deakin University.

The *Cotton gin trash as a potential resource: re-assessing risk factors* project aims to assess the options for beneficial uses of gin trash, and identify the risk factors involved. Approximately 10 per cent (by weight) of the seed-cotton ginned ends up as gin trash, with strict restrictions governing its possible use. It is generally regarded as low value, with significant costs around composting or disposal.

As a result, this project is working to consider the reasoning behind the current waste classification of gin trash, and the restrictions regarding its use to local on-site composting. The project is working to determine factual evidence about gin trash's chemical residue content, and the potential risks should it be consumed by livestock or made available for other uses, such as garden mulch or as a soil amendment.

The *Design of thermal cotton/wool fabrics made from Australian fibre* project is collaborating with Esquel, a Hong Kong-based, vertically integrated producer of high-quality woven shirts. The project is developing a new range of cotton and wool blended fabrics with specific thermal ratings targeted at the cooler autumn and spring seasons, opening new markets for Australian Long Staple (ALS) cotton. Shirts made from fabrics developed in the project have been sold to international brands including J Crew, Hugo Boss, Lacoste, and Gant.

The *Ever-dry self-cooling cotton fabrics* project aims to develop a new coating technique that can give cotton fabrics a new functionality: the ability to regulate moisture, breathability and surface temperature. The project has successfully developed a technique to give single layer cotton fabrics "ever-dry" and "self-cooling" properties, which eliminate the wet and clinging feeling of cotton on the skin and ensures that the fabrics maintain their permeability, even at an over-saturated state.

This technique has the potential to considerably increase the use of cotton in the next generation of sportswear, summer clothing, defence force uniforms, work wear and functional fabric products for healthcare.

The *Novel spinning technologies for fine and high-quality Australian cotton yarns* project is a newly developed project that will explore novel spinning technologies to improve the overall quality of yarn made from long staple Australian cotton. It will focus on ways of making cotton yarns less hairy and more abrasion resistant, to reduce the cost of yarn sizing and improve weaving efficiency. The project aims to increase the demand for Australian cotton and the subsequent premiums offered to growers for the fibre. Preliminary results indicate that modifications to the spinning frame can reduce yarn hairiness

RD&E Portfolio

PROGRAM 4: PEOPLE

Outlined below is a selection of the key projects invested in by CRDC under the people program during 2014-15.

Program 4: People			
Program	People		
Outcome	Capable and connected people driving the cotton industry.		
Theme	4.1 Workforce Capacity	4.2 Networks	4.3 Communication
Strategy Outcomes	A skilled, educated and progressive industry workforce.	An industry connected by dynamic networks.	Stakeholder information needs are met.
Will be achieved by	4.1.1 Investigating effective strategies for attracting, developing and retaining people in the cotton industry. 4.1.2 Supporting initiatives which lead to the continuous improvement of human resource management including on-farm Workplace Health and Safety. 4.1.3 Understanding opportunities for greater Aboriginal participation in cotton and partnering with organisations to support the development of a culturally aware cotton workforce. 4.1.4 Supporting educational opportunities which increase the skills and knowledge of current workforces and will meet the needs of future workforces. 4.1.5 Creating opportunities for, and supporting the development of leadership skills.	4.2.1 Establishing and empowering creative forums and initiatives which build relationships. 4.2.2 Supporting and participating in collaborative cross-sectoral RD&E initiatives. 4.2.3 Creating and facilitating opportunities for national and international RD&E exchange. 4.2.4 Facilitating engagement with stakeholders for prioritising and capturing advice on RD&E issues. 4.2.5 Honing research expertise and the application of science from core research disciplines.	4.3.1 Providing information for demand driven communication strategies and performance reporting. 4.3.2 Applying innovative communication methods.

PROGRAM 4: PEOPLE

Program 4: People			
Program	People		
Outcome	Capable and connected people driving the cotton industry.		
Theme	4.1 Workforce Capacity	4.2 Networks	4.3 Communication
Strategy Outcomes	A skilled, educated and progressive industry workforce.	An industry connected by dynamic networks.	Stakeholder information needs are met.
Measures of success	<p>Opportunities for learning are demanded by industry:</p> <ul style="list-style-type: none"> ■ A 10-fold increase in school visits to promote careers in cotton by 2018. ■ A student gap year internship program. ■ 50 Horizon students by 2018. ■ 30 completed summer scholarships by 2018. ■ 300 students having completed the UNE Cotton Course by 2018. <p>Opportunities for workforce development are demanded by industry.</p> <ul style="list-style-type: none"> ■ 60 ginnerers trained. ■ 25 industry representatives having completed the Field to Fabric Course. ■ 50 cotton farmers awarded a new Diploma in Human Resources by 2018. ■ A 10 per cent reduction in cotton farm-related injuries by 2018. ■ On-farm skill development. ■ Participation in leadership programs. 	<p>People and industry are connected through effective networks:</p> <ul style="list-style-type: none"> ■ 10 conferences and forums are coordinated which promote industry, cross-sectoral and community knowledge sharing. ■ CRDC is an active member of key industry and government initiatives. ■ Primary Industry Standing Committee (PISC) cotton and cross-sectoral RD&E strategies. ■ 50 travel scholarships are supported. ■ The cotton industry has effective collaborative structures for prioritising RD&E. 	<p>People have ready access to industry information:</p> <ul style="list-style-type: none"> ■ Communication systems for all CRDC stakeholders are meeting their communication needs. ■ The information and services derived from CRDC investments are in demand and the technologies are adopted.

Key program investments

This section provides a snapshot of some of CRDC's investments during 2014-15 in this program area. The full list of CRDC's investments for this period can be found at appendix four: the RD&E portfolio.

Workforce capacity: Investigating effective strategies for attracting, developing and retaining people in the cotton industry.

People are the cotton industry's most important resource, and ensuring the industry continues to have a network of capable and connected people is a key priority. CRDC's investments in this area aim to provide critical supporting information for the industry, helping to inform the industry's wider workforce development strategy.

In 2014-15, CRDC continued its investment into workforce development through a number of key projects:

- *Cotton workforce development for sustained competitive advantage*, with the University of Melbourne;
- *Impact of farm workforce turnover in the cotton sector*, with the University of Melbourne;
- *Skills profile and labour supply structure on cotton farms*, with the University of New England; and
- *Career motivational factors of cotton growers (attraction and retention)* (PhD project), with the University of Southern Queensland.

The *Cotton workforce development for sustained competitive advantage* project, which concluded in December 2014, aimed to improve the effectiveness of cotton workforce development so that the industry has the people it needs to drive industry competitiveness over time. The project involved an analysis of key workforce issues affecting the cotton industry to develop a more sustainable approach for workforce development.

The researchers undertook two regional workforce action pilot studies to understand the key drivers and influencers affecting workforce development, and found that in order for the industry to progress locally-relevant action, the following three elements are required:

1. An ability to nurture employer interest in training. Working directly with employers and employees and undertaking a one-on-one skills analysis was

effective in understanding both employer and employee needs, and employers could see the potential benefits for their business from an early stage.

2. Leadership for workforce development activities at the local level. Regionally-led action to coordinate the services that are available at the local level with the needs of employers and employees in that region.
3. Leveraging the cotton investment. A coordinating capacity to network in regions to leverage cotton investment for benefit from government, regional or cross-sectoral initiatives.

The findings from this research will help to inform the industry's workforce development strategy.

The *Impact of farm workforce turnover in the cotton sector* project, which commenced in July 2014, aims to establish meaningful measures of turnover that can be used to assess changes in human resource management performance, and track progress over time; examine the real costs and impacts of staff turnover on a sample of cotton farms; identify the practices most strongly linked to low turnover; and explore the relationship between turnover performance and farm profit.

This project is in its early stages, but it is anticipated that it will provide valuable information to growers and the wider industry on the impact of farm turnover and best management practices for human resource management.

The *Skills profile and labour supply structure on cotton farms* project is investigating the workforce needs of cotton farms and comparing them with supply sources and structures to assess the effectiveness of employee retention practices. The project is developing an inventory of current and future labour needs, to identify the gaps and to outline the strategies to address these needs for the industry.

The *Career motivational factors of cotton growers (attraction and retention)* PhD project looks at the psychological drivers and characteristics that impact on cotton grower motivation and work/life satisfaction. Previous research into the psychology of farming was conducted in the 1970s, but despite the cotton growing profession changing markedly over the past four decades with the advancement of technology, there have been no major advances in

PROGRAM 4: PEOPLE

this research. This research project aims to fill this gap, and will look at such factors as risk tolerance, optimism and entrepreneurship in cotton growers, and how the motivations of growers impacts on their attraction and retention strategies.

Workforce capacity: Supporting initiatives which lead to the continuous improvement of human resource management, including on-farm Workplace Health and Safety.

Health and safety continues to be a major concern for cotton growers and cotton industry employers. The goal for the industry is to reduce cotton farm-related injuries by 10 per cent by 2018. CRDC contributes to the achievement of this industry goal by investing in on-farm safety, and monitoring and evaluation, projects.

In 2014-15, CRDC continued its investment into workplace health and safety through two key projects:

- *Managing cotton farm safety review and update*, with the University of Sydney; and
- *Collaborative Partnership Primary Industries Health and Safety*, a joint partnership with the Rural Industries Research and Development Corporation.

The *Managing cotton farm safety review and update* project, which concluded in May 2015, provided a review of the industry's best management practices (BMPs) around cotton farm safety, and an update of farm safety resources. It piloted the practices and resources with growers to ensure relevance and on-farm practicality, before setting these practices as industry BMPs within *myBMP*.

The revised resources available in *myBMP* include farm safety hazard checklists; cotton farm safety action plans; cotton safety induction resources for on-farm workers and contractors; resources to manage WHS records; and a cotton harvest safety guide and tele-handling guide.

In addition, the project also provided a report detailing the fatalities and injuries occurring on cotton farms, and the impacts and cost of these injuries. Between 2001 and 2013, there were nine confirmed cotton industry-related deaths (with an additional 28 fatalities that could have involved the cotton sector, but could not be confirmed due to data limitations). The economic impact of these nine deaths was estimated at \$25.8 million. The cotton industry represents less than 1.5 per cent of all claims for workers compensation

in the agricultural sector; however cumulatively still amounts to approximately 500 weeks lost per year in productivity and at a cost of \$5 million.

As a result of this project, a number of recommendations have been made to improve both the data availability for injuries within cotton and also fact sheets and information sources as awareness and adoption tools for the cotton industry.

The *Collaborative Partnership Primary Industries Health and Safety* project aims to improve the health and safety of farm workers and their families. A jointly funded project involving six of the Rural Research and Development Corporations (RDCs), it undertakes RD&E activities to improve the physical and mental health of farmers and the safety of the farm work environment.

The project targets its health and safety information at business owners, managers and employees involved with farming, including cotton growers, as well as health professionals and researchers in the field of rural health and safety.

Workforce capacity: Supporting educational opportunities which increase the skills and knowledge of current workforces and will meet the needs of future workforces.

The cotton industry recognises the need for passionate, skilled and innovative people to shape its future in a rapidly changing and growing world. To ensure the industry is able to attract talented young people, CRDC continues to invest in a number of initiatives focused on developing students at the school, undergraduate and postgraduate levels.

In 2014-15, CRDC continued its investment into educational opportunities for current and future workforces through a number of key projects:

- *Primary Industries Education Foundation*, co-funded with Cotton Australia;
- *Cotton ginning training* program, with CSIRO;
- *Cotton industry young professionals* program, with the Primary Industries Centre for Science Education and the University of Southern Queensland;
- *Cotton Production Course*, with the University of New England;
- *Developing education capacity in the Australian cotton industry* project (CottonInfo technical specialist), with CSIRO;

- *Field to Fabric* scholarships, funded by CRDC, with CSIRO.
- *Horizon Scholarship* program, with the Rural Industries Research and Development Corporation;
- *CRDC Summer and Honours Scholarships* program, funded by CRDC; and
- *CRDC PhD Scholarship* program, funded by CRDC.

The *Primary Industries Education Foundation* is focused on encouraging primary industries education in schools, through providing national leadership and coordination of activities; resources for students and teachers; and encouraging interest in primary industry careers. CRDC and Cotton Australia jointly contribute to the Foundation on behalf of the cotton industry.

The *Cotton ginning training* program, which concluded in June 2015, aimed to upskill cotton gin employees, both new and existing, regarding the technical aspects of running a gin efficiently, and ginning with a focus on improved fibre quality. Two courses with some 58 participants were conducted in the 2014-15 period, with positive feedback received from the course participants.

The *Cotton industry young professionals* program places university students into internships within the agribusiness sector of the cotton industry. The initiative aims to help build awareness of the career opportunities available for young professionals in cotton; to develop the on-the-job skills of university students prior to the completion of their degrees; and to establish relationships between cotton industry employers and potential future employees. Placements are available for fourth/final year undergraduate university students studying an agricultural related degree with an interest in working in the cotton industry.

The *Cotton Production Course* provides a tertiary-level course on cotton production for those interested in, and working in, cotton. It also provides the wider benefit of mentoring prospective industry researchers and conducting applied systems research. The number of students participating in the course continues to increase, with approximately 65 students taking part per year.

The *Developing education capacity in the Australian cotton industry* project provides a full-time education officer, who implements a range of activities and programs in schools to boost knowledge of the industry and its varied career options. The office is based at the Australian Cotton Research Institute and forms part of the industry's extension program, CottonInfo.

The *Field to Fabric* program looks at cotton quality and how it is managed at all stages of the cotton pipeline: from on-farm to the finished fibre product. The course is designed for all involved in cotton, from growers to technologists, and looks at how all segments of the industry operate and relate to each other. In 2014-15, CRDC provided financial support to six cotton growers and others within the industry to attend the CSIRO-run course.

The *Horizon Scholarship* program is an initiative of RIRDC that, in partnership with other RDCs and industry sponsors, supports undergraduates studying agriculture at university by providing a bursary, professional development workshop and work experience. In 2014-15, CRDC supported five new Horizon scholarships for undergraduate students: Alan Martin, Felicity Taylor, Grace Scott, Michael Wellington and Sam Johnston. Overall the CRDC has supported 14 Horizon scholars throughout the 2014-15 year.

The *CRDC Summer and Honours Scholarships* are available to university students completing the senior years of an undergraduate degree or enrolled in an honours program. The scholarships provide them with the opportunity to work on real research, extension or industry projects in a working environment as part of their professional development. In 2014-15, CRDC supported eight summer/honours scholarships for students Elizabeth Shakeshaft, Peta Zivec, Fanny Des Escotais, Joanna Nielson, Jaeeun Ryu, Sharna Holman, Simon Kelderman and Timothy Bartimote to work with existing researchers or research organisations.

The *CRDC PhD Scholarship* program funds researchers undertaking their PhDs. In 2014-15, CRDC helped fund 22 new or ongoing PhD scholars across all five of the CRDC's program areas.

PROGRAM 4: PEOPLE

Workforce capacity: Creating opportunities for and supporting the development of leadership skills

The cotton industry, like many other industries, is facing a period of change and uncertainty. Faced with variability in climate, competition for skilled labour, changes in land use and access to water, the industry requires a network of informed and experienced leaders that can work together to develop resilient and sustainable farming systems and communities.

In 2014-15, CRDC continued its investment into leadership through a number of key projects:

- *Cotton industry leadership development strategy*, with the Australian Rural Leadership Foundation;
- *Nuffield Farming Scholarships program*, with Nuffield Australia; and
- *Peter Cullen Trust: Science to Policy Leadership Program*, with the Peter Cullen Trust.

The *Cotton industry leadership development strategy* involves the support of the Australian Rural Leadership Program, which is focused on producing a network of informed, capable and ethical leaders who can work collaboratively to advance the interests of their industries, communities and rural Australia. In 2014-15, CRDC co-sponsored three participants with Auscott and Cotton Australia: Tobin Cherry, Dr Sharon Downes and Bronwyn Christensen.

The *Nuffield Farming Scholarships* program is the leading agricultural study program for primary producers in Australia. It provides farmers with the opportunity to pursue an area of agricultural-related study overseas, to the benefit of both the individual grower and their wider industry. In 2014-15, CRDC supported two cotton growers to undertake the Nuffield Scholarship program: Matthew McVeigh and Tom Quigley.

The *Peter Cullen Trust: Science to Policy Leadership Program* aims to enhance the role of science in policy development and bring about positive change in water and catchment management in Australia. It is intended to build the leadership and communication skills of people actively involved in water systems management – be it river or catchment, rural water or environment science or policy. In 2014-15, CRDC supported two participants in the program: Jane Trindall and Luke Stower.

CASE STUDY: Nuffield scholarship to help optimise overhead irrigation at Trangie

Tom Quigley is from Trangie in the Macquarie Valley in Southern NSW. With his family, Tom manages Quigley Farms, a 6000-hectare mixed farm of up to 600 hectares of cotton, 2400 hectares of winter crop and grazing.

Under government incentives, over the past two years Tom's family has converted 40 per cent of their irrigation area from furrow to lateral move irrigation. With this change came new challenges, which Tom (pictured, with CottonInfo water use efficiency technical specialist (NSW), Janelle Montgomery) is keen to explore further under his Nuffield Scholarship, supported by CRDC and Cotton Australia.

"Many experienced cotton growers have installed some sort of overhead irrigation infrastructure in the recent past to deliver better water use efficiency and higher yield, but conventional management methods are not delivering these outcomes under these systems," Tom says.

"We have seen a 10 per cent yield increase on our farm with our management system, so I think there

is potential there for other growers too with these overhead systems.

"I'm looking at farming systems in Australia and overseas specifically suited to growing cotton under sprinkler irrigation, particularly in regard to crop rotations and sequencing, cover crops, growing cotton on the flat, minimum and strip tillage and crop nutrition, with the aim to deliver higher yields and better water use efficiency."

Tom will travel to the US, which is considered the home of centre pivot irrigation, as well as China and Israel to achieve this aim.

"I believe overhead sprinkler irrigation has a highly productive future if we tweak our management and farming system to suit," Tom said.

For more on Tom and his fellow 2014-15 Nuffield Scholar, Matt McVeigh, view the Spotlight magazine (Summer 2014-15 edition)

www.crdc.com.au/publications/spotlight-magazine.



PROGRAM 4: PEOPLE

Networks: Establishing and empowering creative forums and initiatives which build relationships; Creating and facilitating opportunities for national and international RD&E exchange.

The cotton industry is well known for its collaborative and inclusive nature, and CRDC's investment in this area is designed to ensure the industry continues to stay connected via dynamic networks.

In 2014-15, CRDC continued its investment into networks through a number of key projects:

- *Sponsorship of the 17th Australian Cotton Conference*, with Cotton Australia; and the
- *CRDC Grassroots Grants* program.

CRDC's *Sponsorship of the 17th Australian Cotton Conference* provided a platform to showcase the Australian cotton industry and enhance the outputs of CRDC-funded R&D and extension activities to the industry at large. The August 2014 conference saw the largest gathering of industry participants since the event commenced, with some 1,800 registered attendees, including 600 cotton growers representing every cotton growing region. In addition to the Conference, CRDC also provided financial support to the conference's Next Gen Forum, and sponsored university students to attend the conference.

CRDC's *Grassroots Grants* program encourages Cotton Grower Associations (CGAs) to apply for funding to support capacity building projects in their region. Up to \$10,000 in funding is available for CGAs to help fund a project aimed at increasing the engagement of growers in the industry, solving specific regional issues and improving their skills, knowledge base and networks. Since the Grassroots Grants program commenced in 2011, it has supported 33 projects across the cotton growing valleys, including nine projects in 2014-15.

Communication: Providing information for demand driven communication strategies and performance reporting; Applying innovative communication methods.

CRDC's investment in the area of communication aims to ensure that stakeholders' information needs are met. In 2014-15, CRDC continued its investment into communication through one key project:

- *Australian cotton production and best practice documentaries*, with the Queensland Department of Agriculture.

This project aims to communicate scientifically based crop production, protection and best practice principles to a diverse audience through a series of short, easily accessible videos. To date, 46 short videos have been produced (with an additional 25 in development), ranging from pre-season planter maintenance and planting tips through to overcoming challenges for new growers in the southern districts. The videos are available from the CottonInfo YouTube channel: www.youtube.com/CottonInfoAust.

PROGRAM 5: PERFORMANCE

Outlined below is a selection of the key projects invested in by CRDC under the performance program during 2014-15.

Program 5: Performance			
Program	Performance		
Outcome	Measured performance of the Australian cotton industry and its RD&E drives continuous improvement.		
Theme	5.1 Best Practice	5.2 Monitoring and Evaluation	5.3 Reviews
Strategy Outcomes	World's best practice underpins the performance of the cotton industry.	Industry and RD&E performance is captured.	Continuous improvement in industry and RD&E performance.
Will be achieved by	<p>5.1.1 Supporting a best practice framework as the primary integrated planning, risk management, benchmarking, knowledge development and delivery system.</p> <p>5.1.2 Promoting best practices through the development and delivery Joint Venture.</p>	<p>5.2.1 Developing and implementing an internal M&E framework for evaluating CRDC's investment portfolio balance and its RD&E performance.</p> <p>5.2.2 Conducting annual industry surveys to capture practice change.</p> <p>5.2.3 Establishing a framework through which industry performance can be nationally and internationally reported.</p>	<p>5.3.1 Undertaking scientific discipline reviews of the industry's RD&E.</p> <p>5.3.2 Commissioning and participating in independent reviews of CRDC's RD&E and organisational performance.</p> <p>5.3.3 Commissioning independent reviews of the social, environmental and economic performance of the industry.</p> <p>5.3.4 Participating in cross-sectoral RD&E impact evaluations and reviews.</p>
Measures of success	<p>Industry is able to demonstrate best practice:</p> <ul style="list-style-type: none"> The cotton industry's myBMP program is the primary resource for farmers accessing best practice knowledge and tools. The cotton industry's myBMP program is nationally recognised and integrated with other agricultural sector best management practice programs. An 80 per cent coverage of Best Management Practice systems across the Australian cotton industry. 	<p>Industry and CRDC are able to capture and demonstrate performance:</p> <ul style="list-style-type: none"> A rigorous monitoring and evaluation platform which measures and reports on the performance of CRDC's research and development investments. An industry performance monitoring and evaluation framework that is consistent with national and international standards. Providing the industry with cotton sustainability indicators and supporting its capacity to report against these indicators. 	<p>Industry and CRDC are able to continually review and improve performance:</p> <ul style="list-style-type: none"> Independent reviews of the social, environmental and economic performance of the industry's performance. Independent reviews.

Key program investments

This section provides a snapshot of some of CRDC's investments during 2014-15 in this program area. The full list of CRDC's investments for this period can be found at appendix four: the RD&E portfolio.

Best practice: Supporting a best practice framework as the primary integrated planning risk management, benchmarking, knowledge development and delivery system.

The cotton industry's *myBMP* program sets the industry's best practice performance criteria and provides a framework by which growers can participate in, and be accredited in, best practice.

Through *myBMP*, all Australian cotton growers can access the industry's best practice standards, which are fully supported by scientific R&D, resources and technical support. By using *myBMP*'s tools, growers can improve on-farm production performance by better managing business and production risk, maximising potential market advantages, and demonstrating responsible and sustainable natural resource management to the community.

CRDC is a partner in the *myBMP* program, providing financial support to researchers across a range of disciplines to perform the role of *myBMP* module leads for the key modules: biosecurity, biotechnology, energy and input efficiency, fibre quality, human resources and WHS, integrated pest management, natural assets, pesticide management, petrochemical storage and handling, soil health, and water management.

In addition to this, CRDC continued its support of the *myBMP* program in 2014-15 through two additional key projects:

- *myBMP lead certification*, with Roth Rural and Regional; and
- *Review of the content in and between myBMP modules*, with Rachel Holloway.

The *myBMP lead certification* project provides auditing expertise for growers who wish to become *myBMP* accredited growers. During 2014-15, five farms were audited for *myBMP* compliance under this project.

The *Review of the content in and between myBMP modules* project was a short project in 2014 to provide an overarching review of the *myBMP* modules. This project reviewed the content and consistency of the modules to ensure the practices were practical to implement for growers, and recommended rewrites of specific modules where necessary.

The review also looked at the overarching *myBMP* program and platform and made recommendations for improvements to the system, including reducing the number of best management practices, and prioritising and simplifying the associated resources. As of June 2015, work on the *myBMP* program is underway.

Best practice: Promoting best practices through the development and delivery Joint Venture.

CRDC is a partner in the industry's extension program, CottonInfo, with joint venture partners Cotton Australia and Cotton Seed Distributors. The CottonInfo program is designed to connect growers with research: providing information, improving practices and increasing industry responsiveness to key issues. CottonInfo integrates closely with *myBMP* helping growers to achieve best practice.

The CottonInfo team is comprised of regional development officers (the on-the-ground support team, based in the cotton growing valleys), technical specialists (specialists in specific research areas and the point of contact to the wider cotton research community) and *myBMP* experts (team members who can help growers sign up for, and participate in, *myBMP*).

CRDC's support for the program includes investment in key CottonInfo personnel (including the CottonInfo program manager and communications manager); support for *myBMP* (outlined above); and investment in the CottonInfo technical specialists via research projects under their specific topic areas.

In 2014-15, this investment from CRDC includes a technical specialist that fits within the Performance category, under the project:

- *'Science into best practice,' linking research with CottonInfo*, with CSIRO.

The role of the CottonInfo technical specialist includes: developing new information and strategies to help the industry respond to current issues and pre-empt future issues; ensuring *myBMP* is linked to and updated with the latest best practice messages from research results; validating best practice guidelines using field experiments; supporting the development of key industry publications; and exploring opportunities for the development of new decision-making tools to support the uptake of research outcomes and best practices.

Monitoring and evaluation: Conducting annual industry surveys to capture practice change; Establishing a framework through which industry performance can be nationally and internationally reported.

Measuring the performance of the Australian cotton industry over time is critically important: in helping the industry to continuously improve; in helping to tell the story of the industry to customers; and in helping to secure overseas markets through the demonstration of the industry's social, economic and environmental sustainability.

In 2014-15, CRDC continued its commitment to industry monitoring and evaluation through five key projects:

- *Annual Cotton Grower Practices Survey*, with Roth Rural and Regional;
- *Annual qualitative and quantitative surveys for the Australian cotton industry*, with Crop Consultants Australia;
- *Cotton Comparative Analysis*, with Boyce Chartered Accountants;
- *Integrated economic, environmental and social performance reporting of the cotton industry*, with Roth Rural and Regional; and
- *Potential for growth in the Australian cotton industry: desktop study*, with Eco Logical Australia.

The *Annual Cotton Grower Practices Survey* gathers valuable information about cotton farming practices to give a greater understanding of the industry's performance. Each year, data is collected on the industry's yields, fibre quality and grower perspectives on RD&E. In addition, the survey monitors practices and performance over specific topic areas, including nutrition, soils, biotechnology stewardship, weed management, irrigation, energy, workforce, harvesting and riparian areas. The draft findings of the 2013-14 crop survey (conducted during 2014-15, but yet to be published as of June 2015) cover 27 per cent of irrigated, and 35 per cent of raingrown, cotton production.

The *Annual qualitative and quantitative surveys for the Australian cotton industry* project consists of two separate data sets/reports. The qualitative report is a survey of cotton consultants, which provides information on the practices and attitudes of consultants and their cotton grower clients. The quantitative data provides hard data as to practices on farm, such as chemical use, and tracks how this has improved over time.

The information provided by both surveys forms a critical data set for benchmarking, trending and research purposes. The 2013-14 and 2014-15 crop surveys are both nearing completion as of June 2015.

The *Cotton Comparative Analysis* report provides the industry benchmark for the economics of cotton growing in Australia. The 2014 crop report (published in May 2015) focuses on the economics of the 2014 crop from growers across the different cotton growing valleys. It also presents trends that have been measured against more than 10 years of data. The report shows that for the 'average' grower, the 2014 crop yield was 10.24 bales per hectare (down half a bale on the previous season). Comparatively, for the top 20 per cent of growers, average yield was 11.55 bales per hectare. The top 20 per cent of growers achieved a profit of \$1,543 per hectare in 2014, compared to a four-year average of \$1,900.

PROGRAM 5: PERFORMANCE

The *Integrated economic, environmental and social performance reporting of the cotton industry* project involved the completion of the Australian cotton industry's first ever sustainability report – a significant milestone for the industry. Launched by CRDC and Cotton Australia in November 2014, the *Australian Grown Cotton Sustainability Report* tracks the environmental, social and economic impact of Australian cotton against a set of sustainability indicators.

The report was the result of a recommendation from the industry's Third Environmental Assessment in 2012, and was prepared according to the principles and framework of the Global Reporting Initiative for Sustainability Reporting, reporting data on 45 economic, environmental and social attributes. Reporting under this international framework allows the industry to adhere to best practice in sustainability reporting, and ensures that all relevant considerations are taken into account in preparing the report.

The *Potential for growth in the Australian cotton industry: desktop study* project was a commissioned project by CRDC and Cotton Seed Distributors to provide a review and analysis of the extent of current cotton production within Australia, and to investigate opportunities for expansion. The report, published in October 2014, identifies opportunities through Geographical Information System (GIS) based spatial analysis, testing commonly held metrics and assumptions pertaining to the limits of cotton production.

CASE STUDY: Using climate tools and CottonInfo to better manage farm inputs

Farmers Toby and Susie Moore understand the importance of interpreting information to manage climate risk on their Walgett property, "Walma", particularly at key decision making times.

The Moores operate an extensive farming enterprise that includes both raingrown and irrigated farming, as well as rangeland grazing on the rich alluvial flood plain in the lower Namoi catchment.

Understanding the local climate in terms of the drivers of rainfall and temperature has been a critical survival skill that Toby (pictured) has embraced as a farmer. But with so much information and commentary available on weather and climate, it can be a complex task to sort sea surface temperature indicators, atmospheric indicators and seasonal models when planning cropping regimes or livestock stocking rates.

Through attending CottonInfo webinars and workshops, Toby has developed a basic outline of the climate indicators he's looking for to make crop selection, irrigation and fertiliser decisions for each season at his particular location.

"Knowing which indicators and drivers to watch through different seasons does help streamline the process when making decisions," said Toby.

"The fortnightly summary in the CottonInfo e-news Moisture Manager also saves me time searching for the modelling results. What I'm looking for is a clear trend from a range of sources to give me confidence that something is going to change. At least then I can try and run some scenarios in our business and manage my farm inputs in advance."

One of the key things Toby has learnt from CottonInfo climate workshops is how the atmosphere and ocean temperatures work together, and what to watch for in the winter and spring seasons when the connection with these indicators is strongest.

"Watching the smooth line of sea surface indicators can give some guidance as to what the atmospheric moisture supply will be like on a long lead time. In this year, 2015, unfortunately all the models seem to be saying we are now in an El Niño and it will continue for the remainder of the year.

"But out here the SOI really is the key indicator of rainfall throughout winter and spring. So I'll be keeping an eye on that."

For Toby's full case study, please visit www.cottoninfo.com.au/publication-type/case-studies. To sign up for the CottonInfo fortnightly Moisture Manager, visit www.cottoninfo.com.au/subscribe.



Section 5 CRDC People and Governance

CRDC Board

CRDC employees

Governance and
accountability



CRDC People and Governance

CRDC BOARD



Dr Mary Corbett BSc PhD (FAICD, AFAIM)

Chair

CRDC Chair, Dr Mary Corbett, has more than 20 years' experience as a Company Director in the scientific research and development area, and in education and training. Dr Corbett has significant board and corporate governance experience gained across a range of organisations. She is currently Chair of the West Moreton Hospital and Health Service, and a Board member on the Wound Management Innovation CRC. Previously, Dr Corbett was Deputy Chair of the Southbank Institute of Technology, Deputy Chair of the Australian Agriculture College Corporation, and a board director of the Sugar Research and Development Corporation, and Food Science Australia.

Dr Corbett has extensive experience as Chair and member of a number of board committees. She is Managing Director of Australian Business Class, an organisation specialising in executive leadership development.

Appointed: 01/10/2008 until 30/09/2011.

Reappointed: 01/10/2011 until 30/09/2014.

Appointed Deputy Chair: 12/2011.

Appointed Chair: 12/08/2013 until 13/08/2016.

Appointed Chair of the Remuneration Committee.



Mr Cleave Rogan (MAICD)

Deputy Chair

Mr Rogan has been farming and marketing cotton and grains for 30 years. He has acted in an advisory role to CRDC, working on research projects related to biosecurity, insects, weeds, diseases, cotton fibre processing and quality enhancement. Mr Rogan was a director of Cotton Australia and has been an industry representative on various other cotton industry associations and research advisory committees.

Appointed: 01/10/2011 until 30/09/2014.

Reappointed: 20/10/2014 until 12/08/2016.

Appointed Deputy Chair: 27/01/2015.



Mr Bruce Finney BSc Ag (MAICD)

Executive Director

Mr Finney has extensive experience in the agricultural sector. Prior to his appointment to CRDC in 2004, he worked in corporate agriculture in various corporate, management and agronomy roles in Australia and in an advisory role in Argentina. He is a member of the Advisory Board QDAF programme on Agricultural Robotics at QUT and Agriculture Senior Officials Research and Innovation Committee.

Mr Finney is a past chair of the Australian Cotton Growers Research Association and a past director of the Cotton Catchment Communities CRC and the Irrigation Association of Australia. Mr Finney is a graduate of the Australian Rural Leadership Program and of the Company Directors Course of the Australian Institute of Company Directors.

Appointed: 01/08/2004 by virtue of his appointment as Executive Director of CRDC.

He attends the Audit, Intellectual Property and Remuneration Committees as an observer.



Dr Michael Robinson *BSc (Hons), PhD (FAIMS, GAICD)*

Non-executive Director

Dr Robinson is the CEO of Plant Biosecurity Cooperative Research Centre. Previously he was the CEO of FrOG Tech Pty Ltd, a private research company specialising in geological reconstructions and interpretations across a range of sectors, including oil and groundwater, and CEO of GeoSphere Ltd, a specialist geological consulting firm in New Zealand.

Dr Robinson has extensive experience in primary industries and natural resources research, development and extension. He was the Executive Director of Land & Water Australia, Centre Director of the Primary Industries Climate Challenges Centre (a joint venture between Department of Economic Development, Jobs, Transport and Resources (Victoria) and University of Melbourne), Chair of the National Climate Change Research Strategy for Primary Industries, CEO of the CRC for Greenhouse Accounting, and a member of the National Primary Industries Standing Committee RD&E Extension Subcommittee.

*Appointed 01/10/2011 until 30/09/2014.
Reappointed: 20/10/2014 until 12/08/2016.
Appointed Chair of the Audit Committee.*



Ms Kathryn Adams

B.Sc.Agr (Hons), LL.M, M.Bus, M.Env.Stud, Grad Dip Leg Pract, Prof Cert Arbitration, Practitioners Cert Mediation & Conciliation, FAICD

Non-executive Director

Ms Adams is a microbiologist and lawyer and specialises in intellectual property management, commercial/industry application of R&D and corporate governance. She has had extensive experience in R&D investment from the perspective of a researcher, Director of a research institute, and an investor. She has been a practising lawyer and was also the first Registrar of Plant Breeder's Rights in Australia.

Ms Adams was on the Board of the Cotton CRC and is currently on the Boards of a number of CRCs as well as Agriculture Victoria Services Pty Ltd, and PBIP Ltd. She is a member of the R&D Tax Incentives Committee of AusIndustry, an adjunct Senior Research Fellow with the Australian Centre for Intellectual Property in Agriculture (ACIPA, Griffith Law School) and is a Fellow of the Australian Institute of Company Directors.

*Appointed: 20/10/2014 until 30/09/2017.
Appointed Chair of the Intellectual Property Committee.*



Mrs Elizabeth (Liz) Alexander BA, M.Rur.Sys.Mgt, GAICD

Non-executive Director

Mrs Alexander specialises in finding collaborative and innovative solutions for regional challenges. As principal consultant for Blue Dog Agribusiness, she undertakes community-based planning, research, project management, communication, and extension services for raingrown and irrigated cropping industries, natural resource management groups, local government and the rural training industry.

Mrs Alexander is currently a director of Plant Health Australia, Chair of the Theodore Irrigation Scheme Local Management Arrangements Interim Board (Phase 2), Chair of Glencore Clermont Open Cut Groundwater and Environmental Reference Group, and was previously a director of Cotton Australia. She obtained a Bachelor of Arts and a Masters of Rural Systems Management from the University of Queensland, is a member of the Australasia-Pacific Extension Network and a graduate member of the Australian Institute of Company Directors.

Appointed: 20/10/2014 until 30/09/2017.



Mr Greg Kauter B.Ag.Ec. Grad.Cert.Ru.Sc. GAICD

Non-executive Director

Mr Kauter is an agricultural consultant with more than 30 years of cotton industry experience. He has had extensive experience in cotton research administration and industry stewardship through roles in crop protection, farming systems, plant variety and biotechnology research programs. He has also planned and developed extension strategies to facilitate the adoption of new technology and knowledge. He has experience with industry representative bodies in developing strategic priorities with cotton growers and industry stakeholders, identify emerging issues and developing evidence-based policy responses based on sound research and information.

Mr Kauter currently consults on cotton farm management and Best Management Practice implementation. He has been the industry representative for biosecurity through Plant Health Australia Ltd and Chair of the Cotton Industry Biosecurity Group. He is a former President of the Cotton Consultants Association Inc.

Appointed: 20/10/2014 until 30/09/2017.

Composition

CRDC has a seven-member Board, consisting of a Chair (appointed by the Minister for Agriculture), the Executive Director (selected by the Board) and five non-executive Directors nominated by an independent Selection Committee. Appointment of non-executive Directors is subject to Ministerial approval and Directors (other than the Executive Director) are appointed for three-year terms.

Board

CRDC Board: 1 July 2014 to 1 October 2014

1. Dr Mary Corbett, Chair
2. Mr Hamish Miller, Deputy Chair
3. Mr Richard Haire, Non-executive Director
4. Dr Michael Robinson, Non-executive Director
5. Mr Cleave Rogan, Non-executive Director
6. Ms Lorraine Stephenson, Non-executive Director
7. Mr Bruce Finney, Executive Director

CRDC Board: 2 October 2014 to 19 October 2014

1. Dr Mary Corbett, Chair
2. Mr Bruce Finney, Executive Director

CRDC Board: 20 October 2014 to present

1. Dr Mary Corbett, Chair
2. Mr Cleave Rogan, Deputy Chair
(Deputy Chair from 27 January 2015)
3. Dr Michael Robinson, Non-executive Director
4. Ms Kathryn Adams, Non-executive Director
5. Mrs Elizabeth Alexander, Non-executive Director
6. Mr Greg Kauter, Non-executive Director
7. Mr Bruce Finney, Executive Director

Responsibilities of Executive Director

It is the Executive Director's responsibility to manage CRDC and the senior management team. Close links between the Board of Directors and management have assisted the development of a sense of mutual confidence, trust, teamwork and common purpose. Senior management participates in Board meetings, with other staff invited to contribute wherever appropriate.

Responsibilities of Non-executive Directors

The roles and responsibilities of Directors are set out in the Board Charter, which includes a governance statement, conduct and ethical standards provisions. Internal reviews of Board performance are conducted annually. The Board also obtains an external review of its performance periodically.

Appointment of new Non-executive Directors

In October 2014, the Minister for Agriculture announced the appointment of five Directors to the CRDC Board, to join incumbent Chair Dr Mary Corbett and Executive Director Bruce Finney and replace outgoing Directors Mr Hamish Millar, Mr Richard Haire and Ms Lorraine Stephenson.

Former Board directors Mr Cleave Rogan and Dr Michael Robinson were returned to the Board, and Ms Kathryn Adams, Mr Greg Kauter and Mrs Elizabeth Alexander were appointed as new non-executive Directors.

Cotton grower Joe Robinson had presided over the Selection Committee, which was charged with assessing all applications and making nominations for appointments to the Minister.

The Selection Committee report completed by the Presiding Member can be viewed in detail at the end of Section 5: CRDC People and Governance.

Expertise

The CRDC Board is a skilled-based board, with directors collectively bringing expertise in cotton production, processing and marketing, conservation/management of natural resources, science and technology and technology transfer, environmental and ecological matters, economics, finance and business management, administration of research and development, sociology and public administration.

The PIRD Act requires the CRDC Selection Committee to specify how its Board nominations will ensure that CRDC collectively possesses experience in board affairs, adding to the existing requirement for an appropriate balance of expertise.

Directors may obtain independent legal and professional advice at CRDC's expense to enable them to discharge their duties effectively, subject to prior approval from the Chair, in consultation with the Board and Executive Director. This advice may relate to legislative and other obligations, technical research matters and general skill development to ensure there is a sufficient mix of financial, operational and compliance skills amongst Board members.

Induction

Following appointment to the Board, each Director is provided with an appropriate level of information about CRDC, its history and operations, and the rights, responsibilities and obligations of Directors. This information includes the Board Charter, Strategic R&D Plan and relevant legislation.

The induction process is tailored to the needs of new Directors and may include an initial visit to CRDC office in Narrabri to meet with the Chair and staff for a comprehensive overview of corporate activities and practices and a tour of key industry research facilities.

Training

Where necessary and appropriate, CRDC sources training for Directors, either individually or as a group. The Board generally establishes the need for such training during the first meeting of Directors.

Functions

- Establishing strategic directions and targets.
- Monitoring and evaluating the research and development needs of the industry and ensuring CRDC's research program is effective in meeting those needs.
- Approving policies, plans, performance information and budgets.
- Monitoring policies, procedures and internal controls to manage business and financial risk.
- Ensuring compliance with statutory and legal obligations and corporate governance standards.

Conflicts of interest

In accordance with Section 131 of the PIRD Act, Directors are appointed based on their expertise and do not represent any particular organisation or interest group.

The Board follows section 29 of the PGPA Act regarding Directors' disclosures of interests. A Director who considers that he or she may have a direct or indirect pecuniary or non-pecuniary interest in a matter to be discussed by the Board must disclose the existence and nature of the interest before the discussion.

All disclosures are recorded in the minutes of the meeting and depending on the nature and significance of the interest, Directors may be required to absent themselves from the Board's deliberations.

The Board is very aware of its responsibilities regarding conflict of interest and duty of care and has adopted a very cautious approach. A Board Charter clearly outlines the roles and responsibilities of Directors in terms of potential conflicts of interest. Further the Board has a standing notice of Director's interests which is tabled and reviewed at each meeting.

Board Charter

The CRDC Board Charter assists Directors in carrying out their duties and setting out roles and responsibilities of Directors and staff.

Indemnities and insurance premiums for Directors and officers

The Board has taken the necessary steps to ensure professional indemnity cover is in place for present and past officers of CRDC, including Directors of the CRDC, consistent with provisions of the PGPA Act. CRDC's insurance cover is provided through Comcover; however, the insurance contract prohibits CRDC from disclosing the nature or limit of liabilities covered. In 2014-15, Directors and officers liability insurance premiums were paid and no indemnity-related claims were made.

Board Committees

The Board operated the Audit, Intellectual Property and Remuneration Committees in 2014-15. In addition to face-to-face meetings, the Board and its Committees conduct much of their work via email and telephone, supported by a secure online information portal. CRDC finds this arrangement to be effective, productive and cost effective.

Board Meeting	Dates	Location
Meeting 5 – 2014	18 August 2014	Royal on the Park, Brisbane QLD
Meeting 6 – 2014	14 November 2014	CRDC Boardroom, Narrabri NSW
Meeting 1 – 2015	21 January 2015	Teleconference
Meeting 2 – 2015	19 February 2015	University of New England, Armidale NSW
Meeting 3 – 2015	29 April 2015	CSIRO, Black Mountain, Canberra ACT
Meeting 4 – 2015	24 June 2015	University of Sydney, Sydney NSW

Attendances at Board meetings

Director	Board meeting attendance						
	Meeting 5 2014	Meeting 6 2014	Meeting 1 2015	Meeting 2 2015	Meeting 3 2015	Meeting 4 2015	TOTAL
Mary Corbett	Yes	Yes	Yes	Yes	Yes	Yes	6 of 6
Bruce Finney	Yes	Yes	Yes	Yes	Yes	Yes	6 of 6
Cleave Rogan	Yes	Yes	Yes	Yes	Yes	Yes	6 of 6
Michael Robinson	Yes	No	Yes	Yes	Yes	Yes	5 of 6
Lorraine Stephenson*	No	-	-	-	-	-	0 of 1
Hamish Millar*	Yes	-	-	-	-	-	1 of 1
Richard Haire*	Yes	-	-	-	-	-	1 of 1
Elizabeth Alexander**	-	Yes	No	Yes	Yes	Yes	4 of 5
Kathryn Adams**	-	Yes	Yes	Yes	Yes	No	4 of 5
Greg Kauter**	-	Yes	Yes	Yes	Yes	Yes	5 of 5

* *Outgoing Directors Hamish Millar, Richard Haire and Lorraine Stephenson attended their last Board meeting in August 2014.*

** *Incoming Directors Elizabeth Alexander, Kathryn Adams and Greg Kauter were appointed as new members of the Board on 20 October. These Directors attended their first Board meeting in November 2014.*

Audit Committee

Established under section 89 of the PIRD Act and section 45 of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act), 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.

Richard Haire was Chair of the Audit Committee until October 2014, after which Michael Robinson was appointed Chair. From July to October 2014, Michael Robinson, Hamish Millar and Lorraine Stephenson were members of the Audit Committee; from October 2014 onwards, Greg Kauter and Kathryn Adams were members, with additional skills-based appointee Alex Keatinge (from 1 February 2015). CRDC Executive Director Bruce Finney attended meetings as an observer. The Audit Committee met three times during 2014-15, two of which were by teleconference.

Intellectual Property Committee

The role of the Intellectual Property (IP) Committee is to assist CRDC's Board in fulfilling its responsibilities and to monitor the adequacy and effectiveness of CRDC's policies and procedures relating to the management of IP.

The Committee's specific responsibilities are to review the operation of CRDC's IP policy and IP operating principles and to consider IP matters directed to it by the Board for consideration.

Cleave Rogan was Chair of the IP Committee until October 2014, after which Kathryn Adams was appointed Chair. From July to October 2014, Hamish Millar and Lorraine Stephenson were members of the IP Committee; from October 2014 onwards, Greg Kauter and Liz Alexander were members. CRDC Executive Director Bruce Finney attended meetings as an observer. The IP Committee met five times during 2014-15, two of which were by teleconference. During June 2015 the IP Committee considered and recommended a new IP Management Policy which was approved by the Board.

Attendances at Audit Committee meetings

Member	Date of Audit Committee meetings			
	13 Aug 2014	1 Apr 2015	22 May 2015	TOTAL
Richard Haire <i>(Chair until Oct 2014)</i>	Yes	–	–	1 of 1
Hamish Millar	No	–	–	0 of 1
Lorraine Stephenson	Yes	–	–	1 of 1
Michael Robinson <i>(Chair from Oct 2014)</i>	Yes	Yes	Yes	3 of 3
Greg Kauter	–	Yes	Yes	2 of 2
Kathryn Adams	–	Yes	Yes	2 of 2
Alex Keatinge*	–	Yes	Yes	2 of 2

*Skills-based appointee. Appointed 1 February 2015.

Attendances at Intellectual Property Committee meetings

Member	Date of Intellectual Property Committee meetings						
	2014-15	29 Jul 2014	23 Sep 2014	18 Dec 2014	29 Jan 2015	2 June 2015	TOTAL
Cleave Rogan <i>(Chair until Oct 2014)</i>		Yes	Yes	–	–	–	2 of 2
Hamish Millar		Yes	Yes	–	–	–	2 of 2
Lorraine Stephenson		Yes	Yes	–	–	–	2 of 2
Kathryn Adams, <i>(Chair from Oct 2014)</i>		–	–	Yes	Yes	Yes	3 of 3
Greg Kauter		–	–	Yes	Yes	Yes	3 of 3
Liz Alexander		–	–	Yes	Yes	Yes	3 of 3

Remuneration Committee

The Remuneration Committee advises the Board on the Executive Director's remuneration and senior staff remuneration adjustments. The Chair of the Remuneration Committee was Mary Corbett, supported by Cleave Rogan and Liz Alexander. The Remuneration Committee met twice during 2014-15.

Attendances at Remuneration Committee meetings

Member	Date of Remuneration Committee meetings			
	2014-15	19 March 2015	4 May 2015	TOTAL
Mary Corbett, Chair		Yes	Yes	2 of 2
Cleave Rogan		Yes	Yes	2 of 2
Liz Alexander		Yes	No	1 of 2

Statement of principles

CRDC Directors and staff members are required to:

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

CRDC People and Governance

CRDC EMPLOYEES

CRDC's small but dedicated team of skilled and experienced staff actively manage RD&E investment portfolios to achieve the cotton industry's strategic goals. Our internal capacity is an important element of the overall effectiveness of RD&E investment for the cotton industry.

CRDC Organisational Structure

CRDC Board of Directors
CRDC Chair Dr Mary Corbett
CRDC Executive Director Mr Bruce Finney

R&D Investment Team	CottonInfo	Business and Finance Team
General Manager R&D Investment Ian Taylor R&D Managers: Allan Williams Jane Trindall Susan Maas (<i>Acting</i>) Tracey Leven	CottonInfo Program Manager Warwick Waters Communication Manager Ruth Redfern	General Manager Business and Finance Graeme Tolson Accountant Emily Luff Trainee Accountant Elizabeth Eather Executive Assistant Dianne Purcell Project Administration Assistant Megan Baker Amy Withington Clerk Tamara Johnston (<i>until 19 December 2014</i>)

Employment

Staff members are employed under Section 87 of the PIRD Act, which provides that the terms and conditions of employment are to be determined by the Corporation. CRDC complies with the Australian Government Bargaining Framework when exercising its power to engage employees in relation to sections 12, and 87 of the PIRD Act.

Including the Executive Director, there were 11 full-time employees and one part-time employee on 30 June 2015. R&D Manager Tracey Leven and Trainee Accountant Elizabeth Eather were on extended leave.

CRDC employees

CRDC people	2010-11	2011-12	2012-13	2013-14	2014-15
Full-time employees	7	7	12	10	11
Part-time employees	1	1	2	4	1
Parental leave	0	0	1	2	2
TOTAL CRDC staff	8	8	15	16	14*

*The number of CRDC staff employed by CRDC on 30 June 2015.

Staff training and development

In 2014-15, CRDC spent \$33,790 on training and nil on recruitment. Areas of direct training activities were Director training, WHS training, CBMS, CPA training, Microsoft Outlook training and support for a trainee undertaking academic studies in accounting.

Throughout the year, Directors and staff participated in a wide range of CRDC-related activities involving other organisations, providing valuable experience, as well as skills and knowledge upgrades for the personnel involved.

Equal employment opportunity

CRDC is committed to a merit-based, non-discriminatory recruitment and promotion policy, and staff members are chosen strictly according to their qualifications for the job. Scientists undertaking CRDC-funded research are of diverse backgrounds and cultures.

CRDC's Equal Employment Opportunity, Discrimination and Harassment Policy defines prohibited discrimination and harassment and sets out a complaints procedure to be followed if there is a breach of this policy, including details of what action can be taken once the complaint has been made. The policy applies to all employees, whether full-time, part-time, casual or temporary, to Directors and to contractors and customers (clients).

CRDC People and Governance

GOVERNANCE AND ACCOUNTABILITY

CRDC was established in 1990 as a partnership between the Australian people (through the Australian Government) and the Australian cotton industry (through Cotton Australia – its legislated representative industry body).

Location

CRDC is based in one of Australia's major cotton-growing areas, Narrabri, in North West NSW. Being centrally located within the Australian cotton industry, CRDC benefits from developing and maintaining important relationships with cotton growers, researchers, processors and members of regional cotton communities.

PIRD Act legislation

CRDC began operations in 1990 under the PIRD Act.

Charter

The CRDC charter under the PIRD Act is to invest in and manage a portfolio of research, development and extension projects and programs in order to secure economic, environmental and social benefits for the Australian cotton industry and the community. This is to be conducted in a framework of improved accountability for research and development spending in relation to the cotton industry.

PIRD objects

The objects of this PIRD Act are to:

- (a) make provision for the funding and administration of research and development relating to primary industries with a view to:
 - (i) increasing the economic, environmental and social benefits to members of primary industries and to the community in general by improving the production, processing, storage, transport or marketing of the products of primary industries; and
 - (ii) achieving the sustainable use and sustainable management of natural resources; and
 - (iii) making more effective use of the resources and skills of the community in general and the scientific community in particular; and
 - (iv) supporting the development of scientific and technical capacity; and
 - (v) developing the adoptive capacity of primary producers; and
 - (vi) improving accountability for expenditure on research and development activities in relation to primary industries; and
- (b) make provision for the funding and administration of marketing relating to products of primary industries.

Powers

Under Section 12 of the PIRD Act, CRDC has the power to do all things necessary to carry out its functions, including but not restricted to:

- Entering into agreements for the carrying out of R&D or marketing activities;
- Applying for patents, either solely or jointly;
- Charging for work done, services rendered, and goods and information supplied;
- Acquiring, holding and disposing of real and personal property; and
- Anything incidental to any of its powers.

Functions

Function	Application
<p>Investigating and evaluating the cotton industry’s requirements for research and development, and the preparation, review and revision of an RD&E plan on that basis</p>	<p>This is achieved by continuing interaction with CRDC’s legislated industry body, Cotton Australia, as well as the Australian cotton industry’s wider peak body, the Australian Cotton Industry Council (ACIC). Cotton Australia undertakes a range of functions relating to CRDC, including an annual review to ensure the CRDC Strategic Plan remains current and relevant.</p> <p>The cotton industry and cotton researchers were closely involved in development of the CRDC 2013-18 Strategic R&D Plan, which incorporated Australian Government and cotton industry RD&E priorities, as well as advice from the Minister and the Department of Agriculture.</p>
<p>Preparing an Annual Operational Plan for each financial year</p>	<p>An Annual Operational Plan is submitted to the Australian Government and Cotton Australia prior to the commencement of each financial year.</p>
<p>Coordinating and funding RD&E activities consistent with current planning documents</p>	<p>RD&E projects are approved or commissioned in line with the Annual Operational Plan each year. The Annual Operational Plan is devised to address the objectives and strategies outlined in the current Strategic RD&E Plan.</p>
<p>Monitoring, evaluating and reporting to Parliament, the Minister for Agriculture, and to industry on RD&E activities coordinated or funded by the Corporation</p>	<p>The Corporation reports formally to the Australian Parliament through its Annual Report. In addition, CRDC informs the Minister for Agriculture of any matters of interest or concern in the current operating environment.</p> <p>This occurs in written and, where possible, face-to-face communication. CRDC is also in communication with the Department of Agriculture on a range of issues. Communication with the industry and Cotton Australia occurs continually on both a formal and informal basis, as outlined above. Communication with the broader community is a key focus of CRDC’s communication activities.</p> <p>In order to ensure stringent evaluation of its RD&E activities, CRDC is committed to the ongoing Council of Rural Research and Development Corporation’s Impact Evaluation process.</p>
<p>Facilitating the dissemination, adoption and commercialisation of research and development results in relation to the cotton industry</p>	<p>CRDC plays a pivotal role in facilitating fast and effective dissemination of cotton R&D outcomes.</p> <p>CRDC is a founding partner in the industry’s joint extension program, CottonInfo, along with co-partners Cotton Australia and Cotton Seed Distributors. Formed in 2012, the CottonInfo team works to improve responsiveness to grower needs through better communication and regional representation, focusing on delivering research directly to growers, agronomists and consultants. The model recognises the importance of supporting adoption of RD&E through multiple delivery pathways and is underpinned by the industry’s best management practices program, <i>myBMP</i>.</p> <p>In addition, CRDC hosts forums and on-farm events, participates in roadshows and the cotton trade show, produces publications, sponsors the biennial Australian Cotton Conference and Australian Cotton Research Conference and has a communication strategy to extend and enhance the adoption of RD&E. CRDC also collaborates in the successful commercialisation of RD&E where possible.</p>

The PGPA Act

CRDC has been subject to the *Public Governance, Performance and Accountability Act 2013* since 1 July 2013 which provides enhanced levels of accountability as well as a planning and reporting framework.

Other legislation

The setting and collection of levies on the cotton industry is enabled by the *Primary Industries (Excise) Levies Act 1999* and the *Primary Industries Levies and Charges Collection Act 1991*.

Cotton R&D levy

The Australian Government introduced an R&D levy at the request of industry. The cotton levy funds CRDC research and development programs and the subscription for Industry membership of Plant Health Australia. The levy is payable on cotton produced in Australia and the producer (the person who owns the cotton immediately after harvest) is liable to pay the levy.

The levy rate for cotton is \$2.25 per 227 kilogram bale of cotton. The Australian Government contributes matching funds up to set limits.

Minister

During 2014-15 CRDC was accountable to the Australian Parliament through the Minister for Agriculture, the Hon. Barnaby Joyce MP.

Minister's responsibilities

The Minister's powers and responsibilities, as outlined under various sections of the PIRD Act, include appointing CRDC's Chair and Directors and, under certain conditions, terminating these appointments; approving CRDC's Strategic R&D Plan and any variations to it; appointing a person as Presiding Member of CRDC's Selection Committee, as well as other members of that Committee; and transferring to CRDC any assets held by the Commonwealth that the Minister considers appropriate and which would assist its performance and function.

Ministerial directions

CRDC complies with all Ministerial directions, legislative and policy requirements of the Australian Government that it has been able to ascertain.

CRDC received three Ministerial directions during 2014-15:

- CRDC was directed to apply the Australian Government Public Sector Workplace Bargaining Policy to the extent that it is practical in the context of its operations.
- CRDC was directed to comply with the Australian Government's Indigenous employment target.
- CRDC was directed to complete annual Comcover Risk Benchmarking Surveys.

In addition CRDC was informed that six notifications under section 28 of the CAC Act ceased to have legal effect from 1 July 2014, with the introduction of the *Public Governance, Performance and Accountability Act* rules.

CRDC role, responsibilities and accountabilities

- CRDC is formally accountable to the Australian people through the Australian Parliament and to the cotton industry through its industry representative body, Cotton Australia.
- CRDC's stakeholders set broad objectives, which the Corporation addresses through its Strategic R&D Plan and Annual Operational Plan.
- CRDC has used these objectives as a basis for the development of its planned outcomes and the identification of key outputs.
- CRDC's reporting processes include the presentation of a formal report to its industry stakeholder. Part of this presentation includes an opportunity for questioning and debating Board decisions.
- CRDC annually reports on investments, project outcomes, operation activities and financial statements every year via its Annual Report.
- CRDC publishes an Annual Operational Plan, Strategic R&D Plan for 2013-18 and Annual Report on the outcomes of investments, projects, operations and financials.

Policies, procedures and charters

CRDC has 34 existing policies, procedures and charters to assist with the effective governance of the organisation. These documents are available from CRDC's internal shared folders and are made available to all Directors and new staff during induction training. In addition, staff receive policy training on an annual rolling basis at monthly staff meetings. Directors and management conducted, commissioned or enacted 16 reviews during 2014-15 listed in the table below.

During 2015-16 CRDC will consider and adopt a Cost Allocation Policy to ensure accurate reporting of the allocation of direct and indirect costs.

Corporate reporting

In accordance with the PIRD Act and the PGPA Act, CRDC prepares a five-year Strategic R&D Plan, as well as an Annual Operational Plan for each financial year.

In 2014-15, CRDC submitted its Annual Operational Plan 2015-16 to the Minister for Agriculture, the Hon. Barnaby Joyce with the plan commencing from 1 July 2015. The Annual Report 2013-14 was submitted to the Minister on 15 October 2014 and the Minister agreed to table the report in Parliament in November 2014.

Reviews 2014-15

Description	Board, committee and management	Last review
Board IP Committee Charter Remuneration Committee Charter Audit Committee Charter Board Charter and Governance Statement	Board, IP committee, Remuneration committee and Audit committee	Jan 2015 Apr 2015 Apr 2015 Jan 2015
Finance & Administration Risk Register & Management Plan Fraud Risk Register & Management Plan Privacy Policy Procurement Policy Delegations of Authority Schedule Reserves Policy Financial Investments Policy	Board, Audit committee and management	Aug 2014 Aug 2014 Jun 2015 Jun 2015 Jun 2015 Apr 2015 Apr 2015
Human Resources Motor Vehicle Use Policy Travel Policy Terms and Conditions of Employment Policy Redundancy Policy External Study Assistance Policy EEO, Discrimination and Harassment Policy	Board, Audit committee, Remuneration committee and management	Jun 2015 Jun 2015 Jun 2015 Jun 2015 Jun 2015 Jun 2015
WH&S WH&S Management Arrangements	Board, Audit committee and management	Jun 2015

Fraud control

Active fraud control is a major responsibility of all staff and clear standards and procedures have been established. All personnel engaged in the prevention, detection and investigation of fraud receive appropriate fraud control training, consistent with the Australian Government's Fraud Control Guidelines.

The Audit Committee endorse, monitor and review the fraud control plan, which is read in conjunction with the Risk Management Plan and the Board Charter for Directors and Statement of Principles for staff.

CRDC's Audit Committee, Executive Director and General Manager Business and Finance (the nominated fraud control officer) carry out the functions of a fraud investigation unit collectively, as described in the Commonwealth Fraud Investigation Model. The support of the Australian Federal Police would be sought if CRDC felt there was a prima facie case of fraud and further investigation was required. No such action was necessary in 2014-15.

Service charter

CRDC does not provide services direct to the public and thus does not have a service charter; however, CRDC has a Board Charter which includes a Governance Statement and a Statement of Principles that embody the set of values underlying our decisions, actions and relationships.

National Disability Strategy

CRDC working conditions and procedures for employees and stakeholders align with the *Commonwealth Disability Discrimination Act 1992* in the broader context of the National Disability Strategy 2010-20. CRDC has ensured that any person with a disability could be properly accommodated and carry out all functions, as either a staff member or a visitor. Should a future staff member or visitor need more specialised disability assistance, CRDC will assess and meet these needs.

Equal Employment Opportunity, Discrimination and Harassment Policy

CRDC's Equal Employment Opportunity, Discrimination and Harassment Policy defines prohibited discrimination and harassment and sets out a complaints procedure.

Significant events

CRDC had no significant events in 2014-15.

Significant changes in the state of affairs

CRDC had no significant changes in its state of affairs in 2014-15.

Judicial decisions and reviews by outside bodies

CRDC had no judicial decisions or reviews by outside bodies in 2014-15.

Patents

During 2014-15, CRDC worked with CSIRO, Deakin University, the University of Southern QLD, and NSW DPI to apply for provisional patents for inventions.

Work Health and Safety

CRDC has a strong culture of achieving best practice and continuous improvement in Work Health and Safety (WHS), as required by the *Work Health and Safety Act 2011*. This is achieved by providing the necessary resources (both human and financial) to ensure that WHS functions effectively.

In accordance with Schedule 2 Part 4 of the WHS Act, CRDC details notifiable incidents reported each year. In view of its WHS record, CRDC remains vigilant in maintaining its safety performance by conducting audits and reviews of policies and procedures.

CRDC Work Health and Safety summary

Legislative reporting requirements Schedule 2 Part 4 of the <i>Work Health and Safety Act 2011</i>	Action undertaken 2014-15
Initiatives during 2014-15 and outcomes	<ul style="list-style-type: none"> ■ An independent audit of WHS performance, which informed the review and updating of CRDC's WHS Policy and procedures. ■ Fire warden, evacuation, fire extinguisher, ergonomics training. ■ Safety issues discussed formally at workplace meetings, workplace inspections held (including vehicles) and staff consulted in resolving safety issues and physical conditions of the workplace. ■ A flu vaccination program for all CRDC staff was offered. ■ WHS inductions for new staff, directors and contractors.
Statistics of any notifiable incidents as defined by s.38 of the WHS Act	<ul style="list-style-type: none"> ■ CRDC had no notifiable incidents in 2014-15.
Details of any investigations conducted during the year, including details of all notices under Part 10 of the WHS Act	<ul style="list-style-type: none"> ■ CRDC conducted no investigations and no notices were received from, or given to, an employee.

Freedom of information

General enquiries regarding access to documents or other matters relating to freedom of information should be made in the first instance to the Executive Director.

Funding information on individual projects funded by CRDC is available on request, unless that information has been classified as commercial-in-confidence. Information about CRDC projects is also available at the CRDC website www.crdc.com.au.

During 2014-15, CRDC had no freedom of information requests. However in the event a request was raised the CRDC would manage the request in accordance with the provisions of its freedom of information plan, which complied with subsection 8(1) of the *Freedom of Information Act 1982*.

Categories of documents held

Category	Nature	Access
Administration	Files	D
Annual Operating Plans	Files, Publications	C
Annual Reports	Files, Publications	C
Applications, Guidelines and Contracts	Files, Publications	C, D
Assets Register	Files	D
Financial Management	Files	D
Five-Year Plans	Files, Publications	C
Project Lists	Files, Publications	C, D
Research Reports	Files, Publications	C, D
Workshop Reports	Files, Publications	C, D

C: Documents customarily made available

D: Documents not customarily made available for reasons of privacy or commercial-in confidence.

Contractors and consultants

CRDC employs consultants and contractors on a needs basis and after background checks to ensure proposed appointees have the necessary skills and experience. During the reporting year CRDC spent \$930,699 exclusive of GST, to remunerate consultants and contractors.

Privacy and confidentiality arrangements require that CRDC policy is not to disclose amounts paid to individual consultants. A list of contractors and consultants with remuneration of \$10,000 or more, exclusive of GST, can be found in the following table.

Contractor	Service provided
Aboriginal Employment Strategy Ltd	HSC student traineeships
ACIL Allen Consulting	Strategic advice
Board Matters	Board consultant
CA (Pacific) Pty Ltd	Software consultants
Helen Wheels HR	Project management
HR in Business Pty Ltd	HRM consultant
Keo Design	Web consultant
Carolyn Martin	Publication content
Melanie Jenson	Publication content
Neil Deacon Design	Publication design
Nexia Court & Co	Internal audit services
Oakton Services Pty Ltd	Internal audit services
Revolution IT	Software consultant
Sefton & Associates	Strategic advice
TechMAC Pty Ltd	Program management

Payments to advertising agencies

CRDC did not engage the services of any advertising agency, market research organisation, polling organisation, direct mail organisation or media promotion organisation during the reporting year.

Payment to representative body

CRDC's industry representative body is Cotton Australia. In 2014-15, CRDC contributed \$106,404 to Cotton Australia for industry consultation and RD&E projects.

These funds included \$8,529 for their industry consultation role including several specific activities:

- Industry consultation for reviewing the CRDC Strategic R&D Plan. This ensures CRDC's strategic planning continues to address evolving industry RD&E needs.
- Industry consultation and participation in CRDC forums to review RD&E funding applications and scoping of future directions in research.
- A meeting to receive and discuss the CRDC Annual Report for the preceding year. This enables the industry representative body to ensure CRDC's activities for that year have met its strategic objectives and to question senior staff on any matters of interest or concern.

While CRDC does not pay a fee for service to the industry representative body for these activities, it contributes to the expenses they incur in carrying them out, as authorised by section 15 of the PIRD Act, which relates to consultation with the industry stakeholder.

In 2014-15, CRDC contributed a total of \$97,875 to Cotton Australia for the following co-funded project activities:

- \$65,250 co-funding support for the Primary Industries Education Foundation to support the cotton industry's participation in cross-sectoral education initiatives.
- \$25,000 support for the 2014 Australian Cotton Conference to increase awareness in the Australian cotton industry of research outcomes. This is a joint extension exercise in line with the Australian Government's prioritisation of extension and adoption in the Agricultural Competitiveness White Paper.
- \$4,000 support for the Next Gen Forum at the 2014 Australian Cotton Conference to encourage engagement among the next generation of the cotton industry.
- \$2,625 co-funding support for the cross-sector CottonMap project lead by Cotton Australia and supported by GRDC and commercial organisations. The online mapping tool is used by cotton growers, grain growers and graziers to help prevent spray-drift damage to cotton crops.

CRDC Annual Report 2014-15: Selection Committee Report

Joe Robinson
Presiding Member
Cotton Research and Development Corporation
Board Selection Committee

31 July 2015

The Hon. Barnaby Joyce MP
Minister for Agriculture
Parliament House
CANBERRA ACT 2600

Dear Minister

In accordance with the requirements of Section 141 of the *Primary Industries Research and Development Act 1989* (PIRD Act), I write to inform you of the activities of the Cotton Research and Development Corporation (CRDC) Selection Committee during the year 1 July 2014 to 30 June 2015.

The terms of the existing CRDC directors were due to end on 30 September 2014. I commenced the selection process upon my appointment as the Presiding Member of the Selection Committee in accordance with your letter of 7th May 2014.

The Committee's nominations for five directors were provided to your office on 12th August 2014.

Details of the operation of the selection committee and the process conducted by the committee are outlined in the following report.

Yours sincerely



Mr Joe Robinson
Presiding Member

Establishment of Selection Committee

The CRDC Selection Committee was established under the PIRD Act for the purpose of nominating to you persons for appointment as directors of the CRDC.

On 7th May 2014, you appointed me as the Presiding Member of the CRDC Selection Committee until 31 March 2017.

On 17th June 2014, following nominations made by me, in consultation with Cotton Australia as CRDC's representative organisation, you appointed the following persons to the selection committee:

- Mr Lyndon Mulligan, NSW (CA nominee)
- Mr David Anthony, NSW (CA nominee)
- Ms Sandra Deane, QLD (independent nominee)
- Ms Ruth Wade, NSW (CA nominee).

Selection Process

At the commencement of this process, I consulted with CRDC Chair, Dr Mary Corbett and Executive Director, Mr Bruce Finney, on the strategic direction of the organisation, current and emerging industry issues, particular challenges facing the industry and CRDC's role in contributing to solutions or participation in resolving these issues. I also consulted with officers at the Australian Government Department of Agriculture. The committee discussed in detail the skills and experience that were likely to be required to deal with the organisational and industry challenges likely to emerge over the next three years.

The board positions were advertised in the national press and regional newspapers, as well as through a wide range of electronic media, industry and professional organisations. Cotton Australia was also invited to nominate candidates for consideration.

The advertisements called for written applications against the criteria specified in the PIRD Act, which included cotton production, processing or marketing, management or conservation of natural resources, science and technology or technology transfer, environmental and ecological matters, economics and finance, administration of research and development, business management, sociology and public administration.

The committee sought candidates who also had a sound understanding of corporate governance and the role and responsibilities of directors, as well as good communications skills and the capacity to represent the CRDC to its stakeholders.

In addition, it was considered important that applicants understood the research and development environment in Australia, industry structures and, importantly, the role of the Australian Government as a stakeholder in the CRDC.

In total, 112 applications were received and considered by all members of the selection committee. A meeting was held on 19th June 2014 to agree on a list of suitable candidates for interview. In developing the list of candidates for interview, the selection committee took into account the core selection criteria contained in the PIRD Act, as well as the other criteria agreed to be important, including a level of industry experience and strategic skills that would be useful in supporting and supplementing CRDC’s management in dealing with the range of issues outlined above.

The selection committee unanimously agreed to interview 14 candidates, of whom eight were women. Interviews were conducted on 25th and 26th June 2014 at Cotton Australia, Level 4, 247 Coward Street, Mascot, Sydney. Reference checks were carried out after the interviews in respect of the candidates selected by the Committee for nomination.

Board appointments

Upon completion of the selection process, in accordance with section 130 of the PIRD Act, the CRDC Selection Committee provided for your consideration six nominations for appointment, as requested, and a list of two other candidates considered suitable for appointment.

From those nominations and list, you appointed the following persons as CRDC directors, commencing 20 October 2014:

- Mr Cleave Rogan
- Dr Michael Robinson
- Ms Kathryn Adams
- Mrs Elizabeth Alexander
- Mr Greg Kauter.

Following notification on 20th October 2014 of your appointment of the directors, I disbanded the selection committee in accordance with section 129 of the PIRD Act.

Expenses

The following expenses (excluding GST) were incurred in the selection process:

Item	Expense
Selection committee members travel and related expenses	\$8357.45
Applicants’ travel expenses and other interview costs	\$3681.39
Presiding Member fees	\$10,046.98
Secretarial, office expenses and administrative support	\$5,023.49
Advertising	\$13,311.20
TOTAL	\$40,420.51





Section 6 Financials

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Accountable Authority
and Officers

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INDEPENDENT AUDITOR'S REPORT

To the Minister for Agriculture

I have audited the accompanying annual financial statements of the Cotton Research and Development Corporation for the year ended 30 June 2015, which comprise:

- Statement by the Accountable Authority, Executive Director and Chief Financial Officer;
- Statement of Comprehensive Income;
- Statement of Financial Position;
- Statement of Changes in Equity;
- Cash Flow Statement;
- Schedule of Commitments; and
- Notes to the financial statements comprising a Summary of Significant Accounting Policies and other explanatory information.

Accountable Authority's Responsibility for the Financial Statements

The directors of the Cotton Research and Development Corporation are responsible under the *Public Governance, Performance and Accountability Act 2013* for the preparation and fair presentation of annual financial statements that comply with Australian Accounting Standards and the rules made under that Act. The directors are also responsible for such internal control as is necessary to enable the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

My responsibility is to express an opinion on the financial statements based on my audit. I have conducted my audit in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards. These auditing standards require that I comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of the accounting policies used and the reasonableness of accounting estimates made by the Accountable Authority of the entity, as well as evaluating the overall presentation of the financial statements.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

GPO Box 707 CANBERRA ACT 2601
19 National Circuit BARTON ACT
Phone (02) 6203 7300 Fax (02) 6203 7777

Independence

In conducting my audit, I have followed the independence requirements of the Australian National Audit Office, which incorporate the requirements of the Australian accounting profession.

Opinion

In my opinion, the financial statements of the Cotton Research and Development Corporation:

- (a) comply with Australian Accounting Standards and the *Public Governance, Performance and Accountability (Financial Reporting) Rule 2015*; and
- (b) present fairly the financial position of the Cotton Research and Development Corporation as at 30 June 2015 and its financial performance and cash flows for the year then ended.

Australian National Audit Office



Peter Kerr
Executive Director
Delegate of the Auditor-General
Canberra
20 August 2015

Cotton Research and Development Corporation

**STATEMENT BY THE ACCOUNTABLE AUTHORITY, EXECUTIVE DIRECTOR
AND CHIEF FINANCIAL OFFICER**

In our opinion, the attached financial statements for the year ended 30 June 2015 comply with subsection 42(2) of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act), and are based on properly maintained financial records as per subsection 41(2) of the PGPA Act.

In our opinion, at the date of this statement, there are reasonable grounds to believe that the Cotton Research and Development Corporation will be able to pay its debts as and when they fall due.

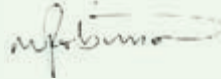
This statement is made in accordance with a resolution of the directors.

Signed



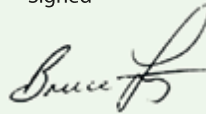
Dr Mary Corbett
Chairperson
20th August 2015

Signed



Dr Michael Robinson
Director
20th August 2015

Signed



Bruce Finney
Executive Director
20th August 2015

Signed



Graeme Tolson
Chief Financial Officer
20th August 2015

STATEMENT OF COMPREHENSIVE INCOME
for the period ended 30 June 2015

	<i>Notes</i>	2015 \$	2014 \$
NET COST OF SERVICES			
Expenses			
Employee benefits	3A	1,878,617	1,937,109
Supplier	3B	1,025,812	1,151,790
Grants	3C	19,829,203	18,771,311
Depreciation and amortisation	3D	91,989	62,756
Total expenses		22,825,621	21,922,966
OWN-SOURCE INCOME			
Own-source revenue			
Interest	4A	1,596,545	1,778,946
Rental income	4B	5,000	5,000
Royalties	4C	1,706,735	1,830,006
Other revenue	4D	2,171,358	1,649,394
Total own-source revenue		5,479,638	5,263,346
GAINS			
Gains from sale of assets		36	-
Total gains		36	-
Total own-source income		5,479,674	5,263,346
Net cost of services		17,345,947	16,659,620
Revenue from Government			
PIRD Act 1989 Contribution	4E	7,295,409	11,238,949
Levies and penalties	4F	7,298,282	10,977,077
Total revenue from Government		14,593,691	22,216,026
Surplus/(Deficit) attributable to the Australian Government		(2,752,256)	5,556,406
OTHER COMPREHENSIVE INCOME			
Changes in asset revaluation surplus	7C	(90,534)	-
Total other comprehensive income/(loss)		(90,534)	-
Total comprehensive income/(loss) attributable to the Australian Government		(2,842,790)	5,556,406

The above statement should be read in conjunction with the accompanying notes.

STATEMENT OF FINANCIAL POSITION
as at 30 June 2015

	<i>Notes</i>	2015 \$	2014 \$
ASSETS			
Financial assets			
Cash and cash equivalents	6A	6,257,640	11,098,065
Investments held to maturity	6B	35,022,609	31,000,000
Trade and other receivables	6C	3,747,877	6,252,649
Total financial assets		45,028,126	48,350,714
Non-financial assets			
Land and buildings	7A	710,000	790,443
Property, plant and equipment	7B,C	20,516	42,871
Intangibles	7D,E	319,848	92,282
Other non-financial assets	7F	5,487	4,205
Total non-financial assets		1,055,851	929,801
Total assets		46,083,977	49,280,515
LIABILITIES			
Payables			
Suppliers	8A	200,677	96,137
Grants	8B	3,785,284	4,286,734
Other payables	8C	109,342	99,406
Total payables		4,095,303	4,482,277
Provisions			
Employee provisions	9A	343,563	310,337
Total provisions		343,563	310,337
Total liabilities		4,438,866	4,792,614
Net assets		41,645,111	44,487,901
EQUITY			
Reserves		255,403	345,937
Retained surplus		41,389,708	44,141,964
Total equity		41,645,111	44,487,901

The above statement should be read in conjunction with the accompanying notes.

STATEMENT OF CHANGES IN EQUITY
for the period ended 30 June 2015

	Retained earnings		Asset revaluation reserve		Total equity	
	2015 \$	2014 \$	2015 \$	2014 \$	2015 \$	2014 \$
Opening balance						
Balance carried forward from previous period	44,141,964	38,585,558	345,937	345,937	44,487,901	38,931,495
Adjusted opening balance	44,141,964	38,585,558	345,937	345,937	44,487,901	38,931,495
Comprehensive income						
Surplus/(Deficit) for the period	(2,752,256)	5,556,406			(2,752,256)	5,556,406
Other comprehensive income	-	-	(90,534)	-	(90,534)	-
Total comprehensive income	(2,752,256)	5,556,406	(90,534)	-	(2,842,790)	5,556,406
Closing balance as at 30 June	41,389,708	44,141,964	255,403	345,937	41,645,111	44,487,901

The above statement should be read in conjunction with the accompanying notes.

CASH FLOW STATEMENT
for the period ended 30 June 2015

	<i>Notes</i>	2015 \$	2014 \$
OPERATING ACTIVITIES			
Cash received			
Industry levies and penalties		7,762,401	10,177,874
Commonwealth contributions		9,424,529	10,902,082
Royalties		1,855,043	2,799,908
Grants		931,895	1,254,535
Grants - Parental Leave		26,950	18,731
Interest		1,657,528	1,850,561
Net GST received		1,924,442	1,765,315
Other		1,121,495	389,395
Total cash received		24,704,283	29,158,401
Cash used			
Employees		1,861,139	1,987,101
Grants		22,322,839	22,789,370
Suppliers		1,030,827	1,333,475
Total cash used		25,214,805	26,109,946
Net cash from/(used by) operating activities	10	(510,522)	3,048,455
INVESTING ACTIVITIES			
Cash received			
Proceeds from sales of property, plant and equipment		100	-
Investments		42,000,000	13,000,000
Total cash received		42,000,100	13,000,000
Cash used			
Purchase of property, plant and equipment		307,394	211,172
Investments		46,022,609	17,000,000
Total cash used		46,330,003	17,211,172
Net cash used by investing activities		(4,329,903)	(4,211,172)
Net increase/(decrease) in cash held		(4,840,425)	(1,162,717)
Cash and cash equivalents at the beginning of the reporting period		11,098,065	12,260,782
Cash and cash equivalents at the end of the reporting period	6A	6,257,640	11,098,065

The above statement should be read in conjunction with the accompanying notes.

SCHEDULE OF COMMITMENTS
as at 30 June 2015

	2015 \$	2014 \$
BY TYPE		
Commitments receivable		
Research grant commitments ³	5,130,947	1,982,477
Net GST recoverable on commitments ¹	2,385,537	2,382,773
Total commitments receivable	7,516,484	4,365,250
Commitments payable		
Other commitments		
Operating leases ²	123,151	242,254
Research grant commitments ³	26,117,746	25,968,241
Total other commitments payable	26,240,897	26,210,495
Net commitments payable by type	18,724,413	21,845,245
BY MATURITY		
Commitments receivable		
Other commitments receivable		
Within 1 year	5,447,444	2,333,667
Between 1 to 5 years	2,069,040	2,031,583
Total other commitments receivable	7,516,484	4,365,250
Commitments payable		
Operating lease commitments		
Within 1 year	76,592	123,825
Between 1 to 5 years	46,559	118,429
Total operating lease commitments	123,151	242,254
Other Commitments		
Within 1 year	13,496,845	14,873,762
Between 1 to 5 years	12,620,901	11,094,479
Total other commitments payable	26,117,746	25,968,241
Total commitments payable	26,240,897	26,210,495
Net commitments by maturity	18,724,413	21,845,245

Note 1: Commitments are GST inclusive where relevant.

Note 2: Operating leases are effectively non-cancellable and comprise of agreements for the provision of motor vehicles for the Corporation.

Note 3: Research grant commitments receivable and payable are Agreements Equally Proportionately Unperformed for research, development and extension contracts.

This schedule should be read in conjunction with the accompanying notes.

NOTES TO THE FINANCIAL STATEMENTS

Note 1: Summary of Significant Accounting Policies

1.1 Objective of Cotton Research and Development Corporation

Cotton Research and Development Corporation is a corporate Commonwealth entity. The Corporation is an Australian Government controlled entity and is a not-for-profit entity. The objective of the Corporation is to bring industry and researchers together to establish research and development strategic directions and to fund projects that provide the cotton industry with the innovation and productivity tools to compete in global markets.

The Corporation is structured to meet this outcome:

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

The continued existence of the Corporation in its present form and with its present programs is dependent on Government policy and on continuing funding by Parliament for the Corporation’s administration and programs.

1.2 Basis of Preparation of the Financial Statements

The financial statements are general purpose financial statements and are required by section 42 of the *Public Governance, Performance and Accountability Act 2013*.

The financial statements have been prepared in accordance with:

- a) Financial Reporting Rule (FRR) for reporting periods ending on or after 1 July 2014; and
- b) Australian Accounting Standards and Interpretations issued by the Australian Accounting Standards Board (AASB) that apply for the reporting period.

The financial statements have been prepared on an accrual basis and in accordance with the historical cost convention, except for certain assets and liabilities at fair value. Except where stated, no allowance is made for the effect of changing prices on the results or the financial position.

The financial statements are presented in Australian dollars and values are rounded to the nearest dollar unless otherwise specified.

Unless an alternative treatment is specifically required by an accounting standard or the FRR, assets and liabilities are recognised in the statement of financial position when and only when it is probable that future economic benefits will flow to the Corporation or a future sacrifice of economic benefits will be required and the amounts of the assets or liabilities can be reliably measured. However, assets and liabilities arising under executory contracts are not recognised unless required by an accounting standard. Liabilities and assets that are unrecognised are reported in the Schedule of Commitments or Note 11: Contingent Assets and Liabilities.

Unless alternative treatment is specifically required by an accounting standard, income and expenses are recognised in the Statement of Comprehensive Income when, and only when the flow, consumption or loss of economic benefits has occurred and can be reliably measured.

1.3 Significant Accounting Judgements and Estimates

In the process of applying the accounting policies listed in this note, the Corporation has made the following judgements that have the most significant impact on the amounts recorded in the financial statements:

- The fair value of land and buildings has been taken to be the market value of similar properties as determined by an independent valuer.
- Leave provisions also involve actuarial assumptions based on the likely tenure of existing staff, patterns of leave claims and payouts, future salary movements and future discount rates.

No accounting assumptions or estimates have been identified that have a significant risk of causing a material adjustment to carrying amounts of assets and liabilities within the next accounting period.

1.4 New Australian Accounting Standards

Adoption of New Australian Accounting Standard Requirements

No accounting standard has been adopted earlier than the application date as stated in the standard.

All new standards, amendments to standards or interpretations that were issued prior to the sign-off date and are applicable to the current reporting period did not have a material effect, and are not expected to have a future material effect, on the Corporation's financial statements.

Future Australian Accounting Standard Requirements

The following new standards, amendments to standards or interpretations were issued by the Australian Accounting Standards Board prior to the signing of the statement by the accountable authority and chief financial officer, which are expected to have a material impact on the Corporation's financial statements for future reporting periods:

Standard / Interpretation	Application date for the Corporation ¹	Nature of impending change/s in accounting policy and likely impact on initial application
AASB 9 Financial Instruments	1/07/2018	Will impact the classification of financial assets.
AASB 124 Related Party Disclosures	1/07/2016	Will have no impact on disclosures as it is a requirement of the 'PGPA (Financial Reporting) Rule 2015' (FRR) to disclose related party transactions.

1. The Corporation's expected initial application date is when the accounting standard becomes operative at the beginning of the Corporation's reporting period.

All other new standards, amendments to standards or interpretations that were issued prior to the sign-off date and are applicable to future reporting periods are not expected to have a future material impact on the Corporation's financial statements.

NOTES TO THE FINANCIAL STATEMENTS

1.5 Revenue

Revenue from the sale of goods is recognised when:

- a) the risks and rewards of ownership have been transferred to the buyer;
- b) the Corporation retains no managerial involvement or effective control over the goods;
- c) the revenue and transaction costs incurred can be reliably measured; and
- d) it is probable that the economic benefits associated with the transaction will flow to the Corporation.

Revenue from rendering of services is recognised by reference to the stage of completion of contracts at the reporting date. The revenue is recognised when:

- a) the amount of revenue, stage of completion and transaction costs incurred can be reliably measured; and
- b) the probable economic benefits associated with the transaction will flow to the entity.

The stage of completion of contracts at the reporting date is determined by reference to the proportion that costs incurred to date bear to the estimated total costs of the transaction.

Receivables for goods and services, which have 30 day terms, are recognised at the nominal amounts due less any impairment allowance account. Collectability of debts is reviewed at end of the reporting period. Allowances are made when collectability of the debt is no longer probable.

Interest revenue is recognised using the effective interest method as set out in AASB 139 *Financial Instruments: Recognition and Measurement*.

Resources Received Free of Charge

Resources received free of charge are recognised as revenue when, and only when, a fair value can be reliably determined and the services would have been purchased if they had not been donated. Use of those resources is recognised as an expense. Resources received free of charge are recorded as either revenue or gains depending on their nature.

Revenue from Government

Funding received or receivable from non-corporate Commonwealth entities (appropriated to the Department of Agriculture as a corporate Commonwealth entity payment item for payment to this Corporation) is recognised as Revenue from Government unless it is in the nature of an equity injection or a loan. Revenue from the Department of Agriculture is recognised on an accrual basis from the date that the Department of Agriculture notifies the Corporation of the amount receivable. Revenue from government includes:

- a) **Industry Levies:** Under section 30(1)(a) of the *Primary Industries Research and Development 1989 Act* (PIRD Act), CRDC received cotton industry levies. This contribution to the Corporation is collected and distributed by the Australian Government under the *Primary Industries (Excise) Levies 1999 Act*.
- b) **PIRD Act 1989 Contributions:** Under section 30(1)(b) of the PIRD Act, the Australian Government provides matching payments, within certain parameters, equal to one half of the amount expended by the Corporation. Matching payments are recognised as Revenue from Government when the necessary expenditure is recognised.

Revenue from Government Grants

Grant funding received from Commonwealth or State agencies is recognised when the funds are received from the agency.

Parental Leave Payments Scheme

Amounts received under the Parental Leave Payments Scheme by the Corporation not yet paid to employees were presented as gross cash and a liability (payable). The total amount received under this scheme was \$26,950 (2014: \$18,731).

1.6 Royalties

Revenue from royalties is recognised on an accruals basis in accordance with the substance of the relevant agreements except when the royalty cannot be measured with sufficient reliability. In the latter case, royalty revenue is recognised based on cash received.

1.7 Gains

Sale of Assets

Gains from disposal of assets are recognised when control of the asset has passed to the buyer.

1.8 Grants for Research and Development

The CRDC recognises project liabilities through project agreements that require the research partner to perform services or provide facilities, or to meet eligibility criteria. A grant R&D expense is recognised when the research provider has provided the services, or facilities and met the eligibility criteria. Eligibility criteria includes but is not limited to providing progress reports, financial statements and intellectual property reports.

1.9 Employee Benefits

Liabilities for 'short-term employee benefits' (as defined in AASB 119 *Employee Benefits*) and termination benefits expected within twelve months of the end of reporting period are measured at their nominal amounts.

The nominal amount is calculated with regard to the rates expected to be paid on settlement of the liability.

Leave

The liability for employee benefits includes provision for annual leave and long service leave. No provision has been made for sick leave as all sick leave is non-vesting and the average sick leave taken in future years by employees of the Corporation is estimated to be less than the annual entitlement for sick leave.

The leave liabilities are calculated on the basis of employees' remuneration at the estimated salary rates that will be applied at the time the leave is taken, including the Corporation's employer superannuation contribution rates to the extent that the leave is likely to be taken during service rather than paid out on termination.

The liability for long service leave has been determined by reference to the Department of Finance standard parameters for the Long Service Leave Shorthand Method set out in the Financial Reporting Rule. The estimate of the present value of the liability takes into account attrition rates and pay increases through promotion and inflation.

Separation and Redundancy

Provision is made for separation and redundancy benefit payments. The Corporation recognises a provision for termination when it has developed a detailed formal plan for the terminations and has informed those employees affected that it will carry out the terminations.

NOTES TO THE FINANCIAL STATEMENTS

Superannuation

Staff of the Corporation are members of Public Superannuation Funds, Self Managed Superannuation Funds, the Public Sector Superannuation Scheme (PSS) or the PSS accumulation plan (PSSap).

The PSS is a defined benefit scheme for the Australian Government. The PSSap is a defined contribution scheme.

The liability for defined benefits is recognised in the financial statements of the Australian Government and is settled by the Australian Government in due course. This liability is reported in the Department of Finance's administered schedules and notes.

The Corporation makes employer contributions to the employees' superannuation scheme at rates determined by an actuary, or by statute, sufficient to meet the current cost to the Government. The Corporation accounts for the contributions as if they were contributions to defined contribution plans.

The liability for superannuation recognised as at 30 June represents outstanding contributions for the final fortnight of the year.

1.10 Leases

A distinction is made between finance leases and operating leases. Finance leases effectively transfer from the lessor to the lessee substantially all the risks and rewards incidental to ownership of leased assets. An operating lease is a lease that is not a finance lease. In operating leases, the lessor effectively retains substantially all such risks and benefits.

The Corporation did not hold any finance leases in 2015 (2014: nil).

Operating lease payments are expensed on a straight-line basis which is representative of the pattern of benefits derived from the leased assets.

1.11 Fair Value Measurement

The Corporation deems transfers between levels of the fair value hierarchy to have occurred when either the quotable prices or observable inputs for each class of asset become available or cease to be available.

1.12 Cash and cash equivalents

Cash and cash equivalents includes cash on hand and demand deposits in bank accounts with an original maturity of 3 months or less that are readily convertible to known amounts of cash and subject to insignificant risk of changes in value. Cash is recognised at its nominal amount.

1.13 Financial Assets

The Corporation classifies its financial assets in the following categories:

- a) financial assets at fair value through profit or loss;
- b) held-to-maturity investments; and
- c) loans and receivables.

The classification depends on the nature and purpose of the financial assets and is determined at the time of initial recognition. Financial assets are recognised and derecognised upon trade date.

Effective Interest Method

The effective interest method is a method of calculating the amortised cost of a financial asset and of allocating interest income over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash receipts through the expected life of the financial asset, or, where appropriate, a shorter period.

Income is recognised on an effective interest rate basis except for financial assets that are recognised at fair value through profit or loss.

Financial Assets at Fair Value Through Profit or Loss

Financial assets are classified as financial assets at fair value through profit or loss where the financial assets:

- a) have been acquired principally for the purpose of selling in the near future;
- b) are derivatives that are not designated and effective as a hedging instrument; or
- c) are a part of an identified portfolio of financial instruments that the Corporation manages together and has a recent actual pattern of short-term profit-taking.

Assets in this category are classified as current assets.

Financial assets at fair value through profit or loss are stated at fair value, with any resultant gain or loss recognised in profit or loss. The net gain or loss recognised in profit or loss incorporates any interest earned on the financial asset.

The Corporation has no derivative financial assets in both the current and prior year.

Held-to-Maturity Investments

Non-derivative financial assets with fixed or determinable payments and fixed maturity dates that the Corporation has the positive intent and ability to hold to maturity are classified as held-to-maturity investments. Held-to-maturity investments are recorded at amortised cost using the effective interest method less impairment, with revenue recognised on an effective yield basis.

Loans and Receivables

Trade receivables, loans and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as 'loans and receivables'. Loans and receivables are measured at amortised cost using the effective interest method less impairment. Interest is recognised by applying the effective interest rate.

Impairment of Financial Assets

Financial assets are assessed for impairment at the end of each reporting period.

Financial assets held at amortised cost – if there is objective evidence that an impairment loss has been incurred for loans and receivables or held to maturity investments held at amortised cost, the amount of the loss is measured as the difference between the asset's carrying amount and the present value of estimated future cash flows discounted at the asset's original effective interest rate. The carrying amount is reduced by way of an allowance account. The loss is recognised in the Statement of Comprehensive Income.

Financial assets held at cost – If there is objective evidence that an impairment loss has been incurred, the amount of the impairment loss is the difference between the carrying amount of the asset and the present value of the estimated future cash flows discounted at the current market rate for similar assets.

NOTES TO THE FINANCIAL STATEMENTS

1.14 Financial Liabilities

Financial liabilities are classified as either financial liabilities 'at fair value through profit or loss' or other financial liabilities. Financial liabilities are recognised and derecognised upon 'trade date'.

Financial Liabilities at Fair Value Through Profit or Loss

Financial liabilities at fair value through profit or loss are initially measured at fair value. Subsequent fair value adjustments are recognised in profit or loss. The net gain or loss recognised in profit or loss incorporates any interest paid on the financial liability.

Other Financial Liabilities

Other financial liabilities are initially measured at fair value, net of transaction costs. These liabilities are subsequently measured at amortised cost using the effective interest method, with interest expense recognised on an effective yield basis.

The effective interest method is a method of calculating the amortised cost of a financial liability and of allocating interest expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash payments through the expected life of the financial liability, or, where appropriate, a shorter period.

Supplier and other payables are recognised at amortised cost. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

Grants

Grant liabilities are recognised to the extent that:

- the services required to be performed by the grantee have been performed, or
- the grant eligibility criteria have been satisfied, but payments due have not been made.

A commitment is recorded when the Corporation enters into an agreement to make these grants but services have not been performed or criteria satisfied.

1.15 Contingent Liabilities and Contingent Assets

Contingent liabilities and contingent assets are not recognised in the statement of financial position but are reported in the relevant notes. They may arise from uncertainty as to the existence of a liability or asset or represent an asset or liability in respect of which the amount cannot be reliably measured. Contingent assets are disclosed when settlement is probable but not virtually certain and contingent liabilities are disclosed when settlement is greater than remote.

1.16 Acquisition of Assets

Assets are recorded at cost on acquisition except as stated below. The cost of acquisition includes the fair value of assets transferred in exchange and liabilities undertaken. Financial assets are initially measured at their fair value plus transaction costs where appropriate.

Assets acquired at no cost, or for nominal consideration, are initially recognised as assets and income at their fair value at the date of acquisition, unless acquired as a consequence of restructuring of administrative arrangements. In the latter case, assets are initially recognised as contributions by owners at the amounts at which they were recognised in the transferor's accounts immediately prior to the restructuring.

1.17 Property, Plant and Equipment

Asset Recognition Threshold

Purchases of property, plant and equipment are recognised initially at cost in the statement of financial position, except for purchases costing less than \$1,000, which are expensed in the year of acquisition (other than where they form part of a group of similar items which are significant in total).

The initial cost of an asset includes an estimate of the cost of dismantling and removing the item and restoring the site on which it is located.

Revaluations

Fair values for each class of asset are determined as shown below:

Asset Class	Fair value measured at
Land	Market selling price
Buildings	Market selling price
Office Equipment	Depreciated replacement cost
Computer Equipment	Depreciated replacement cost
Fittings & Furniture	Depreciated replacement cost

Following initial recognition at cost, property, plant and equipment were carried at fair value less subsequent accumulated depreciation and accumulated impairment losses. Valuations were conducted with sufficient frequency to ensure that the carrying amounts of assets did not differ materially from the assets' fair values as at the reporting date. The regularity of independent valuations depended upon the volatility of movements in market values for the relevant assets.

Fair value is measured at market selling price where the market value can be determined in an "Active Market" in accordance with AASB 116 Property, Plant and Equipment, and AASB 136 Impairment. Where an active market is not available then "Depreciated Replacement Cost" has been used.

Revaluation adjustments were made on a class basis. Any revaluation increment was credited to equity under the heading of asset revaluation reserve except to the extent that it reversed a previous revaluation decrement of the same asset class that was previously recognised in the surplus/deficit. Revaluation decrements for a class of assets were recognised directly in the surplus/deficit except to the extent that they reversed a previous revaluation increment for that class.

Any accumulated depreciation as at the revaluation date is eliminated against the gross carrying amount of the asset and the asset was restated to the revalued amount.

Depreciation

Depreciable property, plant and equipment assets are written-off to their estimated residual values over their estimated useful lives to the Corporation using, in all cases, the straight-line method of depreciation.

Depreciation rates (useful lives), residual values and methods are reviewed at each reporting date and necessary adjustments are recognised in the current, or current and future reporting periods, as appropriate.

NOTES TO THE FINANCIAL STATEMENTS

Depreciation rates applying to each class of depreciable asset are based on the following useful lives:

	2015	2014
Buildings on freehold land	40 years	40 years
Office Equipment	5 to 10 years	5 to 10 years
Computer Equipment	3 years	3 years
Fittings & Furniture	10 years	10 years

Impairment

All assets were assessed for impairment at 30 June 2015. Where indications of impairment exist, the asset's recoverable amount is estimated and an impairment adjustment made if the asset's recoverable amount is less than its carrying amount.

The recoverable amount of an asset is the higher of its fair value less costs of disposal and its value in use. Value in use is the present value of the future cash flows expected to be derived from the asset. Where the future economic benefit of an asset is not primarily dependent on the asset's ability to generate future cash flows, and the asset would be replaced if the Corporation were deprived of the asset, its value in use is taken to be its depreciated replacement cost.

No indicators of impairment were found for assets at fair value.

Derecognition

An item of property, plant and equipment is derecognised upon disposal or when no further future economic benefits are expected from its use or disposal.

1.18 Intangibles

The Corporation's intangibles comprise of purchased and internally developed software for internal use. These assets are carried at cost less accumulated amortisation and accumulated impairment losses.

Software is amortised on a straight-line basis over its anticipated useful life. The useful lives of the Corporation's software are 3 to 5 years (2013-14: 3 to 5 years).

All software assets were assessed for indications of impairment as at 30 June 2015.

1.19 Taxation / Competitive Neutrality

The Corporation is exempt from all forms of taxation except Fringe Benefits Tax (FBT), State payroll taxes and the Goods and Services Tax (GST).

Revenues, expenses and assets are recognised net of GST except:

- where the amount of GST incurred is not recoverable from the Australian Taxation Office; and
- for receivables and payables.

Note 2: Events After the Reporting Period

There was no subsequent event that had the potential to significantly affect the ongoing structure and financial activities of the Corporation.

Note 3: Expenses

	2015 \$	2014 \$
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Note 3A: Employee Benefits

Wages and salaries	1,585,128	1,688,962
Superannuation:		
Defined contribution plans	154,895	153,518
Defined benefit plans	10,862	40,100
Leave and other entitlements	127,732	54,529
Total employee benefits	1,878,617	1,937,109

Note 3B: Suppliers

Goods and services		
External Parties	891,908	1,062,688
Total goods and services	891,908	1,062,688
Goods and services are made up of:		
Provision of goods – external parties	293,139	386,532
Rendering of services – external parties	598,769	676,156
Total goods and services	891,908	1,062,688
Other supplier expenses		
Operating lease rentals – external parties:		
Minimum lease payments	113,369	69,639
Remuneration of auditors	17,000	16,500
Workers compensation expenses	3,535	2,963
Total other supplier expenses	133,904	89,102
Total supplier expenses	1,025,812	1,151,790

NOTES TO THE FINANCIAL STATEMENTS

	2015 \$	2014 \$
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Note 3C: Grants

Public sector:		
Australian Government entities (related entities)	5,907,416	6,536,619
State and Territory Governments	4,990,375	4,540,041
Universities & Colleges	5,732,747	4,971,850
Other Research Institutions	69,000	111,750
Corporate extension activities	585,363	567,827
Private sector:		
Commercial entities	2,544,302	2,043,224
Total grants	19,829,203	18,771,311

Note 3D: Depreciation and Amortisation

Depreciation:		
Buildings	16,382	15,944
Office equipment	10,737	10,737
Computer equipment	15,921	15,353
Fixtures & Fittings	1,360	1,350
Total depreciation	44,400	43,384
Amortisation:		
Intangibles		
Computer Software	47,589	19,372
Total amortisation	47,589	19,372
Total depreciation and amortisation	91,989	62,756

NOTES TO THE FINANCIAL STATEMENTS

Note 4: Own-Source Income

	2015	2014
	\$	\$

OWN-SOURCE REVENUE

Note 4A: Interest

Deposits	1,596,545	1,778,946
Total interest	1,596,545	1,778,946

Note 4B: Rental Income

Operating lease:		
Other	5,000	5,000
Total rental income	5,000	5,000

Note 4C: Royalties

Royalties	1,706,735	1,830,006
Total royalties	1,706,735	1,830,006

Note 4D: Other Revenue

Project refunds	1,237,017	395,244
Industry grants	925,213	1,243,287
Other revenue	9,128	10,863
Total other revenue	2,171,358	1,649,394

REVENUE FROM GOVERNMENT

Note 4E: Revenue from Government

Department of Agriculture:		
PIRD Act 1989 Contribution	7,295,409	11,238,949
Total revenue from Government	7,295,409	11,238,949

Note 4F: Levies and Penalties

Industry Levies	7,295,409	10,961,887
Penalties	2,873	15,190
Total levies and penalties	7,298,282	10,977,077

NOTES TO THE FINANCIAL STATEMENTS

Note 5: Fair Value Measurements

The following tables provide an analysis of assets and liabilities that are measured at fair value. The different levels of the fair value hierarchy are defined below.

Level 1: Quoted prices (unadjusted) in active markets for identical assets or liabilities that the entity can access at measurement date.

Level 2: Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly.

Level 3: Unobservable inputs for the asset or liability.

Note 5A: Fair Value Measurements, Valuation Techniques and Inputs Used

	Fair value measurements at the end of the reporting period using		For Levels 2 and 3 fair value measurements			
	2015 \$	2014 \$	Category (Level 1, 2 or 3)	Valuation technique(s) ¹	Inputs used	Range (weighted average) ²
Non-financial assets						
Land	190,000	180,000	Level 2	Market comparables	Sale prices of comparable land Land size Long-term land appreciation rate	N/A
Buildings on freehold land	520,000	610,443	Level 2	Discounted cash flow	Price per square metre Market rate of interest	N/A
Other property, plant and equipment	20,516	42,871	Level 2	Depreciated replacement cost	Market prices of similar assets less depreciation	N/A
Total non-financial assets	730,516	833,314				
Total fair value measurements of assets in the statement of financial position	730,516	833,314				

1. No change in valuation technique occurred during the period.

2. Significant unobservable inputs only. Not applicable for assets or liabilities in the Level 2 category.

Fair value measurements

The highest and best use of all non-financial assets are the same as their current use.

NOTES TO THE FINANCIAL STATEMENTS

Note 5B: Level 1 and Level 2 Transfers for Recurring Fair Value Measurements

There were no transfers of recurring fair value measurements between level 1 and level 2 in the current or prior year.

The Corporation's policy for determining when transfers between levels are deemed to have occurred can be found in Note 1.

Note 6: Financial Assets

	2015 \$	2014 \$
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Note 6A: Cash and Cash Equivalents

Cash on hand or on deposit	6,257,640	11,098,065
Total cash and cash equivalents	6,257,640	11,098,065

Note 6B: Investments held to maturity

Investments held to maturity	35,022,609	31,000,000
Total investments held to maturity	35,022,609	31,000,000

Note 6C: Trade and Other Receivables

Goods and services:		
Goods and services - related entities	1,193	8,211
Goods and services - external entities	288,145	59,020
Total receivables for goods and services	289,338	67,231

Receivables from Government

Department of Agriculture		
- PIRD Act 1989 Contributions receivable	1,373,745	3,502,865
- Industry levies receivable	1,175,754	1,639,873
Total receivables from government	2,549,499	5,142,738

Other receivables:

GST receivable from the Australian Taxation Office	347,226	419,884
Interest	561,814	622,796
Total other receivables	909,040	1,042,680
Total trade and other receivables	3,747,877	6,252,649

NOTES TO THE FINANCIAL STATEMENTS

	2015 \$	2014 \$
Trade and other receivables are expected to be recovered in:		
No more than 12 months	3,747,877	6,252,649
Total trade and other receivables	3,747,877	6,252,649
Trade and other receivables are aged as follows:		
Not overdue	3,678,412	6,250,274
Overdue by:		
0 to 30 days	69,465	1,000
31 to 60 days	-	-
61 to 90 days	-	-
More than 90 days	-	1,375
Total trade and other receivables (gross)	3,747,877	6,252,649

No indicators of impairment were found for trade and other receivables.

Note 7: Non-Financial Assets

	2015 \$	2014 \$
Note 7A: Land and Buildings		
Land:		
Land at fair value	190,000	180,000
Total land	190,000	180,000
Buildings on freehold land:		
Fair value	520,000	639,887
Accumulated depreciation	-	(29,444)
Total buildings on freehold land	520,000	610,443
Total land and buildings	710,000	790,443

*No indicators of impairment were found for land and buildings.
No land or buildings were expected to be sold or disposed of within the next 12 months.*

NOTES TO THE FINANCIAL STATEMENTS

	2015 \$	2014 \$
Note 7B: Other Property, Plant and Equipment		
Office equipment:		
Fair value	60,052	60,052
Accumulated depreciation	(50,644)	(39,907)
Total office equipment	9,408	20,145
Computer equipment:		
Fair value	87,876	82,158
Accumulated depreciation	(79,572)	(63,651)
Total computer equipment	8,304	18,507
Fittings and furniture:		
Fair value	13,046	13,596
Accumulated depreciation	(10,242)	(9,377)
Total fittings and furniture	2,804	4,219
Total other property, plant and equipment	20,516	42,871

No indicators of impairment were found for property, plant and equipment.

No property, plant or equipment is expected to be sold or disposed of within the next 12 months.

Revaluations of non-financial assets

All revaluations were conducted in accordance with the revaluation policy stated at Note 1. On 30th June 2015, an independent valuer conducted the revaluation.

A revaluation increment of \$10,000 for land (2014: \$nil) was credited to the asset revaluation surplus by asset class and included in the equity section of the Statement of Financial Position.

A revaluation decrement of \$100,534 for buildings on freehold land (2014: \$nil) was debited to the asset revaluation surplus by asset class and included in the equity section of the Statement of Financial Position.

No increments or decrements were expensed (2014: \$nil).

NOTES TO THE FINANCIAL STATEMENTS

Note 7C: Reconciliation of the Opening and Closing Balances of Property, Plant and Equipment (2014-15)

	Land \$	Buildings \$	Total land and buildings \$	Office equipment \$	Computer equipment \$	Fittings & furniture \$	Total other property, plant & equipment \$	Total \$
As at 1 July 2014								
Gross book value	180,000	639,887	819,887	60,052	82,158	13,596	155,806	975,693
Accumulated depreciation and impairment		(29,444)	(29,444)	(39,907)	(63,651)	(9,377)	(112,935)	(142,379)
Net book value 1 July 2014	180,000	610,443	790,443	20,145	18,507	4,219	42,871	833,314
Additions	-	26,473	26,473	-	5,718	-	5,718	32,191
Revaluations recognised in other comprehensive income	10,000	(100,534)	(90,534)				-	(90,534)
Depreciation expense		(16,382)	(16,382)	(10,737)	(15,921)	(1,360)	(28,018)	(44,400)
Disposals:								
Gross book value	-	-	-	-	-	(550)	(550)	(550)
Accumulated depreciation and impairment	-	-	-	-	-	495	495	495
Net book value 30 June 2015	190,000	520,000	710,000	9,408	8,304	2,804	20,516	730,516
Net book value as of 30 June 2015 represented by:								
Gross book value	190,000	520,000	710,000	60,052	87,876	13,046	160,974	870,974
Accumulated depreciation and impairment		-	-	(50,644)	(79,572)	(10,242)	(140,458)	(140,458)
Total net book value	190,000	520,000	710,000	9,408	8,304	2,804	20,516	730,516

NOTES TO THE FINANCIAL STATEMENTS

Note 7C: (Cont'd) Reconciliation of the Opening and Closing Balances of Property, Plant and Equipment (2013-14)

	Land \$	Buildings \$	Total land and buildings \$	Office equipment \$	Computer equipment \$	Fittings & furniture \$	Total other property, plant & equipment \$	Total \$
As at 1 July 2013								
Gross book value	180,000	527,912	707,912	60,052	78,027	12,598	150,677	858,589
Accumulated depreciation and impairment		(13,500)	(13,500)	(29,170)	(48,298)	(8,027)	(85,495)	(98,995)
Net book value 1 July 2013	180,000	514,412	694,412	30,882	29,729	4,571	65,182	759,594
Additions	-	111,975	111,975	-	4,131	998	5,129	117,104
Depreciation expense		(15,944)	(15,944)	(10,737)	(15,353)	(1,350)	(27,440)	(43,384)
Disposals:								
Gross book value	-	-	-	-	-	-	-	-
Accumulated depreciation and impairment	-	-	-	-	-	-	-	-
Net book value 30 June 2014	180,000	610,443	790,443	20,145	18,507	4,219	42,871	833,314

Net book value as of 30 June 2014 represented by:

Gross book value	180,000	639,887	819,887	60,052	82,158	13,596	155,806	975,693
Accumulated depreciation and impairment		(29,444)	(29,444)	(39,907)	(63,651)	(9,377)	(112,935)	(142,379)
Total net book value	180,000	610,443	790,443	20,145	18,507	4,219	42,871	833,314

NOTES TO THE FINANCIAL STATEMENTS

	2015 \$	2014 \$
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Note 7D: Intangibles

Computer software:		
Purchased & internally developed software	513,056	237,901
Accumulated amortisation	(193,208)	(145,619)
Total computer software	319,848	92,282
Total intangibles	319,848	92,282

No indicators of impairment were found for intangible assets.
No intangibles are expected to be sold or disposed of within the next 12 months.

Note 7E: Reconciliation of the Opening and Closing Balances of Intangibles

	Computer software internally developed and purchased 2015 \$	Computer software internally developed and purchased 2014 \$
As at 1 July		
Gross book value	237,901	143,832
Accumulated amortisation and impairment	(145,619)	(126,247)
Net book value 1 July	92,282	17,585
Additions	275,155	94,069
Amortisation	(47,589)	(19,372)
Net book value 30 June	319,848	92,282
Net book value as of 30 June represented by:		
Gross book value	513,056	237,901
Accumulated amortisation and impairment	(193,208)	(145,619)
Total net book value	319,848	92,282

Note 7F: Other Non-Financial Assets

Prepayments	5,487	4,205
Total other non-financial assets	5,487	4,205
Total other non-financial assets – are expected to be recovered in:		
No more than 12 months	5,487	4,205
Total other non-financial assets	5,487	4,205

No indicators of impairment were found for other non-financial assets.

NOTES TO THE FINANCIAL STATEMENTS

Note 8: Payables

	2015 \$	2014 \$
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Note 8A: Suppliers

Trade creditors and accruals	200,677	96,137
Total suppliers	200,677	96,137

Supplier payables expected to be settled within 12 months:

Related entities	151	1,840
External parties	200,526	94,297
Total suppliers	200,677	96,137

Settlement is usually made within 30 days.

Note 8B: Grants

Grants:

Public sector:		
Australian Government entities (related entities)	759,430	484,172
State and Territory Governments	501,004	1,774,454
Universities and colleges	1,563,803	973,776
Other research organisations	218,060	200,997
Private sector:		
Other	742,987	853,335
Total grants	3,785,284	4,286,734

Total grants are expected to be settled in:

No more than 12 months	3,785,284	4,286,734
Total grants	3,785,284	4,286,734

All grants payable are expected to be settled within 12 months.

Settlement is usually within 30 days.

NOTES TO THE FINANCIAL STATEMENTS

	2015 \$	2014 \$
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Note 8C: Other Payables

Salaries and wages	48,057	39,900
Superannuation	4,942	4,466
PAYG & FBT	49,184	48,989
State payroll tax	6,854	6,051
Other	305	-
Total other payables	109,342	99,406

Total other payables are expected to be settled in:

No more than 12 months	109,342	99,406
Total other payables	109,342	99,406

Note 9: Provisions

	2015 \$	2014 \$
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Note 9A: Employee Provisions

Leave	343,563	310,337
Total employee provisions	343,563	310,337

Employee provisions are expected to be settled in:

No more than 12 months	282,988	179,712
More than 12 months	60,575	130,625
Total employee provisions	343,563	310,337

Note 10: Cash Flow Reconciliation

	2015 \$	2014 \$
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Reconciliation of cash and cash equivalents as per Statement of Financial Position to Cash Flow Statement

Cash and cash equivalents as per:		
Cash flow statement	6,257,640	11,098,065
Statement of financial position	6,257,640	11,098,065
Difference	-	-

Reconciliation of net cost of services to net cash from operating activities:		
Net cost of services	(17,345,947)	(16,659,620)
Add revenue from Government	14,593,691	22,216,026

Adjustments for non-cash items		
Depreciation / amortisation	91,989	62,756

Movements in assets / liabilities		
Assets		
(Increase) / decrease in net receivables	2,504,773	(489,564)
(Increase) / decrease in prepayments	(1,282)	(4,205)
Liabilities		
Increase / (decrease) in employee provisions	28,329	(27,638)
Increase / (decrease) in supplier payables	99,386	(65,473)
Increase / (decrease) in other payable	19,987	(365)
Increase / (decrease) in grants payable	(501,448)	(1,983,462)
Net cash from/(used by) operating activities	(510,522)	3,048,455

NOTES TO THE FINANCIAL STATEMENTS

Note 11: Contingent Assets and Liabilities

The Corporation had no contingent assets and liabilities in the current or prior period.

Significant Remote Contingencies

Commonwealth Contributions

The Cotton Research and Development Corporation was established under the *Primary Industries Research and Development Act, 1989*. This Act states that the Commonwealth government will make payments to the Corporation equal to one half of the Corporation's annual expenditure. However, government matching payments must not exceed industry levy receipts nor exceed 0.5% of the amount that the Minister determines to be the gross value of production (GVP) for that financial year. In 2014-15 Commonwealth contributions were capped to levy receipts of \$7,295,409, leaving a remote contingent receivable of \$9.443m for unmatched R&D expenditure.

Other Remote Contingencies

International Cotton Advisory Committee Membership

The Australian Government through the Department of Agriculture is a member of the International Cotton Advisory Committee (ICAC). The May 2014 Portfolio Budgets transferred the cost of this membership to the Corporation. In October 2014, amendments to the *Primary Industries Research and Development Act 1989* (PIRD Act) were tabled in the House of Representatives to amend the Act to enable the Department of Agriculture to recover the costs of the ICAC membership from the Corporation. The bill was subsequently the subject of a Senate Inquiry, and is yet to pass both houses of parliament.

Should the amendment to the PIRD Act pass into law, the Corporation may be required to retrospectively pay the Department of Agriculture \$105,000 for the ICAC membership in relation to 2015 (2014: \$nil).

Note 12: Senior Management Personnel

	2015 \$	2014 \$
Short-term employee benefits:		
Salary	658,253	818,786
Other ¹	41,374	21,118
Total short-term employee benefits	699,627	839,904
Post-employment benefits:		
Superannuation	65,597	92,619
Total post-employment benefits	65,597	92,619
Other long-term benefits:		
Annual leave accrued	44,525	57,158
Long-service leave	18,014	(56,069)
Total other long-term benefits	62,539	1,089
Total senior executive remuneration expenses	827,763	933,612

Notes:

1. Other includes motor vehicle benefits, other benefits and fringe benefit tax on those benefits.
2. The total number of senior management personnel that are included in the above table are 3 (2014: 4).
3. The total number of non-executive directors that are included in the above table are 9 (2014: 7). The term of five (5) directors ended on the 30th September 2014. On the 20th October 2014 two (2) directors were reappointed and three (3) new directors were appointed.

NOTES TO THE FINANCIAL STATEMENTS

Note 13: Related Party Disclosures

Certain director-related entities have transactions with the Corporation that occur within normal customer or supplier relationships on terms and conditions no more favourable than those which it is reasonable to expect the Corporation would have adopted if dealing with the director-related entity at arm's length in similar circumstances. These transactions include the following entities and have been described below where the transactions are considered likely to be of interest to users of these financial statements:

	2015 \$	2014 \$
Transactions with Director-Related Entities		
Michael Robinson is the Chief Executive Officer of Plant Biosecurity CRC which received funding from CRDC for projects:		
PBCRC1501 "Networking remote diagnostics for the Australian cotton industry" for the project term of 1/7/2014 to 30/6/2015.	32,345	-
DAN1301 "Travel: Attend International Congress of Entomology at Daegu, South Korea" for the project term of 17/8/2012 to 26/9/2012.	-	3,027
Elizabeth Alexander is a non-executive director of Plant Health Australia which received funding from CRDC for projects:		
PHA1501 "Review of the Industry Biosecurity Plan for the cotton industry" for the project term of 7/7/2014 to 30/6/2015.	16,000	-
PHA1502 "Provision of the independent technical, secretarial and operational services to the NWPPA 2014-15" for the project term of 7/7/2014 to 30/6/2015.	18,000	-
Total transactions with director-related entities	66,345	3,027

Note 14: Financial Instruments

	2015 \$	2014 \$
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Note 14A: Categories of Financial Instruments

Financial Assets		
Held-to-maturity investments		
Term deposits	35,022,609	31,000,000
Carrying amount of held-to-maturity investments	35,022,609	31,000,000
Loans and receivables		
Cash and cash equivalents	6,257,640	11,098,065
Trade and other receivables	851,152	690,027
Carrying amount of loans and receivables	7,108,792	11,788,092
Total Financial Assets	42,131,401	42,788,092
Financial Liabilities		
At amortised cost:		
Grants payable	3,785,284	4,286,734
Suppliers payable	200,677	96,137
Carrying amount of financial liabilities	3,985,961	4,382,871

Note 14B: Net Gains or Losses on Financial Assets

Held-to-maturity investments		
Interest revenue	1,341,394	1,355,778
Net gain on held-to-maturity investments	1,341,394	1,355,778
Loans and receivables		
Interest revenue	255,151	423,168
Net gain from loans and receivables	255,151	423,168
Net gain from financial assets	1,596,545	1,778,946

There was no interest expense on financial liabilities measured at amortised cost in the year ending 2015 (2014: \$nil)

NOTES TO THE FINANCIAL STATEMENTS

Note 14C: Fair Value of Financial Instruments

	Carrying amount 2015 \$	Fair value 2015 \$	Carrying amount 2014 \$	Fair value 2014 \$
Financial Assets				
Held-to-maturity investments	35,022,609	35,022,609	31,000,000	31,000,000
Cash and cash equivalents	6,257,640	6,257,640	11,098,065	11,098,065
Trade and other receivables	851,152	851,152	690,027	690,027
Total	42,131,401	42,131,401	42,788,092	42,788,092
Financial Liabilities				
Grants payable	3,785,284	3,785,284	4,286,734	4,286,734
Suppliers payable	200,677	200,677	96,137	96,137
Total	3,985,961	3,985,961	4,382,871	4,382,871

The Corporation's financial assets and financial liabilities comprise term deposits held at banks, cash and deposits held at banks, current receivables and current liabilities. It is held that their carrying amount and fair value are the same.

Note 14D: Credit Risk

The Corporation's maximum exposure to credit risk is the risk that arises from the potential default of a debtor. This amount is equal to the total amount of trade receivables (2015: \$289,338 and 2014: \$67,231). The Corporation has assessed that there is no risk of default and has not recognised an impairment allowance account.

The Corporation manages its credit risk through monthly reviews by management of the Corporation's debtors and the use of policies and procedures that guide employees in managing debtors.

The Corporation holds no collateral to mitigate against credit risk.

Credit quality of financial instruments not past due or individually determined as impaired

	Not past due nor impaired 2015 \$	Not past due nor impaired 2014 \$	Past due or impaired 2015 \$	Past due or impaired 2014 \$
Held-to-maturity	35,022,609	31,000,000	-	-
Cash and cash equivalents	6,257,640	11,098,065	-	-
Trade and other receivables	781,687	687,652	69,465	2,375
Total	42,061,936	42,785,717	69,465	2,375

NOTES TO THE FINANCIAL STATEMENTS

Ageing of financial assets that were past due but not impaired for 2015

	0 to 30 days \$	31 to 60 days \$	61 to 90 days \$	90+ days \$	Total \$
Trade and other receivables	69,465	-	-	-	69,465
Total	69,465	-	-	-	69,465

Ageing of financial assets that were past due but not impaired for 2014

	0 to 30 days \$	31 to 60 days \$	61 to 90 days \$	90+ days \$	Total \$
Trade and other receivables	1,000	-	-	1,375	2,375
Total	1,000	-	-	1,375	2,375

Note 14E: Liquidity Risk

The Corporation's financial liabilities are payables. The exposure to liquidity risk is based on the notion that the Corporation will encounter difficulty in meeting its obligations associated with financial liabilities. The Corporation has minimal exposure to liquidity risk. The Corporation receives funding from industry through levies and contributions from the Australian Government. In addition, the Corporation has controls in place to ensure that it has adequate resources to meet its financial obligations and has no past experience of default.

Maturities for non-derivative financial liabilities 2015

	On demand \$	within 1 year \$	1 to 5 years \$	> 5 years \$	Total \$
Grants payable	-	3,785,284	-	-	3,785,284
Suppliers payable	-	200,677	-	-	200,677
Total	-	3,985,961	-	-	3,985,961

Maturities for non-derivative financial liabilities 2014

	On demand \$	within 1 year \$	1 to 5 years \$	> 5 years \$	Total \$
Grants payable	-	4,286,734	-	-	4,286,734
Suppliers payable	-	96,137	-	-	96,137
Total	-	4,382,871	-	-	4,382,871

The Corporation manages its finances to ensure it has adequate funds to meet payments as they fall due. In addition, the Corporation has policies in place to ensure timely payments are made when due and has no past experience of default.

The Corporation has no derivative financial liabilities in both the current and prior year.

NOTES TO THE FINANCIAL STATEMENTS

Note 14F: Market Risk

The Corporation holds basic financial instruments that do not expose it to certain market risks. The Corporation is not exposed to 'currency risk' or 'other price risk'.

Interest Rate Risk

The only interest-bearing items on the statement of financial position are the 'Cash and cash equivalents' and the 'Investments held to maturity'. 'Cash and cash equivalents' have variable interest rates and 'Investments held to maturity' have fixed interest rates. Interest will fluctuate due to changes in the market interest rate. The interest rate risk does not have any impact on the fair value of the 'Cash and cash equivalents' or 'Investments held to maturity'.

Interest rates for cash held at banks in operating accounts and at call accounts ranged from 0% to 2.7% as at 30th June 2015. Term deposit fixed interest rates during the year decreased from a high of 3.74% down to 2.84% for new term deposits. Interest rates on term deposits held at the end of the year range from 2.84% to 4.62%. Although Australian interest rates are at record lows it is expected there will continue to be downward pressure on interest rates due to volatility in the world economy continuing to effect the Australian economy. The sensitivity analysis has used 40 basis points as a reasonable representation of the continued volatility in the economy.

Sensitivity analysis of the risk that the entity is exposed to for 2015

	Risk variable	Change in risk variable %	Effect on	
			Profit and loss \$	Equity \$
Interest rate risk	Interest	+0.40%	192,668	192,668
Interest rate risk	Interest	-0.40%	(192,668)	(192,668)

Sensitivity analysis of the risk that the entity is exposed to for 2014

	Risk variable	Change in risk variable %	Effect on	
			Profit and loss \$	Equity \$
Interest rate risk	Interest	+0.60%	291,939	291,939
Interest rate risk	Interest	-0.60%	(291,939)	(291,939)

Note 15: Financial Assets Reconciliations

	<i>Notes</i>	2015 \$	2014 \$
Total financial assets as per statement of financial position		45,028,126	48,350,714
Less: Non-financial instrument components			
Receivables from Government	6C	2,549,499	5,142,738
GST receivable from the Australian Taxation Office	6C	347,226	419,884
Total non-financial instrument components		2,896,725	5,562,622
Total financial assets as per financial instruments note		42,131,401	42,788,092

Note 16: Reporting of Outcomes

The Corporation is structured to meet one outcome:

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

Note 16A: Net Cost of Outcome Delivery

	Outcome 1	
	2015 \$	2014 \$
Expenses	22,825,621	21,922,966
Income from non-government sector		
Industry Contributions	7,298,282	10,977,077
Royalties	1,706,735	1,830,006
Interest	1,596,545	1,778,946
Other	2,176,358	1,654,394
Total	12,777,920	16,240,423
Net cost/(contribution) of outcome delivery	10,047,701	5,682,543

NOTES TO THE FINANCIAL STATEMENTS

Note 17: Budgetary Reports and Explanations of Major Variances

The following tables provide a comparison of the original budget as presented in the 2014-15 Portfolio Budget Statements (PBS) to the 2014-15 final outcome as presented in accordance with Australian Accounting Standards for the Corporation. The Budget is not audited.

Note 17A: Departmental Budgetary Reports	Actual ¹	Budget estimate	
	2015 \$,000	Original ² 2015 \$,000	Variance ³ 2015 \$,000
Statement of Comprehensive Income for the period ended 30 June 15			
NET COST OF SERVICES			
Expenses			
Employee benefits	1,878	2,221	(343)
Supplier expenses	1,026	1,091	(65)
Grants	19,829	20,756	(927)
Depreciation and amortisation	92	110	(18)
Total expenses	22,825	24,178	(1,353)
OWN-SOURCE INCOME			
Own-source revenue			
Interest	1,597	850	747
Rental income	5	5	-
Royalties	1,707	1,182	525
Other ⁴	2,171	1,276	895
Total own-source revenue	5,480	3,313	2,167
Total own-source income	5,480	3,313	2,167
Net cost of (contribution by) services	17,345	20,865	(3,520)
Revenue from Government			
Commonwealth Contribution	7,295	8,513	(1,218)
Industry contributions	7,298	8,618	(1,320)
Total revenue from Government	14,593	17,131	(2,538)
Surplus/(Deficit) attributable to the Australian Government	(2,752)	(3,734)	982

NOTES TO THE FINANCIAL STATEMENTS

	Actual ¹	Budget estimate	
	2015 \$,000	Original ² 2015 \$,000	Variance ³ 2015 \$,000
Statement of Comprehensive Income for the period ended 30 June 15 (Cont.)			

OTHER COMPREHENSIVE INCOME

Items not subject to subsequent reclassification to net cost of services			
Changes in asset revaluation surplus ³	(91)	-	(91)
Total other comprehensive income/(loss)	(91)	-	(91)
Total comprehensive income/(loss) attributable to the Australian Government	(2,843)	(3,734)	891

Notes:

1. Includes rounding to balance with the financial statements.
2. The Corporation's 2014-15 Portfolio Budget Statements (PBS).
3. Variance between the actual and Portfolio Budget Statements for 2014-15. Explanations of major variances are provided further below.
4. 'Gains from sale of assets' included within 'Other revenue'.

	Actual ¹	Budget estimate	
	2015 \$,000	Original ² 2015 \$,000	Variance ³ 2015 \$,000
Statement of Financial Position for the period ended 30 June 15			

ASSETS

Financial assets			
Cash and cash equivalents ⁴	6,258	35,858	(29,600)
Investments	35,022	-	35,022
Trade and other receivables	3,748	4,500	(752)
Total financial assets	45,028	40,358	4,670
Non-financial assets			
Land and buildings	710	842	(132)
Property, plant and equipment	21	118	(97)
Intangibles	320	186	134
Other	5	10	(5)
Total non-financial assets	1,056	1,156	(100)
Total assets	46,084	41,514	4,570

NOTES TO THE FINANCIAL STATEMENTS

Statement of Financial Position for the period ended 30 June 15 (Cont.)	Actual ¹	Budget estimate	
	2015 \$,000	Original ² 2015 \$,000	Variance ³ 2015 \$,000

LIABILITIES

Payables

Suppliers	201	30	171
Grants	3,785	2,000	1,785
Other	109	30	79
Total payables	4,095	2,060	2,035

Provisions

Employee provisions	344	322	22
Total provisions	344	322	22
Total liabilities	4,439	2,382	2,057
Net assets	41,645	39,132	2,513

EQUITY

Reserves	255	346	(91)
Retained surplus	41,390	38,786	2,604
Total equity	41,645	39,132	2,513

Notes:

1. Includes rounding to balance with the financial statements.
2. The Corporation's 2014-15 Portfolio Budget Statements (PBS).
3. Variance between the actual and Portfolio Budget Statements for 2014-15. Explanations of major variances are provided further below.
4. Budget Original 'Cash and cash equivalents' includes short term investments held to maturity.

NOTES TO THE FINANCIAL STATEMENTS

Statement of Changes in Equity for the period ended 30 June 15	Retained earnings			Asset revaluation reserve			Total equity		
	Actual ¹	Budget estimate		Actual ¹	Budget estimate		Actual ¹	Budget estimate	
	2015 \$,000	Original ² 2015 \$,000	Variance ³ 2015 \$,000	2015 \$,000	Original ² 2015 \$,000	Variance ³ 2015 \$,000	2015 \$,000	Original ² 2015 \$,000	Variance ³ 2015 \$,000
Opening balance									
Balance carried forward from previous period	44,142	42,520	1,622	346	346	-	44,488	42,866	1,622
Adjusted opening balance	44,142	42,520	1,622	346	346	-	44,488	42,866	1,622
Comprehensive income									
Surplus/(Deficit) for the period	(2,752)	(3,734)	982				(2,752)	(3,734)	982
Other comprehensive income	-	-	-	(91)	-	(91)	(91)	-	(91)
Total comprehensive income attributable to Australian Government	(2,752)	(3,734)	982	(91)	-	(91)	(2,843)	(3,734)	891
Closing balance as at 30 June	41,390	38,786	2,604	255	346	(91)	41,645	39,132	2,513

Notes:

1. Includes rounding to balance with the financial statements.
2. The Corporation's 2014-15 Portfolio Budget Statements (PBS).
3. Variance between the actual and Portfolio Budget Statements for 2014-15. Explanations of major variances are provided further below.

NOTES TO THE FINANCIAL STATEMENTS

	Actual ¹	Budget estimate	
	2015 \$,000	Original ² 2015 \$,000	Variance ³ 2015 \$,000
Cash Flow Statement for the period ended 30 June 15			
OPERATING ACTIVITIES			
Cash received			
Industry Contributions	7,762	8,513	(751)
Receipts from Government	9,425	8,618	807
Interest	1,658	850	808
Net GST received	1,924	1,966	(42)
Other ³	3,935	2,709	1,226
Total cash received	24,704	22,656	2,048
Cash used			
Employees	1,861	2,220	(359)
Suppliers	1,030	1,198	(168)
Grants	22,323	22,832	(509)
Other	-	30	(30)
Total cash used	25,214	26,280	(1,066)
Net cash from/(used by) operating activities	(510)	(3,624)	3,114
INVESTING ACTIVITIES			
Cash received			
Investments	42,000	-	42,000
Total cash received	42,000	-	42,000
Cash used			
Purchase of property, plant and equipment	307	266	41
Investments	46,023	-	46,023
Total cash used	46,330	266	46,064
Net cash from/(used by) investing activities	(4,330)	(266)	(4,064)
Net increase/(decrease) in cash held	(4,840)	(3,890)	(950)
Cash and cash equivalents at the beginning of the reporting period	11,098	39,748	(28,650)
Cash and cash equivalents at the end of the reporting period	6,258	35,858	(29,600)

Notes:

1. Includes rounding to balance with the financial statements.
2. The Corporation's 2014-15 Portfolio Budget Statements (PBS).
3. Variance between the actual and Portfolio Budget Statements for 2014-15. Explanations of major variances are provided further below.

Note 17B: Departmental Major Budget Variances for 2015

Variances are considered to be 'major' based on the following criteria:

- the variance between budget and actual is greater than 10%; and
- the variance between budget and actual is greater than 2% of the relevant category (Income, Expenses and Equity totals); or
- an item below this threshold but is considered important for the reader's understanding or is relevant to an assessment of the discharge of accountability and to an analysis of performance of an entity.

Explanations of major variances	Affected line items (and statement)
Employees	
Employees expense decreased by \$0.343m and cash used for paying employees decreased by \$0.359m as a result of a reduction in full-time equivalent staff levels.	<i>Employee benefits expense (Statement of Comprehensive Income), Operating cash used - employees (Cash Flow Statement), Cash and cash equivalents (Statement of Financial Position)</i>
Grants paid	
Grant expenses decreased by \$0.927m and Grant cash used decreased by \$0.509m as a result of several research organisations requesting a delay in the start of projects and scholarship by one year.	<i>Grants expense (Statement of Comprehensive Income, Cash used - grants (Cash Flow Statement), Cash and cash equivalents (Statement of Financial Position)</i>
Grant liabilities variance of \$1.785m represents an increase in accrued completed project milestones which have not been invoiced by research organisations.	<i>Grants payable (Statement of Financial Position)</i>
Interest revenue	
Interest revenue increased by \$0.747m and Interest cash received increased of \$0.808m as a result of holding term deposits for longer terms at interest rates above average market rate for short term deposits.	<i>Interest revenue (Statement of Comprehensive Income), Cash received - interest (Cash Flow Statement), Cash and cash equivalents (Statement of Financial Position)</i>
Royalties revenue	
Royalties revenue increased by \$0.525m which contributed to a \$0.505m increase in Other cash received as a result of a higher proportion of 2013-14 cotton seed royalties received in 2014-15 than was estimated to be received per the PBS.	<i>Royalty revenue (Statement of Comprehensive Income), Cash received - other (Cash Flow Statement), Cash and cash equivalents (Statement of Financial Position)</i>
Other revenue	
Other revenue increased by \$0.895m which contributed \$0.721m to the increase in Other cash received as a result of an increase in surplus project funds returned by research organisation.	<i>Other revenue (Statement of Comprehensive Income), Cash received - other (Cash Flow Statement), Cash and cash equivalents (Statement of Financial Position)</i>

NOTES TO THE FINANCIAL STATEMENTS

Explanations of major variances	Affected line items (and statement)
Revenue from Government	
Commonwealth Contributions; and Industry Contributions, comprising of levies and penalties, decreased by \$2.538m as a result of a decrease in cotton production from which levies are collected and Commonwealth contributions determined in accordance with the PIRD Act 1989.	<i>Revenue from Government (Statement of Comprehensive Income)</i>
Trade and Other Receivable decreased by \$0.752m as the accrued receivable at the 30th June is impacted by the amount of cotton ginned in May each year.	<i>Trade and other receivables (Statement of Financial Position)</i>
Cash Received from Industry Contributions decreased by \$0.751m and receipts from Government increased by \$0.807m as a result of the significant change in cotton production offset by changes in the accrued revenue during the period 30th June 2014 to 30th June 2015.	<i>Cash Received - Industry Contributions and Receipts from Government (Cash Flow Statement), Cash and cash equivalents (Statement of Financial Position)</i>
Investing activities	
Cash Received - Investments and Cash Used - Investments were included as operating activities in the Portfolio Budget Statements as term deposit investments were expected to be for less than 3 months. Actual investments in terms deposits in 2014-15 were for longer terms at higher interest rates. This contributed to the \$42m cash received from investments and the \$46m cash used for investments.	<i>Investment Activities (Cash Flow Statement), Cash and cash equivalents and Investments held to maturity (Statement of Financial Position)</i>
Land and building revaluation	
Land and buildings decreased \$0.132m and Reserves decreased \$0.091m as a result of a revaluation decrement in the building.	<i>Land and buildings and Reserves (Statement of Financial Position), Asset revaluation reserve (Statement of Changes in Equity)</i>
Intangibles	
Intangibles held at 30th June 2015 were above budget by \$0.134m mainly due to additional software upgrades to the Project Management System.	<i>Intangibles (Statement of Financial Position)</i>
Suppliers payable	
Suppliers payable variance of \$0.171m represents an increase in supplier liabilities incurred as at the 30th June 2015 which invoices were not received until July 2015.	<i>Payables (Statement of Financial Position)</i>



Section 7 Appendices

Appendix 1: Measuring performance

Appendix 2: Australian Government priorities

Appendix 3: Environmental performance

Appendix 4: RD&E portfolio

Appendix 5: Glossary and acronyms

Appendix 6: Annual Report list of requirements



APPENDIX 1: Measuring performance

Through focusing on CRDC's five programs: farmers, customers, industry, people and performance – CRDC will strive to achieve its stated outcome of 'Adoption of innovation that leads to increased productivity, competitiveness and environmental sustainability through investment in research and development that benefits the Australian cotton industry and the wider community'.

The CRDC continues to monitor, evaluate and report on the achievement of all program key performance indicators by submitting Portfolio Budget Statements (PBS) and annual reporting.

Portfolio Budget Statement performance indicators

The following deliverables and Key Performance Indicators (KPIs) formed part of CRDC's Portfolio Budget Statement for 2014-15.

Deliverables 2014-15

- Cotton is profitable and consistently farmers crop of choice.
- The Australian cotton industry is the global leader in sustainable agriculture.
- The Australian cotton industry captures the full value of its products.
- Capable and connected people driving the cotton industry.
- Measured performance of the Australian cotton industry and its RD&E drives continuous improvement.

Key Performance Indicators

KPI	2014-15	Measure of Success
Industry productivity growth per hectare per annum.	3 per cent	In progress. Average production per hectare has continued to increase annually by 2.5 to 3 per cent (averaged over the past five years).
Industry reports to customer needs for sustainability indicators.	Report	Complete. Forty-five recognised sustainability indicators have been developed for the cotton industry under the key aspects of economic, environment and social impacts. The industry's first ever sustainability report, the Australian Grown Cotton Sustainability Report, was publicly released in November 2014.
Coverage of Best Management Practice systems across Australian cotton industry.	70 per cent	In progress. CRDC and Cotton Australia are partners in the cotton industry's best management practice program, <i>myBMP</i> . The <i>myBMP</i> program comprises of 11 modules which cover areas of production and farm business operations. Adoption of <i>myBMP</i> is increasing with more than 60 per cent of farms participating and support provided by the industry's joint extension program CottonInfo.
Agriculture Senior Officials Committee's (AgSOC) cotton and cross-sectoral Research Development and Extension (RD&E) strategies supported.	Report	In progress. CRDC continues to support cross-sectoral priorities and strategies such as climate change, soils, plant biosecurity and water use through the delivery of the Cotton Sector RD&E Strategy and CRDC's Strategic R&D Plan.

APPENDICES

APPENDIX 1: Measuring performance

CRDC Strategic R&D Plan progress during 2014-15

Program One: Farmers		
Will be achieved by:	Measure of success	Progress
Theme: Successful Crop Protection		
Outcome: Cotton crops protected from pest, weed and disease threats		
Monitoring and investigating the ecological behaviours and responses of cotton pest, weeds and diseases.	World-class science foundations for managing ecological adaptations in cotton insect pests, weeds and diseases.	<i>In progress.</i> Understanding the ecology of cotton pests (insect, weed and pathogens) is the focus of 10 projects, including five PhDs and three Post-Doctoral positions. This information ensures a strong scientific basis for development of best practice and is the foundation for integrated pest, weed and disease management.
Testing practices that deliver improved management of insect pests, weeds and diseases.	85 per cent of farmers adopting improved practices that reduce the reliance on pesticide inputs.	<i>In progress.</i> Current investments are aimed at developing the resistance management plan for the next generation Bt cotton to enter the Australian cotton market. Bollgard 3 [®] cotton contains an additional insecticidal protein that may further alleviate the need for sprays to control <i>Helicoverpa</i> spp. Testing new and novel products and practices to improve insect pest, weed and disease management continues. New thresholds and tactics have been developed for a number of emerging insect pests, weeds and diseases. A number of innovative crop monitoring technologies and bio-pesticides are under development and are likely to significantly change the reliance on pesticides inputs. High adoption of insect best practice has seen total insecticide active applied (g/ha) continue to decrease, with a 90 per cent reduction over the last decade.
Improving capacity, knowledge and adoption of techniques to successfully protect the cotton crop.	50 per cent of farmers adopting improved practices that reduce the incidence of insect pests, weeds and diseases affecting cotton on their farm.	<i>In progress.</i> The ecology and best practice recommendations developed by research are packaged and communicated to industry through investment in the CottonInfo partnership.

Program One: Farmers		
Will be achieved by:	Measure of success	Progress
Theme: Productive Resource Efficiencies		
Outcome: Inputs for cotton production are optimised		
Delivering benchmarks of on-farm resource use efficiencies.	Farmers are able to increase their productivity: <ul style="list-style-type: none"> ■ per hectare of land. ■ per unit of nitrogen fertiliser. ■ per ML of water. ■ per unit of CO₂ emitted. 	<p>In progress. Two projects are specifically providing benchmarks of on-farm resource use efficiencies regarding water and energy use. The Australian cotton industry has used values of Gross Production Water Use Index (GPWUI farm) to benchmark water use efficiency since 1988-89 and in the 2012-13 season, which saw record planting and full production, the GPWUI farm was 1.12 bales/ML. Commonwealth grants are being utilised to benchmark energy efficiency and greenhouse gas emissions on farms, the results of which will be available from 2015 through 2017.</p>
Developing and proving decision systems and practices that deliver optimal resource efficiencies on cotton farms.	Farmers are able to increase their productivity: <ul style="list-style-type: none"> ■ per hectare of land. ■ per unit of nitrogen fertiliser. ■ per ML of water. ■ per unit of CO₂ emitted. 	<p>In progress. A number of projects continue to investigate nitrogen, in particular looking at developing a comprehensive understanding of the:</p> <ul style="list-style-type: none"> ■ Nitrogen requirements of high-yielding cotton crops. ■ Nitrogen loss pathways associated with each stage of the cotton farming system. <p>Research is also on-going into phosphorous and potassium nutrition, and managing carbon in a cotton farming system.</p> <p>The latter research has demonstrated the potential for a range of benefits by incorporating a corn rotation, such as:</p> <ul style="list-style-type: none"> ■ Increased yield of cotton in the crop following corn. ■ Higher levels of soil carbon (especially at depth i.e. 60-120 cm). ■ Increased cotton root densities and rooting depth. ■ A decrease in black root rot infestation.

APPENDICES

APPENDIX 1: Measuring performance *(continued)*

Program One: Farmers		
Will be achieved by:	Measure of success	Progress
Developing new systems and tools to support farm decision making processes.	Farmers are able to increase their productivity: <ul style="list-style-type: none"> ■ per hectare of land. ■ per unit of nitrogen fertiliser. ■ per ML of water. ■ per unit of CO₂ emitted. 	<p>In progress. Current irrigation projects have led to advances in the optimisation and automation of irrigation applications.</p> <p>Remote sensing and satellite imagery can now be used as indicators of crop stress and spatial variability – and the industry is close to fully understanding how weather forecasts and canopy temperature sensors can be used to refine scheduling decisions.</p> <p>The development of a control system for variable rate irrigation application, and software that sequences irrigations and controls the communications between the system components, brings the industry close to smart automated furrow irrigation.</p>
Improving capacity, knowledge and adoption of techniques to optimise resource uses.	Farmers are able to increase their productivity: <ul style="list-style-type: none"> ■ per hectare of land. ■ per unit of nitrogen fertiliser. ■ per ML of water. ■ per unit of CO₂ emitted. 	<p>In progress. CRDC is supporting the enhancement of a crop carbon management tool. The tool allows farmers to better understand the source and extent of nitrous oxide emissions from their cotton farm, and how to reduce them by improving their farming efficiency.</p>
Theme: Profitable Futures		
Outcome: Innovations in cotton production		
Investigating the application of new technologies and different scientific approaches which have the potential to deliver significant improvements and economic returns to the cotton farming system.	Farmers are profitable: <ul style="list-style-type: none"> ■ On-farm innovations and partnerships established to drive profitability. ■ Improving gross margins for Australian cotton systems. 	<p>In progress. CRDC has developing a futures-based program to ensure the industry has research underway to meet its needs for a 15-20 year horizon.</p> <p>The objective of the profitable futures theme is to increase cotton producer profitability through improved productivity and certainty of production.</p> <p>Feasibility studies for some projects identified in the futures program have begun while other advanced projects have been incorporated as part of the Australian Governments Rural R&D for Profit programme.</p> <p>The targets for the profitable futures theme are:</p> <ul style="list-style-type: none"> ■ Doubling input efficiency by 2029. ■ Reducing per hectare volatility of yield by half by 2029. ■ Reducing per bale volatility of quality grade by half by 2029.

Program Two: Industry		
Will be achieved by:	Measure of success	Progress
Theme: Respected stewardship		
Outcome: Industry protects its production technologies and its biosecurity		
Monitoring for and investigating changes in pest and weed susceptibility to biotechnologies and crop protection products used by the cotton industry.	Industry is able to maintain access to, and the effectiveness of, biotechnologies and crop protection products.	<i>In progress.</i> Current investments include monitoring for resistance to conventional insecticides/mitricides in aphids, mites, silverleaf whitefly and <i>Helicoverpa</i> spp., as well monitoring <i>Helicoverpa</i> spp. for resistance to Cry1Ac, Cry2Ab and VIP proteins.
Exploring tactics and strategies that lower the risks of pesticides to the environment and resistance evolution in populations of key insect pests and weeds.	<p>100 per cent of farmers are aware of the underlying risks of trait and agricultural chemical resistance.</p> <p>100 per cent of insecticide use decisions are consistent with the Insecticide Resistance Management Strategy (IRMS).</p> <p>The cotton industry demonstrates pesticide management practices that lower the risks posed to the environment and the evolution of resistance in target insect pest and weed populations.</p>	<p><i>In progress.</i> There is a high level of awareness of the risks of trait and agricultural chemical resistance.</p> <p>The 2013 Growing Practices Survey found 83 per cent of growers agreed that all their insecticide use decisions were consistent with the IRMS.</p> <p>Herbicide resistance has been identified as a significant emerging issue. Investments have been made in identifying practices to reduce the risk of herbicide resistance including development of a herbicide resistance management strategy.</p>
Developing and supporting the industry's capacity to effectively steward key technologies and products.	The cotton industry has the necessary science to provide informed input into the development of resistance management plans for biotech traits.	<p><i>In progress.</i> The range of research investment into determining an effective Resistance Management Plan (RMP) for third generation transgenic cotton includes:</p> <ul style="list-style-type: none"> ■ Efficacy and expression characteristics of the toxins contained in Bollgard 3®. ■ Reviewing the effectiveness of key tactics in the current RMP, <i>Helicoverpa</i> spp. ecology. ■ Examining resistance levels and characteristics. <p>This science has been used by the Transgenic and Insect Management Strategy (TIMS) Bt Technical Panel, to provide advice to industry on the development of the RMP for the third generation Bt technology.</p>

APPENDICES

APPENDIX 1: Measuring performance *(continued)*

Program Two: Industry		
Will be achieved by:	Measure of success	Progress
Supporting the industry's preparedness and ability to deal with biosecurity threats.	<p>Industry is capable of managing its biosecurity responsibilities:</p> <ul style="list-style-type: none"> ■ The cotton industry is able to meet its biosecurity obligations. ■ The cotton industry is prepared to effectively respond to biosecurity incursions. 	<p>In progress. Investment in biosecurity research and diagnostic capacity has resulted in surveillance and diagnostic capacity within existing CRDC-funded disease projects for each of the six priority disease threats.</p> <p>Biosecurity awareness is promoted through industry publications and through the CottonInfo team.</p>
Theme: Responsible Landscape Management		
Outcome: Industry leads in managing natural assets		
Defining the values and drivers relating to the management of natural landscapes and systems in cotton growing regions.	<p>Industry participation in the collective management of natural landscapes:</p> <ul style="list-style-type: none"> ■ Regional delivery partnership for every major cotton growing region. 	<p>In progress. A project titled <i>Resilience assessment of the Australian cotton industry at multiple scales</i> has commenced.</p> <p>This project proposes using a resilience assessment approach to assist the cotton industry to develop a whole-of-system perspective that incorporates the economic, social and ecological dimensions of the industry, how these interact, influence each other and change over time.</p> <p>Of particular importance is how the industry copes in the face of major expected and unexpected future changes and events (or shocks) such as droughts or market fluctuations.</p>
Recording and demonstrating improved environmental performance of the cotton industry.	<p>Industry contributes to the improvement of landscape systems knowledge and science:</p> <ul style="list-style-type: none"> ■ A comprehensive database documenting the extent and condition of the natural assets the industry utilises and manages. 	<p>In progress. The first Australian Grown Cotton Sustainability Report has compiled all data documenting the progress and status of a set of environmental indicators shortlisted for and by the cotton industry. This report was launched in 2014 and has identified gaps for further investigation.</p>

Program Two: Industry		
Will be achieved by:	Measure of success	Progress
Identifying and proving integrated management strategies which deliver environmental and productivity gains.	Recognition by national and global initiatives for biodiversity management.	<i>In progress.</i> The current investments underway will provide knowledge to use trees to arrest lateral saline water movement, boost the carbon footprint of cotton farms, and keep pest thresholds lower for longer. A NRM Technical Specialist will deliver these innovative management strategies through myBMP and the CottonInfo platforms.
Researching the connectivity between cotton farms and natural systems in the landscape.	One million hectares of floodplain vegetation managed under best practice.	<i>In progress.</i> The current investments provide knowledge for key environmental assets in cotton landscapes – riparian vegetation, deep drainage, groundwater and ecosystem services.
Supporting initiatives and partnerships to improve the knowledge and capacity to manage natural landscapes and systems in cotton regions.	Two national science-based collaborations for the industry to inform surface and groundwater management.	<i>In progress.</i> Science partnerships remain a work in progress as research and NRM funding programs are uncertain at a state and national level.
Theme: Sustainable Futures		
Outcome: An industry achieving its vision		
Scoping and investigating critical threats and opportunities which may influence the long-term sustainability of the Australian cotton industry.	Industry is capable of leading and adapting to change.	<i>In progress.</i> CRDC is developing a futures-based program to ensure the industry has research underway to meet its needs for a 15-20 year horizon. The objective of the sustainable futures theme is to achieve an increasingly resilient and responsible cotton industry.
Supporting innovative approaches to solve traditional industry issues and drive future sustainability.	Innovations and partnerships established to drive cotton industry sustainability.	The targets for the sustainable theme program are: <ul style="list-style-type: none"> ■ The cotton industry is an innovative low impact irrigator by 2029. ■ The Australian cotton industry is carbon neutral by 2029. ■ The Australian cotton industry is recognised as the leader in sustainable agriculture by 2029.

APPENDICES

APPENDIX 1: Measuring performance *(continued)*

Program Three: Customers		
Will be achieved by:	Measure of success	Progress
Strategic theme: Assured Cotton		
Outcome: The integrity and qualities of Australian cotton set global benchmarks for customers		
Improving Australian fibre quality testing standards and procedures and the capacity to measure and manage contamination.	Australia has the best ranking for non-contamination in the International Textile Manufacturers Federation (TMF) survey.	<i>In progress.</i> Two projects have been initiated to further improve the non-contamination and quality status of Australian cotton, looking at minimising plastic contamination and improving moisture management in the round-module harvester system. Work investigating how to best measure and manage fibre elongation is on-going.
Supporting the development and implementation of post-farmgate BMPs.	Customers recognise and use Australia's BMP standards as their guarantee of quality assurance.	<i>In progress.</i> CRDC continues to support the training of cotton ginners and the investigation of how farm management and ginning practices influence fibre quality. The <i>myBMP</i> program has been recognised by the Better Cotton Initiative so certified <i>myBMP</i> cotton can be sold as Better Cotton.
Developing and implementing a standardised reporting system for Australian cotton product quality and traceability.	Australia uses standardised reporting systems for product quality and traceability for farmers, industry and customers.	<i>In progress.</i> A project has been initiated to determine whether the geographic origin of cotton lint can be objectively identified, and terms of reference to investigate options for enhancing the retrospective traceability of cotton have been developed.
Benchmarking Australian cotton against key international programs for product stewardship and sustainability.	Australia can respond to customer needs for reporting against sustainability indicators.	<i>In progress.</i> Sustainability indicators for Australian cotton farming have been developed, which were informed by international initiatives, including the Better Cotton Initiative and the International Cotton Advisory Committee's Expert Panel on the Social, Economic and Environmental impact of cotton.

Program Three: Customers		
Will be achieved by:	Measure of success	Progress
Theme: Differentiated Products		
Outcome: Customers recognise the differentiated value of Australian cotton products		
Identifying opportunities for improvements in fibre quality and cotton products.	Customers value the qualities of Australian cotton.	<i>In progress.</i> Collaborations have been established with six spinning mills to test CottonSpec, and with eight mills (under the Premium Cotton Initiative) to produce high-quality yarns and fabrics from Australian cotton.
Demonstrating the value of different fibre classes and defining fibre quality parameters that secure a premium market.	New fibre classification systems established.	<i>In progress.</i> A project investigating novel spinning technologies to produce fine and high-quality yarns from Australian cotton has been initiated. Research has demonstrated that Australian Long Staple cotton is a viable replacement for a proportion of extra-long staple yarn in high-quality fabrics.
Developing customer-based partnerships for the development of high value and novel products, which differentiate Australian cotton.	Partnerships established to demonstrate the potential for differentiating Australian cotton.	<i>In progress.</i> A collaborative project with the integrated spinning mill Esquel Limited is developing novel cotton/wool fabrics.

APPENDICES

APPENDIX 1: Measuring performance *(continued)*

Program Three: Customers		
Will be achieved by:	Measure of success	Progress
Theme: Competitive Futures		
Outcome: The demand for Australian cotton products is positively transformed		
Investigating existing and future markets for Australian cotton and communicate these findings to the Australian cotton industry.	<p>Customers continue to demand Australian cotton products:</p> <ul style="list-style-type: none"> ■ Provide the Australian cotton industry with knowledge of fabric innovations and future market opportunities. 	<p>In progress. CRDC has developed a futures-based program to ensure the industry has research underway to meet its needs for a 15-20 year horizon. Feasibility studies for a number of projects in this area have begun and results are expected throughout 2015.</p> <p>The objective of the competitive futures theme is to capture increased value through supply chain transformation and development of new products and markets.</p> <p>The targets for the competitive futures theme are:</p> <ul style="list-style-type: none"> ■ Reduce the length and complexity of the supply chain to add \$1 billion of value to the Australian cotton industry by 2029. ■ Explore, identify and realise new end uses of cotton to add \$2 billion of value to the Australian cotton industry by 2029.
Facilitating the development of new technologies and systems to improve the competitiveness of Australian cotton.	Development of alternative and high-value cotton products.	<p>In progress. A number of projects have been initiated that are aiming to develop new technologies to add value to cotton products, including: new finishes for anti-wetting, self-sterilising cotton fabrics, and ever-dry self-cooling cotton fabrics.</p>

Program Four: People		
Will be achieved by:	Measure of success	Progress
Theme: Workforce Capacity		
Outcome: A skilled, educated and progressive industry workforce		
Investigating effective strategies for attracting, developing and retaining people in cotton.	Opportunities for workforce development are demanded by industry.	<p><i>In progress.</i> CRDC has three investment projects to support this objective: One research project with University of Melbourne and two PhD projects with University of Southern Queensland.</p> <p>Collectively these projects are contributing to the development of a whole of industry workforce development strategy.</p>
Supporting initiatives which lead to the continuous improvement of human resource management including on-farm Workplace Health and Safety.	A 10 per cent reduction in cotton farm-related injuries by 2018.	<p><i>In progress.</i> CRDC currently has two investment projects aimed at addressing on-farm health and safety with University of Sydney and Australian Centre for Agricultural Health and Safety.</p> <p>These projects have delivered a profile of incidents occurring on cotton farms and are developing campaigns to increase awareness and tactics to address specific incidents (such as roll-over protection for Quad bikes).</p> <p>CRDC has co-invested with other RDCs in the People in Ag program, as well as in the myBMP Human Resource Management (HRM) module update, to ensure that growers are able to access best practice HRM information.</p>
Understanding opportunities for greater Aboriginal participation in cotton and partnering with organisations to support the development of a culturally aware cotton workforce.	Opportunities for learning are demanded by industry.	<p><i>In progress.</i> CRDC currently supports student workplace scholarships through the Aboriginal Employment Strategy and has provision for the support for an additional two placements.</p>

APPENDICES

APPENDIX 1: Measuring performance *(continued)*

Program Four: People		
Will be achieved by:	Measure of success	Progress
Supporting educational opportunities which increase the skills and knowledge of current workforces and will meet the needs of future workforces.	<ul style="list-style-type: none"> ■ 50 Horizon scholars by 2018. ■ 30 completed summer scholarships by 2018. ■ 300 students having completed the UNE Cotton Course by 2018. ■ On-farm skill development. ■ 50 cotton farmers awarded a new Diploma in Human Resources by 2018. 	<p>In progress. In 2014-15 CRDC supported an additional seven summer and honours scholarships and two Horizon Scholarships through RIRDC – taking the total number of Horizon scholars to 15.</p> <p>CRDC also invested in three new PhD scholarships during the 2014-15 year, taking the total number of PhD scholars supported by CRDC to 22.</p> <p>An additional 63 students enrolled in the UNE Cotton production course supported by CRDC in 2014-15, while initiatives to support on-farm skill development and a new Human Resource Management Diploma continue to be developed.</p>
Creating opportunities for, and supporting the development of leadership skills.	Participation in leadership programs.	<p>In progress. 15 participants completed the Future Cotton Leaders course in December 2014.</p> <p>CRDC also supported two Nuffield scholars, three participants in the Australian Rural Leadership Program, and two participants in the Peter Cullen Trust Program.</p>
Theme: Networks		
Outcome: An industry connected by dynamic networks		
Establishing and empowering creative forums and initiatives which build relationships.	<ul style="list-style-type: none"> ■ Ten conferences and forums are coordinated which promote industry, cross-sectoral and community knowledge sharing. 	<p>In progress. CRDC supported 17th Australian Cotton Conference in 2014 and is an active participant in the cross-RDC collaborative forums held biannually.</p> <p>Additionally CRDC supported numerous industry and technical forums throughout 2014-15.</p>
Supporting and participating in collaborative cross-sectoral RD&E initiatives.	<ul style="list-style-type: none"> ■ CRDC is an active member of key industry and government initiatives. ■ Agriculture Senior Officials Committee (AgSOC) cotton and cross-sectoral strategies supported. 	<p>In progress. CRDC participated in activities that include joint national strategic R&D planning with AgSOC, particularly in relation to climate change, soils and water, human capacity, communication and impact evaluation.</p> <p>CRDC is a participant in the soils cross-sectoral strategy with the Department of Agriculture and other RDCs.</p>

Program Four: People		
Will be achieved by:	Measure of success	Progress
Creating and facilitating opportunities for national and international RD&E exchange.	<ul style="list-style-type: none"> 50 travel scholarships are supported by 2018. 	<i>In progress.</i> CRDC supported 9 travel scholarships and scientific exchanges during 2014-15. Additionally CRDC has established relations with its US counterpart (Cotton Incorporated) and is seeking to co-invest in projects that have significance at an international scale.
Facilitating engagement with stakeholders for prioritising and capturing advice on RD&E issues. Honing research expertise and the application of science from core research disciplines.	The cotton industry has effective collaborative structures for prioritising RD&E.	<i>In progress.</i> CRDC supported the activities of the grower panels, which provide advice on RD&E. Additionally CRDC supports the activities of the Cotton Innovation Network, which is part of the AgSOC RD&E framework and was formed to help the cotton industry form strategy. The main purpose of the Cotton Innovation Network is to ensure the industry gets best value for its investment in research to achieve key outcomes.
Theme: Communication		
Outcome: Stakeholder information needs are met		
Providing information for demand driven communication strategies and performance reporting.	Communications systems for all CRDC stakeholders are meeting their communication needs.	<i>In progress.</i> CRDC invested \$2.9 million in the CottonInfo joint venture during 2014-15 to assist in the development and extension of research outcomes. The new CRDC and CottonInfo websites were launched in 2014-15 to provide better access to information that cotton growers and the broader industry requires.
Applying innovative communication methods.	The information and services derived from CRDC investments are in demand and the technologies adopted.	<i>In progress.</i> CRDC is continuously applying innovative communication methods to communicate the outcomes of investments to the core stakeholders and target audiences. This has included the redevelopment of the CRDC website and the creation of the new CottonInfo website, plus the development of many communications outputs, including innovative videos, audio, blogs, and social media.

APPENDICES

APPENDIX 1: Measuring performance *(continued)*

Program Five: Performance		
Will be achieved by:	Measure of success	Progress
Theme: Best Practice		
Outcome: World's best practice underpins the performance of the cotton industry		
Supporting a best practice framework as the primary integrated planning, risk management, benchmarking, knowledge development and delivery system.	The cotton industry's <i>myBMP</i> program is the primary resource for farmers accessing best practice knowledge and tools.	<p>In progress. CRDC invests in two projects to support the achievement of this objective.</p> <p>The investments have developed a centralised information repository for the storage of all extension materials and CRDC reports with appropriate metadata attached. The centralised repository will be accessible through the CottonInfo, <i>myBMP</i> and CRDC websites, ensuring that a common set of materials is referenced and that material is stored in a single location. CRDC is also investing in a GIS referenced database.</p>
Promoting best practices through the development and delivery Joint Venture.	<ul style="list-style-type: none"> ■ An 80 per cent coverage of best management practice systems across the Australian cotton industry. ■ The cotton industry's <i>myBMP</i> program is nationally recognised and integrated with other agricultural sector best management practice programs. 	<p>In progress. As part of the CottonInfo joint venture, CRDC invests in a number of Technical Specialists whose role is to update <i>myBMP</i> modules, ensuring that the content of the modules reflects the latest in research findings and outcomes.</p> <p>CRDC commissioned a review of <i>myBMP</i> and a number of key recommendations have been developed to ensure that <i>myBMP</i> continues to meet industry needs. Coverage of <i>myBMP</i> is increasing with more than 60 per cent of cotton farms participating.</p>

Program Five: Performance		
Will be achieved by:	Measure of success	Progress
Theme: Monitoring and Evaluation		
Outcome: Industry and RD&E performance is captured		
Developing and implementing an internal M&E framework for evaluating CRDC's investment portfolio balance and its RD&E performance.	A rigorous monitoring and evaluation platform which measures and reports on the performance of CRDC's research and development investments.	In progress. CRDC invested in the development of an M&E framework through Roth Rural. The framework, being developed on a program logic basis, is close to completion and will be implemented by CRDC in 2015-16.
Conducting annual surveys to capture practice change.	An industry performance monitoring and evaluation framework that is consistent with national and international standards.	In progress. CRDC invests in two projects to assess industry performance: an annual grower practices survey and a survey conducted by Crop Consultants Australia. These two surveys provide details of current industry practice both from a grower perspective and from consultants who provide much of the advice. Key findings from the 2014 growers practices survey include: <ul style="list-style-type: none"> ■ 23 per cent of respondents had made a change to their irrigation systems in the last 5 years while a further 21 per cent are seriously considering making changes. ■ 85 per cent or respondents identified issues that substantially impacted their yields including extreme heat and rain at harvest time. The most mentioned drivers of productivity and profitability were yield and price followed by water, costs and nutrition.
Establishing a framework through which industry performance can be nationally and internationally reported.	Providing the industry with cotton sustainability indicators and supporting its capacity to report against these indicators.	In progress. CRDC invested in a project to develop sustainability indicators enabling the industry to report its performance at a national and international level. This report was launched in December 2014.

APPENDICES

APPENDIX 1: Measuring performance *(continued)*

Program Five: Performance		
Will be achieved by:	Measure of success	Progress
Theme: Reviews		
Outcome: Continuous improvement in industry and RD&E performance.		
Undertaking scientific discipline reviews of the industry's RD&E.	Independent reviews of the CRDC's research and development performance.	Achieved. CRDC has undertaken a review of soil science in cotton.
Commissioning and participating in independent reviews of CRDC's RD&E and organisational performance.	Independent reviews of the CRDC's research and development performance.	In progress. CRDC has invested in the development of an M&E framework to enable performance monitoring of the R&D portfolio.
Commissioning independent reviews of the social, environmental and economic performance of the industry.	Independent reviews of the social, environmental and economic performance of the industry's performance.	In progress. CRDC, in conjunction with the peak industry body Cotton Australia, has developed 45 sustainability indicators to enable the industry to benchmark and monitor its performance against these indicators.
Participating in cross-sectoral RD&E impact evaluations and reviews.	Independent reviews of the social, environmental and economic performance of the industry's performance.	In progress. CRDC, and the industry peak body Cotton Australia launched the industry's sustainability report in 2014 demonstrating how it performs in relation to 45 key sustainability indicators.

APPENDIX 2: Australian Government priorities

Strategic Research Priorities

This Annual Report outlines the alignment of CRDC's investments with the Strategic Research Priorities (SRPs). The SRPs ceased on 26 May 2015 and were replaced with nine new Science Research Priorities. From 1 July 2015 CRDC projects will be classified under Science and Research Priorities.

During 2014-15, CRDC did not fund projects related to Strategic Research Priorities B3 and D1.

Priority 1 – Living in a changing environment

- A1: Identify vulnerabilities and boundaries to the adaptability of changing natural and human systems.
- A2: Manage risk and capture opportunities for sustainable natural and human systems.
- A3: Enable societal transformation to enhance sustainability and wellbeing.

Priority 3 – Managing our food and water assets

- C1: Optimise food and fibre production using our land and marine resources.
- C2: Develop knowledge of the changing distribution, connectivity, transformation and sustainable use of water in the Australian landscape.
- C3: Maximise the effectiveness of the production value change from primary to processed food.

Priority 5 – Lifting productivity and economic growth

- E1: Identify the means by which Australia can lift productivity and economic growth.
- E2: Maximise Australia's competitive advantage in critical sectors.
- E3: Deliver skills for the new economy.

Priority 2 – Promoting population health and wellbeing

- B1: Optimise effective delivery of health care and related systems and services.
- B2: Maximise social and economic participation in society.
- B3: Improve the health and wellbeing of Aboriginal and Torres Strait Islander people.

Priority 4 – Securing Australia's place in a changing world

- D1: Improve cybersecurity for all Australians.
- D2: Manage the flow of goods, information, money and people across our national and international boundaries.
- D3: Understand political, cultural, economic and technological change, particularly in our region.

APPENDICES

APPENDIX 2: Australian Government priorities *(continued)*

Rural Research and Development Priorities

The Australian Government issued five revised Rural Research and Development Priorities in May 2007, and all are addressed below. During 2014-15, CRDC achieved the following outputs related to applicable priorities.

Australian Government Priorities		CRDC RD&E outputs 2014-15
Rural R&D Priorities	Applicable SRPs & goals	
<p>Productivity and Adding Value</p> <p><i>Improve the productivity and profitability of existing industries and support the development of viable new industries.</i></p>	C1; C3; E1	<ul style="list-style-type: none"> ■ Supported initiatives to address the resilience of the Australian cotton industry and rural communities in NSW and QLD. ■ Supported ongoing R&D cross-sectoral partnerships that addressed climate variability, natural resource management, irrigation, farm health and safety, and encouraged the development of future scientists. ■ Developed new initiatives to disrupt the supply chain and enhance the value of cotton-based products for Australian cotton growers. ■ Extended farming systems innovations to farmers for improved production efficiencies, with a focus on resource management (soils, water, fertiliser use, energy use and carbon), as well as environmental performance. ■ Commercialisation of novel biopesticides for key cotton and grains pests. ■ Enhanced the Best Management Practices program to integrate planning, risk management and benchmarking with development of skills, knowledge and adoption of research outputs throughout the value chain.

Australian Government Priorities		CRDC RD&E outputs 2014-15
Rural R&D Priorities	Applicable SRPs & goals	
<p>Supply Chain and Markets</p> <p><i>Better understand and respond to domestic and international market and consumer requirements and improve the flow of such information through the whole supply chain, including to consumers.</i></p>	C3; D3; E2	<p>Maintaining and improving international market access opportunities</p> <ul style="list-style-type: none"> ■ Developed initiatives to optimise and disrupt the cotton supply chain. ■ Developed sustainability indicators to benchmark and improve production of Australian cotton. ■ Supported accreditation of Australian cotton growers for participation in the Better Cotton Initiative and the Cotton Leads program. ■ Further improved industry awareness and preparedness for major biosecurity threats, particularly silverleaf whitefly, <i>Solenopsis mealybug</i>, <i>Helicoverpa</i> spp., aphids, mites and viruses. ■ Continued to improve market intelligence and customer feedback on Australian cotton's competitive advantage. ■ Facilitated post-farmgate best practices for harvest, classing, ginning, transport, storage and handling. ■ Continued to develop collaborative R&D partnerships with Australian cotton shippers and overseas cotton spinning mills and domestic brand owners to facilitate opportunities for using newly developed Australian premium-quality cotton, innovations in objective fibre measurement and textile processing knowledge.
<p>Natural Resource Management</p> <p><i>Support effective management of Australia's natural resources to ensure primary industries are both economically and environmentally sustainable.</i></p>	A1; A2; A3; C2; E2	<ul style="list-style-type: none"> ■ Developed the first-ever sustainability report for the Australian cotton industry. ■ Invested in initiatives to measure and manage GHG emissions, soil carbon and energy throughout the Australian cotton industry. ■ Supported ongoing R&D cross-sector partnerships addressing climate variability, natural resource management, irrigation, and biodiversity, and encouraged the development of future natural resources scientists. ■ Enhancement of the best management practices system (as above).

APPENDICES

APPENDIX 2: Australian Government priorities *(continued)*

Australian Government Priorities		CRDC RD&E outputs 2014-15
Rural R&D Priorities	Applicable SRPs & goals	
<p>Climate Variability and Climate Change</p> <p><i>Build resilience to climate variability and adapt to and mitigate the effects of climate change.</i></p>	A1; A2; A3; C1; C2	<ul style="list-style-type: none"> ■ Undertook a resilience assessment of the Australian cotton industry. ■ Undertook R&D investments in biosecurity, as well as cropping systems for improved nitrogen, energy and water use efficiencies that will increase farm businesses' climate change preparedness and reduce nitrous oxide emissions. ■ Extended farming systems innovations to farmers, facilitating production efficiencies with an emphasis on resource management (soils, water, fertiliser, energy and carbon) and environmental performance. ■ Consolidated new collaborations with GRDC addressing productivity and climate change preparedness in cotton and grains farming systems. ■ Supported ongoing R&D cross-sector partnerships addressing climate change, natural resource management, irrigation and biodiversity, and encouraged the development of new scientists in these areas.
<p>Biosecurity</p> <p><i>Protect Australia's community, primary industries and environment from biosecurity threats.</i></p>	A1; A3; C3; D2	<ul style="list-style-type: none"> ■ Undertook a review of the Industry Biosecurity plan. ■ Invested in the training and upskilling of growers, consultants and industry extension personnel to ensure preparedness for biosecurity threats. ■ Improved industry awareness and preparedness for major biosecurity threats, particularly silverleaf whitefly, <i>Solenopsis mealybug</i>, <i>Helicoverpa</i> spp., aphids, mites and viruses. ■ Further tested and commercialised novel biopesticides for key cotton and grain pests. ■ Continued surveying for the incidence of endemic diseases and pests, and surveillance for the presence of exotic diseases and pests, in all cotton growing districts. ■ Undertook R&D investments and activities that underpinned the stewardship of biotechnologies and chemicals. ■ Enhanced the Best Management Practices system to integrate planning, risk management and benchmarking, with development of skills, knowledge and adoption of research outputs for biosecurity.

Australian Government Priorities		CRDC RD&E outputs 2014-15
Rural R&D Priorities	Applicable SRPs & goals	
Supporting the Rural R&D Priorities		
Improve the skills to undertake research and apply its findings.	E1; E3	<p>Workforce, skills, education</p> <ul style="list-style-type: none"> ■ Postgraduate scholarships (PhD and Masters) and leadership programs for a broadly based response to the cotton industry's future capacity. ■ Supported Horizon scholarships for school and undergraduate level programs. ■ Continued to support and enhance networks and collaborations with education providers to activate a supply chain approach for the industry's future R&D human capacity. ■ Supported ongoing R&D cross-sector partnerships addressing climate variability, irrigation, and farm health and safety, and encouraged the development of future partnerships. ■ Invested in projects and partnerships with Wincott (Women's Industry Network – cotton), the Aboriginal Employment Strategy, and the Future Cotton Leaders program.
Promote the development of new and existing technologies.	A3; D3; E2; E3	<ul style="list-style-type: none"> ■ Further enhanced the Best Management Practices system, with the development of a new inter-face platform to enable increased interaction with growers. ■ Supported the review and updating of <i>myBMP</i> modules for improved accreditation and sustainability of the cotton industry. ■ Invested in new technologies such as the WHS and Birds on Cotton Farms app.

APPENDICES

APPENDIX 2: Australian Government priorities *(continued)*

Composition of Strategic Research Priorities attributed to each CRDC RD&E Program 2014-15 (\$'000)

Strategic Research Priorities	Living in a changing environment			Promoting population health and wellbeing			Managing our food and water assets			Securing Australia's place in a changing world			Lifting productivity and economic growth			TOTAL
	A1	A2	A3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	
Expenditure	\$'000			\$'000			\$'000			\$'000			\$'000	\$'000	\$'000	\$'000
Program 1: Farmers	705	1,165	645	0	0	0	2,410	986	716	0	37	0	399	393	1,456	8,912
Program 2: Industry	138	581	122	0	0	0	1,847	532	732	0	1,223	0	27	41	105	5,348
Program 3: Customers	47	47	48	0	0	0	419	0	544	0	0	0	604	571	12	2,292
Program 4: People	87	216	328	49	35	0	177	286	18	0	50	63	129	30	709	2,177
Program 5: Performance	25	62	0	0	11	0	114	89	55	0	0	0	45	7	107	515
TOTAL	1,002	2,071	1,143	49	46	0	4,967	1,893	2,065	0	1,310	63	1,204	1,042	2,389	19,244

Some funding totals have been rounded up or down to the closest whole number.

Composition of Rural Research and Development Priorities attributed to each CRDC RD&E Program 2014-15(\$'000)

Rural Research and Development Priorities (RRDP)	Productivity and Adding Value	Supply Chain and Markets	Natural Resource Management	Climate Change and Climate Variability	Biosecurity	Supporting the Priorities		TOTAL
						Innovation Skills	Technology	
Expenditure	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Program 1: Farmers	3,622	242	1,715	1,122	1,516	143	553	8,913
Program 2: Industry	1,399	81	1,122	528	2,130	23	64	5,347
Program 3: Customers	605	1,195	0	113	0	99	280	2,292
Program 4: People	421	58	103	81	32	1,287	195	2,177
Program 5: Performance	224	58	90	66	29	38	10	515
TOTAL	6,271	1,634	3,030	1,910	3,707	1,590	1,102	19,244

Some funding totals have been rounded up or down to the closest whole number.

APPENDICES

APPENDIX 3: Environmental performance

CRDC has integrated the principles of ecologically sustainable development under s.516A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) into its planning framework.

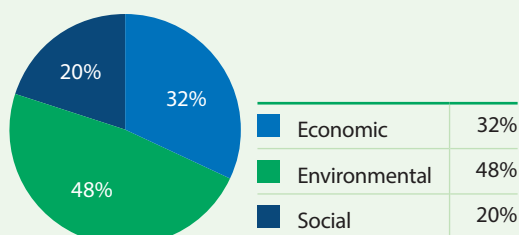
This meant developing contributions to Strategic Plan Measures of Success within each program for the broader triple bottom line outputs contained in the Strategic R&D Plan 2013-18.

In line with this, the Annual Operational Plan 2014-15 was designed to ensure strategic research initiatives to provide measurable environmental, economic and social benefits to the cotton industry and the wider community.

Environmental and social objectives underpin the economic viability of the industry. Improvements in the efficient use of resources (water, energy, nutritional supplements and chemicals), crop yields per hectare, and efficient farming methods aid the economic performance of cotton growers.

A contracted project with Crop Consultants Australia gathers information about on-farm practices and attitudes across the industry, which CRDC then analyses and which provides researchers with valuable guidance to future RD&E directions.

CRDC-funded projects across economic, environmental and social performance 2014-15



Number of CRDC projects and funding which contributed to economic, environmental and social outcomes during 2014-15.

CRDC programs	Economic		Environmental		Social		Total sum of CRDC 2014-15 Investment	Total number of projects
	Sum of CRDC 2014-15 Investment	Number of projects	Sum of CRDC 2014-15 Investment	Number of projects	Sum of CRDC 2014-15 Investment	Number of projects		
Program 1: Farmers	\$3,219,471	27	\$4,945,967	39	\$746,952	4	\$8,912,390	70
Program 2: Industry	\$1,631,226	16	\$3,331,166	28	\$385,183	4	\$5,347,575	48
Program 3: Customers	\$1,156,213	13	\$818,638	6	\$317,353	2	\$2,292,204	21
Program 4: People	\$79,560	2	\$31,028	4	\$2,065,846	82	\$2,176,434	88
Performance 5: Performance	\$49,000	1	\$155,943	4	\$310,294	7	\$515,237	12
Percentage	32%	25%	48%	34%	20%	41%	100%	100%
Grand Total	\$6,135,470	59	\$9,282,742	81	\$3,825,628	99	\$19,243,840	239

APPENDIX 4: RD&E portfolio

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
Farmers					
DAN1510	Advancing integrated weed management in the Australian cotton and grains industries	NSW DPI		1/04/15	30/06/18
CSE1403	Automated insect monitoring for pest management	CSIRO	Nancy Schellhorn	1/07/13	30/06/15
DAN1404	Centre for Biopesticides & Semiochemicals: Development of new tools & strategies for IPM	NSW DPI	Robert Mensah	1/07/13	30/06/18
UWS1401	Centre for Biopesticides & Semiochemicals: Novel insecticides and synergists from endemic and exotic flora	UWS	Robert Spooner-Hart	1/10/13	30/06/18
UNE1404	Centre for Biopesticides & Semiochemicals: Semiochemical management for occasional pests of cotton and grains	UNE	Peter Gregg	1/10/13	30/06/18
NEC1402	Commercial development and evaluation of a machine vision-based weed spot sprayer	NCEA	Cheryl McCarthy	1/07/13	30/06/16
DAQ1502	Crop Protection Development Specialist (CottonInfo Technical Specialist)	QDAF	Ngaire Roughley	1/07/14	30/06/17
DAN1403	Diseases of Cotton XI	NSW DPI	Karen Kirkby	1/07/13	30/06/16
CSP1401	Enhancing IPM in cotton systems	CSIRO	Lewis Wilson	1/07/13	30/06/18
DAN1501	Establishing Southern Cotton – IPM	NSW DPI	Sandra McDougall	1/07/14	30/06/17
DAQ1402	Fusarium wilt management in cotton	QDAF	Linda Smith	1/07/13	30/06/16
CSP1303	Identification of beneficials attacking silverleaf whitefly and green vegetable bug	CSIRO	Lewis Wilson	1/07/13	30/06/16
DAQ1501	Management of Solenopsis mealybug, mirids and apple dimpling bug in Bollgard® cotton	QDAF	Moazzem Khan	1/07/14	30/06/17
CSE1401	Management options enhancing beneficial microbial functions in cotton soils	CSIRO	Gupta Vadakattu	1/07/13	30/06/16

APPENDICES

APPENDIX 4: RD&E portfolio *(continued)*

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
Farmers					
UNE1303	Microbial solutions for sustainable cotton and soil health management	UNE	Lily Pereg	1/07/12	31/10/15
UQ1402	PhD: Host plant relationships of green mirids – is alternative control possible?	UQ	Justin Cappadonna	18/11/13	17/11/16
UNE1305	PhD: Microbial tools for advancing the management of soil and seedling health in cotton production systems	UNE	Sarah Cooper	1/02/13	1/02/16
UQ1403	PhD: Multiple host use and gene-flow in green vegetable bug relative to cotton crop	UQ	Dean Brookes	1/03/13	30/06/16
USQ1404	PhD: Quantifying and mapping the impacts of herbicide drift on cotton (non-target crop)	USQ	Luz Angelica Suarez Cadavid	9/12/13	8/12/16
DAN1402	Postdoc: Hard-to-control weeds in northern farming systems – understanding key processes to improve control methods	NSW DPI	Sudheesh Manalil Velayudhan	1/07/13	30/06/17
UQ1501	Staying ahead of weed evolution in changing cotton systems	QAAFI	Jeff Werth and Bhagirath Chauhan	1/07/14	30/06/19
UNE1505	Travel: The 6th Congress of European Microbiologists (FEMS Federation of European Microbiological Societies)	UNE	Sarah Cooper	4/06/15	14/06/15
DAN1305	Updating and expanding WeedPAK in support of the cotton industry & myBMP	NSW DPI	Graham Charles	1/07/12	31/07/15
UQ1305	Viruses, vectors and endosymbionts: Exploring interactions for control	UQ	Sharon van Brunschot	1/04/13	30/06/16
NEC1401	Advancing VARLwise with autonomous irrigation and a grower's guide	NCEA	Alison McCarthy	1/07/13	30/06/16
CSP1308	Agronomic management for better fibre and textile quality	CSIRO	Michael Bange	1/07/12	30/06/16
CSP1104	Applying plant-based measurements for irrigation in water limited environments.	CSIRO	Onoriode Coast	1/07/12	30/06/16

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
Farmers					
NEC1301	Assessing the impacts of new harvesting technologies on cotton	NCEA	John Bennett	1/07/12	31/12/15
CSP1302	Assisting cotton industry diversification in coastal NQ & tropical Australia	CSIRO	Stephen Yeates	1/07/12	30/09/15
DAN1505	Benchmarking water use efficiency and crop productivity in the Australian Cotton Industry (CottonInfo Technical Specialist)	NSW DPI	Janelle Montgomery	1/07/14	30/06/19
CFEO1501	Carbon farming in the Australian cotton industry – Grant communications support	Seedbed Media Pty Ltd	Rachel Bowman	28/10/14	1/12/15
CFEO1401	Carbon farming in the Australian cotton industry (CottonInfo Technical Specialist)	CSD	Jon Welsh	1/07/13	30/06/17
NEC1302	Commercial prototype smart automation system for furrow irrigation of cotton	NCEA	Rod Smith	1/01/13	30/03/15
CRDC1521	Cotton Irrigation Technologies Tour	NSW DPI	Janelle Montgomery	6/02/15	12/03/15
EEIG1502	CRDC energy data project	BCA	Sam Bacigalupo	1/11/14	30/11/14
EEIG1505	Design and layout of energy materials	Neil Deacon Graphic Design	Neil Deacon	10/04/15	25/05/15
AOTG1401	Determining optimum nitrogen strategies for abatement of emissions for different irrigated cotton systems	NSW DPI	Steve Kimber	1/07/13	30/06/17
UQ1302	Developing soil testing and fertilizer response guidelines to manage P K and S fertility for irrigated and raingrown cotton cropping systems	QAAFI	Mike Bell	1/07/12	30/06/15
NEC1501	Development of a pump efficiency monitor for use in the Australian cotton industry	NCEA	Phillip Szabo	1/07/14	30/06/16
CRDC1514	Development of Revolutionary 'Float Actuated, Fully Automatic, Flow Regulating Valves'	Cocky Valves	Peter Cocciardi	1/07/14	30/06/16

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APPENDIX 4: RD&E portfolio *(continued)*

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
Farmers					
CCEO1502	Economic and risk analysis for carbon farming in the Australian cotton industry	NSW DPI	Janine Powell	1/07/14	1/05/17
AOTG1501	Emerald Trial Consultant	AJ Noone Pty Ltd	Amanda Noone	1/09/14	30/06/15
EEIG1503	Energy audits on irrigated cotton farms (level 2)	GL Irrigation Pty Ltd	Glenn Lyons	26/03/15	30/04/15
EEIG1504	Energy audits on irrigated cotton farms (level 2)	Aquatech Consulting Pty Ltd	James Purcell	10/04/15	30/04/15
EEIG1506	Energy audits on irrigated cotton farms (level 2)	Agripath	Chris McCormack	21/04/15	30/04/15
GVIA1302	Grower-led research in irrigation system comparisons in the Gwydir Valley	GVIA	Zara Lowien	1/07/12	30/06/15
CSP1403	Improving cotton productivity with crop nutrition	CSIRO	Ian Rochester	1/07/13	30/06/16
EEIG1401	Improving energy efficiency on irrigated Australian cotton farms	NCEA	Craig Baillie	1/07/13	30/06/15
EEIG1501	Improving energy efficiency on irrigated cotton farms – Grant communications support	Seedbed Media Pty Ltd	Rachel Bowman	28/10/14	30/03/15
FTRG1401	Indirect emissions of nitrous oxide from broad acre irrigated agriculture	CSIRO	Ben Macdonald	1/07/13	30/06/16
DAQ1503	Irrigation benchmarking of lateral move and centre pivot systems in the QMDB (Phase 3)	QDAF	Rosie Hannah	1/07/14	30/09/15
CSP1305	Irrigation strategies in a limited water environment	CSIRO	Rose Brodrick	1/07/12	30/06/15
CLW1401	Monitoring greenhouse gas emissions from irrigated cropping systems	CSIRO	Ben Macdonald	1/07/13	28/02/17
AOTG1502	Moree Trial Consultant	B&W Rural Pty Ltd	Megan Adams	19/12/14	30/06/15
CRDC1405	Network Development Officer – Upper Namoi Valley (CottonInfo Regional Development Officer)	UNCGA AgVance	Katie Slade	1/07/13	30/06/16

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
Farmers					
BGC1501	Optimising accuracy and efficiency of defoliation by ground application (CottonInfo Technical Specialist)	Bill Gordon Pty Ltd	Bill Gordon	1/07/14	30/06/15
DAQ1404	Optimising water and energy use in the CQ irrigation sector (CottonInfo Technical Specialist)	QDAF	Lance Pendergast	1/07/13	30/06/16
DAN1502	Optimising water and nitrogen fertiliser management in cotton	NSW DPI	Jonathan Baird	1/07/14	30/06/15
UTS1202	PhD: Image Processing Method to Estimate Cotton Requirements for Nitrogen Fertiliser	UTS	Mahdi Mousa Ali	1/05/12	30/06/15
USQ1402	PhD: Self-guided drones for tracking irrigation in a cotton field	USQ	Derek Long	1/03/14	1/03/17
NEC1403	PhD: Soil-specific strategic irrigation: identifying saline-sodic water as a resource	NCEA	Aaditi Dang	3/03/14	5/01/17
UQ1502	PhD: The impact of irrigation methods and management strategies on nitrogen fertiliser recovery in cotton	UQ	John Smith	1/07/14	31/12/18
US1301	PhD: The physiology of cotton crop nutrition, shade & waterlogging	USYD	Najeeb Ullah	31/03/12	31/09/2015
UNE1501	Phosphorus availability in raingrown cotton	UNE	Brendan Griffiths	1/07/14	28/02/16
DAN1401	Postdoc: Closing the soil-carbon balance in cotton farming systems	NSW DPI	Gunasekhar Nachimuthu	1/07/13	30/06/16
CSP1501	Postdoc: Cotton production in a future climate	CSIRO	Katie Broughton	1/07/14	31/01/18
UNE1403	Postdoc: Professor of soil biology	UNE	Oliver Knox	1/01/14	31/12/18
DAN1503	Resilient cotton farming systems in irrigated Vertosols: soil quality, carbon and nutrient losses, cotton growth & yield in long-term studies	NSW DPI	Gunasekhar Nachimuthu	1/07/14	30/06/17
DAQ1401	Strengthening the Central Highlands cotton production system	QDAF	Paul Grundy	1/07/13	30/06/16
CRDC1529	The implications of "big data" for Australian agriculture	AFI	Mick Keogh	1/04/15	30/11/15
Outcome 1: Farmers program projects TOTAL					\$8,912,389

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APPENDIX 4: RD&E portfolio *(continued)*

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
Industry					
CSE1302	Area-wide pest suppression in transgenic landscapes: implications for IRM	CSIRO	Cate Paull	1/07/12	30/06/15
UQ1301	Can genetic diversity predict the potential for emergent glyphosate resistance?	UQ	James Hereward	1/07/12	30/06/15
DAN1506	Conventional insecticide resistance in <i>Helicoverpa</i> – monitoring, management and novel mitigation strategies in Bollgard 3®	NSW DPI	Lisa Bird	1/07/14	30/06/19
CA1502	Cotton Map 2014-15	CA	Nicola Cottee	1/07/14	30/06/15
CA1504	Biosecurity training for growers and agronomists	CA	Nicola Cottee	1/06/15	30/09/15
CSE1404	Economic risk assessment of resistance management strategies for Bt cotton	CSIRO	Stuart Whitten	1/05/14	30/06/16
CCA1401	<i>Helicoverpa</i> egg collecting in cotton regions to support Bt and insecticide resistance monitoring	CCA	Fiona Anderson	1/07/13	30/06/16
UNE1502	<i>Helicoverpa punctigera</i> in inland Australia – what has changed?	UNE	Peter Gregg	1/07/14	30/06/17
CLW1501	Honey bees in cotton: a literature review of benefits to beekeepers and cotton growers	CSIRO	Saul Cunningham	13/10/15	31/12/15
BGC1301	Increasing capacity to deliver accredited drift management workshops	Bill Gordon Pty Ltd	Bill Gordon	1/07/12	30/06/15
DAN1406	Investigating the risk of mycotoxin contamination in Australian cotton production systems	NSW DPI	Kathy Schneebeli	1/01/14	31/12/16
CSE1304	Managing Bt resistance and induced tolerance with effective refuge crops in preparation for Bollgard 3®	CSIRO	Mary Whitehouse	1/07/12	30/06/15
CSE1306	Managing Bt resistance, <i>H. punctigera</i> movements & cotton planting windows	CSIRO	Geoff Baker	1/07/12	30/06/16
CSE1402	Monitoring to manage resistance to Bt toxins	CSIRO	Sharon Downes	1/07/13	30/06/16

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
Industry					
PBCRC1501	Networking remote diagnostics for the Australian cotton industry	Plant Biosecurity CRC	Gary Kong	1/07/14	30/06/15
QUT1402	PhD: Evolution of viral diversity and virus ecology in the management of resistance to biopesticides	QUT	Chris Noune	12/01/14	30/06/17
DAN1201	PhD: Molecular genetic methods to detect neonicotinoid resistance in cotton aphid	NSW DPI	Kate Marshall	1/01/12	30/06/15
CRDC1519	Plant Biosecurity RD&E Strategy	PHA	Greg Fraser	1/07/14	30/06/15
CRC1109A	Postdoc: Ecology of <i>Helicoverpa punctigera</i> revisited: implications for Bt resistance	UNE	Kris Le Mottee	1/05/11	30/06/14
PHA1502	Provision of the independent technical, secretarial and operational services to the NWPPA 2014-15	PHA	Nicholas Woods	20/07/14	31/05/15
PHA1501	Review of the Industry Biosecurity Plan for the cotton industry	PHA	Rohan Burgess	7/07/14	30/06/15
DAQ1403	Silverleaf whitefly resistance monitoring 2013-2016	QDAF	Jamie Hopkinson	1/07/13	30/06/16
SC1301	Stewardship of biotechnologies (CottonInfo Technical Specialist)	Sally Ceeney	Sally Ceeney	1/07/12	30/06/15
UNE1301	Substitutes for pupae busting – commercial scale trials of moth busting	UNE	Peter Gregg	1/07/12	31/12/15
DAQ1201	Surveillance and monitoring for endemic and exotic virus diseases of cotton	QDAF	Murray Sharman	1/07/11	30/06/15
DAQ1405	Surveillance for exotic cotton viruses: Multiple targets in and nearby Australia	QDAF	Cherie Gambley	1/07/13	30/06/16
DAN1507	The sustainable chemical control and resistance management of aphids, mites and mirids in Australian cotton 2014-2019	NSW DPI	Grant Herron	1/07/14	30/06/19
UTS1301	Assessing climate change impacts and adaption options in the cotton industry	UTS	Qunying Luo	1/07/12	30/06/15

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APPENDIX 4: RD&E portfolio *(continued)*

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
Industry					
GRDC1301	Climate champion program	GRDC	Andrew Watson	26/03/13	8/12/14
UWS1301	Cotton industry adaptation to extreme weather and climate change	UWS	Brajesh K Singh	1/07/12	31/12/15
GU1401	Critical thresholds for riparian vegetation regeneration in the northern MDB	GriffithU	Samantha Capon	1/07/13	30/06/16
CRCP1401	Demonstration of novel evaporation mitigation technology in large scale trials	CRC Polymers	David Solomon	1/07/13	30/06/16
MQ1501	Developing the groundwater health index (GHI) as an industry-wide monitoring tool	MacquarieU	Grant Hose	1/07/14	30/06/17
CSE1501	Keeping pest populations lower for longer: Connecting farms and natural systems	CSIRO	Nancy Schellhorn	1/07/14	31/12/17
GRDC1401	Managing climate variability program	GRDC	Beverley Henry	1/07/13	30/06/16
GRDC1402	Agtrans Review	GRDC		1/06/15	30/06/15
CLW1301	Measuring deep drainage from a cotton/wheat trial	CSIRO	Anthony Ringrose-Voase	1/07/12	30/06/16
CRDC1501	National Cotton NRM Technical Specialist (CottonInfo Technical Specialist)	Stacey Vogel Consulting	Stacey Vogel	1/07/14	30/06/17
CSP1402	National Facility for Cotton Climate Change Research	CSIRO	Michael Bange	1/07/13	31/12/16
US1403	PhD: Effects of climatic fluctuation and landuse change on soil condition in the Lower Lachlan	USYD	Patrick Filippi	3/03/14	2/03/17
UNE1202	PhD: Next generation rural landscape governance: the Australian dimension	UNE	Tanya Howard	1/07/11	30/06/15
UNSW1403	PhD: Spatial & temporal importance of diffuse & stream recharge in semiarid environments – implications for integrated water management.	UNSW	Calvin Li	1/03/14	28/02/17

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
Industry					
UNE1406	PhD: Sustainable water extractions: Low flow refugia and critical flow thresholds	UNE	Marita Pearson	1/01/14	30/12/19
UNE1201	Positioning growers to take advantage of future ecosystem service markets	UNE	Rhiannon Smith	1/03/12	30/06/15
UNSW1401	Quantifying the uncertainty associated with predicting CSG production impacts	UNSW	Bryce Kelly	1/07/13	30/06/15
CRDC1502	Resilience assessment of the Australian cotton industry at multiple scales	Bel Tempo	Francesca Andreoni	1/07/14	31/12/16
DNRM1401	The impact of improved water use efficiency on paddock and catchment health	DNRM	Mark Silburn	1/07/13	30/06/16
UNE1503	Waterbirds in cotton landscapes: revisiting the Gwydir and Namoi	UNE	Adam Smith	1/07/14	30/06/15
Outcome 2: Industry program projects TOTAL					\$5,347,576

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APPENDIX 4: RD&E portfolio *(continued)*

CRDC No	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
Customers					
DAN1508	A review of emission methodologies for the Australian cotton industry & development of a detailed study for NW NSW	NSW DPI	Pip Brock	1/07/14	1/12/15
CMSE1402	Automated gin seed fingers – commercial application	CSIRO	Andrew Krajewski	1/07/13	30/06/15
CMSE1501	Determining the shelf life of round modules and impact on cotton quality	CSIRO	Menghe Miao	1/07/14	30/06/16
UQ1503	Enhancing and testing the Cotton Carbon Management Tool (CCMT)	UQ	Francois Visser	1/07/14	30/06/16
CMSE1503	Raising the quality of Australian cotton through post-harvest initiatives	CSIRO	Rene Van der Sluijs	1/07/14	30/06/17
TSW1401	Traceability of Australian cotton pilot study	TSW Analytical	Chris May	1/05/14	31/12/14
QTT1401	Cotton gin trash as a potential resource: re-assessing risk factors	QuickTest Technologies	Angus Crossan	1/11/13	31/12/14
DU1301	Design of thermal cotton/wool fabrics made from Australian fibre	DeakinU	Xungai Wang	1/07/12	30/06/15
DU1402	Ever-dry self-cooling cotton fabrics	DeakinU	Tong Lin	1/01/14	31/12/15
CMSE1201	Identifying the glass transition temperature behaviour of Australian cotton	CSIRO	Chantal Denham	1/07/11	31/12/15
CMSE1504	Measuring and managing fibre elongation for the Australian cotton industry	CSIRO	Shouren Yang	1/01/15	31/12/16
DU1501	Novel anti-wetting & self-sterilising cotton fabrics	DeakinU	Xin Liu, Yan Zhao	1/07/14	30/06/17
DU1502	Novel spinning technologies for fine and high-quality Australian cotton yarns	DeakinU	Xungai Wang	1/07/14	30/06/17
CMSE1308	PhD: Effects of cotton cellulose structure & interactions on dye uptake	CSIRO	Genevieve Crowle	1/07/12	30/06/16

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
Customers					
DAN1504	PhD: High value bio-extractives and bioethanol from cotton gin trash	NSW DPI	Mary Egbuta	1/07/14	31/08/17
DU1401	PhD: Improving length, strength and fineness of cotton fibre	DeakinU	Rangam Rajkhowa	1/07/13	30/06/16
CMSE1403	PhD: Low wax Australian Cotton – reducing the scouring requirements of cotton fabric	CSIRO	Katherine Birrer	1/04/14	31/03/17
CMSE1502	The contribution of cotton cellulose crystallites to fibre strength	CSIRO	Stuart Gordon	1/07/14	30/06/16
CMFG1501	Supply Chain Optimisation including traceability	CSIRO	Simon Dunstall	10/06/15	31/12/15
CRDC1532	Industry engagement role for supply chain optimisation study	Tracey Byrne-Morrison	Tracey Byrne-Morrison	26/06/15	30/09/15
QUT1502	Cotton Rapid Customisation Feasibility Study	QUT	Jared Donovan	26/06/15	31/03/16
Outcome 3: Customers program projects TOTAL					\$2,292,204

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APPENDIX 4: RD&E portfolio *(continued)*

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
People					
CA1503	Co-investment in PIEF membership for the cotton industry 2014-15	CA/PIEF	Adam Kay	1/07/13	30/06/16
CMSE1307	Cotton ginning training program	CSIRO	Rene Van der Sluijs	1/07/12	30/06/15
US1401	Cotton industry injury and safety profile	USYD	Tony Lower	1/11/13	31/10/14
RIR1401	Cotton Industry Leadership Development Strategy	ARLF	Lesley Fitzpatrick	1/07/13	30/06/16
UT1301	Cotton Industry Young Professionals Program	PICSE	David Russell	1/01/13	31/12/14
USQ1501	Cotton Industry Young Professionals Program	USQ	Kay Lembo	1/01/15	31/12/15
UNE1302	Cotton Production Course	UNE	Brendan Griffiths	1/07/12	30/06/15
GSA1501	Cotton Professional Personnel Program	Gordon Stone and Associates	Gordon Stone	4/11/14	30/04/15
CSE1305	Developing education capacity in the Australia cotton industry (CottonInfo Technical Specialist)	CSIRO	Trudy Staines	1/07/12	30/06/15
CRDC1507	Field to Fabric scholarship: Ben Dawson	CSIRO	Ben Dawson	29/07/14	1/10/14
CRDC1504	Field to Fabric scholarship: Daniel Kahl	CSIRO	Daniel Kahl	29/07/14	1/10/14
CRDC1506	Field to Fabric scholarship: Jason Seigmeier	CSIRO	Jason Seigmeier	29/07/14	1/10/14
CRDC1503	Field to Fabric scholarship: Lyndon Mulligan	CSIRO	Lyndon Mulligan	29/07/14	1/10/14
RIRDC1201	Horizon Scholarship 2012: Kirsty McCormack and Billy Browning	RIRDC	Kirsty McCormack and Billy Browning	1/01/12	31/12/15

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
People					
RIRDC1305	Horizon Scholarship 2013: Alana Johnson	RIRDC	Alana Johnson	30/04/13	31/12/15
RIRDC1303	Horizon Scholarship 2013: Charlie French	RIRDC	Charlie French	30/04/13	31/12/15
RIRDC1306	Horizon Scholarship 2013: Emily Miller	RIRDC	Emily Miller	30/04/13	31/12/15
RIRDC1302	Horizon Scholarship 2013: Jessica Kirkpatrick	RIRDC	Jessica Kirkpatrick	30/04/13	31/12/16
RIRDC1304	Horizon Scholarship 2013: Paul Sanderson	RIRDC	Paul Sanderson	30/04/13	31/12/16
RIRDC1404	Horizon Scholarship 2014: Alana Martin	RIRDC	Alana Martin	31/03/14	31/12/17
RIRDC1401	Horizon Scholarship 2014: Felicity Taylor	RIRDC	Felicity Taylor	31/03/14	31/12/17
RIRDC1402	Horizon Scholarship 2014: Grace Scott	RIRDC	Grace Scott	31/03/14	31/12/17
RIRDC1405	Horizon Scholarship 2014: Michael Wellington	RIRDC	Michael Wellington	31/03/14	31/12/17
RIRDC1403	Horizon Scholarship 2014: Sam Johnston	RIRDC	Sam Johnston	31/03/14	31/12/17
RIRDC1504	Horizon Scholarship 2015: Camilla a'Beckett	RIRDC	Camilla a'Beckett	31/03/15	31/12/18
RIRDC1503	Horizon Scholarship 2015: Scott Nevison	RIRDC	Scott Nevison	31/03/15	31/12/18
UM1201	Innovative work: Cotton workforce development for sustained competitive advantage	UMelb	Ruth Nettle	1/02/12	31/12/14
US1201	Managing cotton farm safety review and update	USYD	Tony Lower	1/07/11	30/05/15
CRDC1516	Nuffield Scholarship 2015: Tom Quigley	Nuffield Australia	Jim Geltch	1/10/14	30/09/16
DA1502	People on farm – employment starter kit (ESKi)	Dairy Australia	Shane Hellwege	1/07/14	30/06/17

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APPENDIX 4: RD&E portfolio *(continued)*

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
People					
PCT1501	Peter Cullen Trust: Science to Policy Leadership Program 2014 – Jane Trindall & Luke Stower	Peter Cullen Trust	Sandy Hinson	1/07/14	30/06/15
USQ1401	PhD: Career motivational factors of cotton growers (attraction and retention)	USQ	Geraldine Wunsch	1/07/13	31/12/16
USQ1403	PhD: Investigating cotton farm workers' experiences of job satisfaction using social cognitive career theory	USQ	Nicole McDonald	28/01/14	27/01/17
CRDC1515	Project management and extension management tasks	Warrenbri Farming Partnership	Sally Knight	1/07/14	30/06/15
ABA1501	Science & Innovation Awards for Young People 2015	Dept of Ag	ABARES	1/07/14	30/06/16
UNE1402	Skills profile and labour supply structure on cotton farms	UNE	Bernice Kotey	1/07/13	29/08/17
US1501	Smart technology for best practice Work Health & Safety by cotton growers	USYD	Tony Lower	1/07/14	31/08/15
CRDC1512	Sponsorship: Wagga Agricultural Club Industry Dinner	Wagga Agricultural Club	Jessica Kirkpatrick	20/8/14	19/9/14
US1504	Summer/Honours Scholarship: Benefits of plastic clad cotton	USYD	Elizabeth Shakeshaft	1/11/14	30/11/15
GU1501	Summer/Honours Scholarship: Farm-scale factors influencing riparian plant recruitment	GriffithU	Peta Zivec	1/12/14	1/03/15
UNE1504	Summer/Honours Scholarship: Investigation of soil properties that have changed root soil profile exploration in cotton	UNE	Fanny Des Escotais	1/01/15	30/11/15

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
People					
DAN1509	Summer/Honours Scholarship: Morphology and pathogenicity assays of selected <i>Thielaviopsis basicola</i> isolates	NSW DPI	Joanna Nielson	1/12/14	30/03/15
CSE1502	Summer/Honours Scholarship: Resistance genes in <i>Helicoverpa armigera</i> from Northern Australia	CSIRO	Jaeun Ryu	24/11/14	30/01/15
US1502	Summer/Honours Scholarship: Testing for a 'critical exposure period' for developing tolerance to Bt toxin	USYD	Sharna Holman	1/12/14	26/01/15
NEC1502	Summer/Honours Scholarship: Using the Green & Ampt Infiltration model on cracking clay soils with CP&LM sprinklers	NCEA	Simon Kelderman	2/03/15	13/11/15
US1503	Summer/Honours Scholarship: Water use efficiency, economics, yield and quality of cotton in wide (1.5m) and conventional (1m) row spacing in Warren NSW	USYD	Timothy Bartimote	21/11/14	30/04/15
UM1501	The impact of farm workforce turnover in the cotton sector	UMelb	Geoff Kuehne/ Ruth Nettle	1/07/14	31/12/15
CRDC1530	Workforce Development Strategy	AFSS	Ross Ord	11/05/15	13/07/15
CRDC1520	AACS 2015 Australian Cotton Researcher Conference	AACS	Paul Grundy	30/01/15	31/10/15
CCR1201	CCRSPI	RIRDC	Heather Hemphill	1/07/13	30/06/16
RIRDC1301	Collaborative Partnership Primary Industries Health & Safety	Joint Partnership RIRDC	Simon Winter	28/8/12	30/6/17

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APPENDIX 4: RD&E portfolio *(continued)*

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
People					
CA1401	Cotton Conference: Foundation Sponsorship	CA		1/07/14	30/06/15
CA1501	Cotton Conference: Next Gen in Cotton Forum	CRDC		1/8/14	31/8/14
CRDC1509	Cotton Conference: Student travel to Cotton Conference	CRDC		1/8/14	31/8/14
CGA1506	CRDC Grassroots Grant: Addressing the burning questions – giving growers the info they're asking for	Macquarie Valley CGA	Amanda Thomas	15/10/14	30/06/15
CGA1502	CRDC Grassroots Grant: Building the capacity of teachers via the Field to Fabric Course	Dawson Valley CGA	Bronwyn Christensen	22/09/14	24/09/14
CGA1508	CRDC Grassroots Grant: Cotton nutrition workshop	Southern Valley CGA	Tom Cowlrick	3/11/14	30/06/15
CGA1501	CRDC Grassroots Grant: Cotton planter development	Lower Namoi CGA	Geoff Hunter	31/07/14	31/03/15
CGA1507	CRDC Grassroots Grant: Education and development of the cotton industry	Menindee & Lower Darling CGA	Emma Ayliffe	1/12/14	31/12/15
CGA1503	CRDC Grassroots Grant: Emerald Irrigation Area Weather Station Network	Central Highlands CG&IA	Emma McCullagh	7/05/14	7/05/15
CGA1505	CRDC Grassroots Grant: Grower investigation of tools to manage soil compaction in irrigated cotton soils in the Gwydir Valley	Gwydir Valley CGA	Lou Gall	1/07/14	30/06/15

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
People					
CGA1509	CRDC Grassroots Grant: Upgrade to local weather station network and Darling Downs grower of the year field day	Darling Downs CGA	Mary O'Brien	1/01/15	30/06/15
SH1201	CRDC Grassroots Grants – Management	Fundbase	Sally Hunter	1/7/14	15/5/15
CRDC1527	CRDC procurement engagement process	Barnett Consultancy	Paul Barnett	23/03/15	26/05/15
IREC1501	IREC Field Station Upgrade (jointly funded with CSD)	IREC	Rob Houghton	1/07/14	30/06/17
RIRDC1501	Rural Womens' Award National Dinner Sponsorship 2014	RIRDC	Margo Andrae	12/8/14	24/9/14
RIRDC1505	Rural Womens' Award National Dinner Sponsorship 2015	RIRDC	Craig Burns	1/05/15	9/09/15
DAFF1401	National Soil RD&E Implementation Committee membership and contributions Soils cross-sectoral strategy	Dept of Ag		1/06/14	30/06/17
RIRDC1502	Sponsorship: Horizon Future Leaders Program	RIRDC	Nigel Burnett	1/11/14	30/11/14
CRDC1510	Travel: 19th Australasian Weeds Conference, Hobart	AGDel	Annabelle Guest	31/8/14	5/9/14
DAN1511	Travel: 20th ISTRO Conference 2015, China	NSW DPI	Gunasekhar Nachimuthu	1/06/15	4/11/15
CSP1502	Travel: Attendance at 'Grand Challenges Great Solutions Conference' and SE in the USA	CSIRO	Rose Brodrick	31/10/14	28/11/14
CSP1503	Travel: Attendance at 'Grand Challenges Great Solutions Conference' and SE in the USA	CSIRO	Onoriode Coast	31/10/14	28/11/14
CLW1502	Travel: Bt Technical Panel Meeting	CSIRO	Tom Walsh Tek Tay	9/03/15	12/03/15
CRDC1522	Travel: Collaborative research with USDA and Plant Biology 2015 meeting	ANU	Robert Sharwood	13/02/15	10/09/15

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APPENDIX 4: RD&E portfolio *(continued)*

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
People					
CSP1505	Travel: College Station Texas to meet with Gaylon Morgan, USA	CSIRO	Michael Bange	1/05/15	31/07/15
UNE1506	Travel: ECSEE 2015, UK	UNE	Tanya Howard	1/06/15	24/08/15
DA1501	Water use in agriculture strategy	DA	Catherine Phelps	1/07/14	30/06/15
UWS1501	Workshop: Harnessing rhizosphere-soil-microbial interactions	UWS	Brajesh Singh	1/06/15	24/11/15
DAQ1302	Australian cotton production and best practice documentaries	QDAF	Paul Grundy	1/07/13	30/06/16
DAN1302	Building the cotton industry knowledge hub (CottonInfo Technical Specialist)	NSW DPI	David Larsen	1/07/12	30/09/15
CRDC1523	CCA 2013 survey design	Weemalah Writeability	Elizabeth Tout	9/10/14	15/03/15
CRDC1517	CottonInfo communications support	Meg Strang	Meg Strang	1/09/14	30/06/15
CRDC1528	CRDC 2014-15 Annual Report	Carolyn Martin	Carolyn Martin	28/04/15	30/11/15
CRDC1518	Industry database management	Making Data Easy	Lee Armson	15/10/14	31/7/15
DAN1304	Spatial technologies and best practice in Australian cotton production (CottonInfo Technical Specialist)	NSW DPI	Peter Verwey	1/07/12	30/06/15
UNE1507	RINPAS	UNE	David Miron	1/05/15	31/12/15
WIN1501	Regional Leadership Workshops: Resilience - Confidence - Leadership from Emerald to Griffith	Wincott	Alison Benn	1/05/15	30/06/15
Outcome 4: People program projects TOTAL					\$2,176,434

CRDC No.	Project Title	Research Organisation	Principal Researcher	Start Date	Cease Date
Performance					
CSP1504	'Science into best practice', linking research with CottonInfo	CSIRO	Sandra Williams	1/07/14	30/06/17
RRR1402	myBMP lead certification	Roth Rural and Regional Pty Ltd	Guy Roth	1/07/13	30/06/15
CRDC1428	Review of the content in and between the myBMP modules	Rachel Holloway	Rachel Holloway	11/06/14	8/08/14
RRR1501	Annual Cotton Grower Practices Surveys: 2014, 2015 & 2016	Roth Rural and Regional Pty Ltd	Ingrid Roth	1/07/14	31/05/17
CCA1201	Annual qualitative & quantitative surveys for the Australian cotton industry	CCA	Fiona Anderson	1/07/12	30/06/15
BCA1501	2014-15 Cotton Comparative Analysis	BCA	Phil Achin	17/06/15	30/06/16
CRDC1511	CottonInfo monitoring and evaluation support system	Coutts J&R Pty Ltd	Jeff Coutts	1/07/14	30/06/15
RRR1403	Integrated economic environmental & social performance reporting of cotton industry	Roth Rural and Regional Pty Ltd	Guy Roth	1/07/13	30/06/16
CRDC1427	Cotton Futures engagement process	Paul Barnett	Paul Barnett	26/06/14	29/08/14
CRDC1420	Potential for growth in the Australian cotton industry: desktop study	Eco Logical Australia	Roland Breckwoldt	14/04/14	30/06/14
CRDC1513	Procurement process review	ACIL Allen Pty Ltd	JP van Moort	21/8/14	30/9/14
CRDC1531	Update the Cotton Innovation Network's research pathways investment analysis	ACIL Allen Pty Ltd	JP van Moort	19/6/15	14/8/15
Outcome 5: Performance program projects TOTAL					\$515,237
CRDC TOTAL RD&E INVESTMENT					\$19,243,840

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APPENDIX 5: Glossary and acronyms

AACS	Australian Association Cotton Scientists	Bt	<i>Bacillus thuringiensis</i> (crystal protein gene expressed in Bollgard II® and Bollgard 3® cotton varieties, resistant to <i>Helicoverpa</i> spp.)
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences	C	carbon
ACIC	Australian Cotton Industry Council	CA	Cotton Australia
ACRI	Australian Cotton Research Institute	CBTV	Cotton Bunchy Top Virus
ACSA	Australian Cotton Shippers Association	CCA	Crop Consultants Australia Inc.
AECL	Australian Egg Corporation Limited	CCMT	Crop Carbon Management Tool
AES	Aboriginal Employment Strategy	CCRSPI	National Climate Change Research Strategy for Primary Industries
AFI	Australian Farm Institute	CDI	Corporate Development Institute
AFM	atomic force microscopy	CGA	Cotton Grower Association
AFSS	AgriFood Skill Solutions	CGT	Cotton Gin Trash
AgSOC	Agriculture Senior Officials Committee	CMSE	CSIRO Materials Science and Engineering
AGWA	Australian Grape and Wine Authority	Corporation, the	Cotton Research and Development Corporation
ai/ha	active ingredient per hectare	Cotton CRC	Cotton Catchment Communities Cooperative Research Centre
ALS	Australian Long Staple cotton	CottonInfo team	Team of Regional Development Officers, technical specialists and myBMP specialists, formed under a joint venture between CRDC, Cotton Australia and CSD.
AMPC	Australian Meat Processing Council Limited	CottonLEADS	Australian and United States program to lead responsible cotton production sustainably.
ANU	Australian National University	CQ	Central Queensland
APL	Australian Pork Limited	CRC	Cooperative Research Centre
App	Application program available from smart devices such as mobiles	CRC Polymers	Cooperative Research Centre for Polymers
APVMA	Australian Pesticides and Veterinary Medicines Authority	CRDC	Cotton Research and Development Corporation
ARLF	Australian Rural Leadership Foundation	CRRDC	Council of Rural Research and Development Corporations
ARLP	Australian Rural Leadership Program	CSD	Cotton Seed Distributors Ltd (a grower-owned cooperative)
AUSAgLCI	Australian Agriculture Life Cycle Inventory		
AVG	aminoethoxyvinylglycine		
AWI	Australian Wool Innovation Limited		
BCA	Boyce Chartered Accountants		
BIPL	Blast Industry Pty Ltd		
BMP	Best Management Practices program		
Bollgard II®	Cotton varieties contain two genes resistant to <i>Helicoverpa</i> spp.		
Bollgard 3®	Cotton varieties contain three genes resistant to <i>Helicoverpa</i> spp.		

CSIRO	Commonwealth Scientific and Industrial Research Organisation	<i>Helicoverpa</i> spp.	Cotton's major insect pests (<i>H. armigera</i> and <i>H. punctigera</i>)
DA	Dairy Australia Limited	HIA	Horticulture Innovation Australia
DeakinU	Deakin University	HRMS	Herbicide Resistance Management Strategy
Dept of Ag	Commonwealth Department of Agriculture	HVI	High Volume Instrument
DEDJTR	Department of Economic Development, Jobs, Transport and Resources (Victoria)	ICT	Information and Communications Technology
DMA	dynamic mechanical analysis	IDM	Integrated Disease Management
DNRM	Department of Natural Resources and Mines (Queensland)	IP	Intellectual Property
DSC	differential scanning calorimeter	IPM	Integrated Pest Management
ELS	Extra Long Staple	IREC	Irrigation Research and Extension Committee
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>	IRMS	Insecticide Resistance Management Strategy
EPI	Environmental Performance Indicator	IT	Information Technology
ESD	Ecologically Sustainable Development	IWM	Integrated Weed Management
F1	F1 screens involve testing the offspring of single-pair matings between moths from Cry2Ab resistant strains maintained in the laboratory (SP15 for <i>H. armigera</i> and Hp4-13 for <i>H. punctigera</i>) and moths raised from eggs collected from field populations	K	potassium
FRDC	Fisheries Research and Development Corporation	KPI	Key Performance Indicator (measure of success)
FWPA	Forest and Wood Products Australia Limited	LCA	Life Cycle Assessment
g/ha.	grams per hectare	Livecorp	Australian Livestock Export Corporation Limited
GIS	Geographic Information System	M&E	Monitoring and Evaluation
GM	Genetically Modified	MacquarieU	Macquarie University
GPWUifarm	Gross Production Water Use Index farm	MCF	Mill Correction Factor
GRDC	Grains Research and Development Corporation	MDB	Murray-Darling Basin
GriffithU	Griffith University	ML	megalitre
GVIA	Gwydir Valley Irrigators Association	MLA	Meat and Livestock Australia
ha	hectare	MP	Member of Parliament
		myBMP	Best Management Practices Program
		N	nitrogen
		NAQS	Northern Australia Quarantine Strategy
		NCEA	National Centre for Engineering in Agriculture
		NFF	National Farmers' Federation

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APPENDIX 5: Glossary and acronyms

NPIRDEF	National Primary Industries RD&E Framework	QLD	Queensland
NPSI	National Program for Sustainable Irrigation	QTT	Quick Test Technology
NQ	North Queensland	QUT	Queensland University of Technology
NRM	Natural Resource Management	R&D	Research and Development
NSW	New South Wales	RD&E	Research, Development and Extension
NSW DPI	NSW Department of Primary Industries	RDC	Rural Research and Development Corporation
NWPPA	National Working Party of Pesticide Application	RDO	Regional Development Officers
NZ	New Zealand	RH	relative humidity
P	phosphorus	RIC	Research and Innovation Committee
PBS	Portfolio Budget Statements	RINPAS	Research & Innovation Network for Precision Agriculture Systems
PGPA Act	<i>Public Governance, Performance and Accountability Act 2013</i>	RIRDC	Rural Industries Research and Development Corporation
PHA	Plant Health Australia	RMP	Resistance Management Plan
PhD	Post Doctorate	RRDP	Rural Research and Development Priorities
PIB	Peak Industry Body	RRDP grants	Rural Research and Development for Profit grants
PICSE	National Primary Industry Centre for Science Education	RRR	Roth Rural and Regional Pty Ltd
PIEF	Primary Industries Education Foundation	S	sulphur
PIHSP	Primary Industries Health and Safety Partnership	SLW	silverleaf whitefly
Pima cotton	<i>Gossypium barbadense</i> . Related to Egyptian cotton, having extra long and fine staples. Limited Australian production.	spp.	species
PIRD Act	<i>Primary Industries Research and Development Act 1989</i>	SRP	Strategic Research Priorities
PISC	Primary Industries Standing Committee	SRA	Sugar Research Australia
Plant Biosecurity CRC	Plant Biosecurity Cooperative Research Centre	Tg	glass transition
QAAFI	Queensland Alliance for Agricultural and Food Innovation	TIMS	Transgenic and Insect Management Strategy Committee
QDAF	Queensland Department of Agriculture and Fisheries	TRAIL	Training Rural Australians in Leadership
		TSW	TSW Analytical
		UA	University of Adelaide
		UMelb	University of Melbourne
		UNCGA AgVance	Upper Namoi Cotton Growers Association and AgVance
		UNE	University of New England
		UNSW	University of New South Wales

Upland cotton	<i>Gossypium hirsutum</i> . Comprises the vast majority of the Australian cotton crop, with Pima cotton comprising the remainder
UQ	University of Queensland
USDA	United States Department of Agriculture
USQ	University of Southern Queensland
USYD	University of Sydney
UTS	University of Technology, Sydney
UWA	University of Western Australia
UWS	University of Western Sydney
VCG	Vegetative Compatibility Group
VIC	Victoria
WHS	Workplace Health and Safety
Wincott	Women's Industry Network – Cotton
WUE	Water use efficiency
Zn	zinc

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APPENDIX 6: Annual reporting requirements

CRDC prepared this Annual Report in accordance with the *Public Governance, Performance and Accountability Act 2013* section 46, *Funding Agreement 2015-2019* extract from sections 11.8, 11.9 and 11.10.

Additional information beyond the requirements of the PGPA Act required to meet the requirements of the Funding Agreement were provided to the Commonwealth separately by the CRDC.

This Annual Report includes the following items in respect to 2014-2015:

- a report on CRDC's contribution to the implementation of relevant Industry sector and cross-sectoral strategies under the RD&E Framework;
- the rationale for the mix of projects included in the Balanced Portfolio;
- a report on CRDC's research extension activities;
- collaboration with Industry and other research providers;
- sources of income allowing for separate identification of Research and Development Payments, Commonwealth Matching Payments and any other forms of income and, if applicable Marketing Payments and Voluntary Contributions;
- the full cost of the Research and Development and Marketing programs, with costs being allocated in accordance with the Cost Allocation Policy;
- progress made in implementing R&D Plans, including progress against key performance indicators and the achievement of key deliverables and associated outcomes specified in the plans;
- an assessment of the efficiency and effectiveness of CRDC's investments;
- progress in implementing the Guidelines;
- consultation with the corporation's Representative Organisation on its R&D and Annual Operational Plans, Research and Development and extension Activities and Marketing Activities; and
- other relevant matters notified to CRDC by the Commonwealth.

'*Annual Report*' means a report prepared by the Directors of CRDC in accordance with section 46 of the Public Governance, Performance and Accountability Act 2013, section 28 of the *Primary Industries Research and Development Act 1989* and clause 11.8 to 11.10 of the Funding Agreement 2015-19.

'*Balanced Portfolio*' means a Research and Development investment portfolio incorporating issues of critical national importance based on government and Levy Payer priorities and balancing long-term, short-term, high and low risk, and strategic and adaptive research needs and includes consideration of regional variations and needs.

CRDC prepared this Annual Report in accordance with the *Primary Industries Research and Development (PIRD) Act 1989*.

- (a) This Annual Report includes the following particulars as instructed by directors during 2014-15:**
- (i) the R&D activities that it co-ordinated or funded, wholly or partly, during the period; and
 - (ia) if a levy attached to the Corporation had a marketing component during the period—the marketing activities that it coordinated or funded, wholly or partly, during the period; and
 - (ii) the amount that it spent during the period in relation to each of those activities; and
 - (iib) the impact of those activities on the primary industry or class of primary industries in respect of which the Corporation was established; and
 - (iii) revisions of its R&D plan approved by the Minister during the period; and
 - (iv) the entering into of agreements under sections 13 and 14 during the period and its activities during the period in relation to agreements entered into under that section during or prior to the period; and
 - (v) its activities during the period in relation to applying for patents for inventions, commercially exploiting patented inventions and granting licences under patented inventions; and
 - (vi) the activities of any companies in which the Corporation has an interest; and
 - (vii) any activities relating to the formation of a company; and
 - (viii) significant acquisitions and dispositions of real property by it during the period; and
- (b) an assessment of the extent to which its operations during the period have:**
- (i) achieved its objectives as stated in its R&D plan; and
 - (ii) implemented the annual operational plan applicable to the period; and
- (c) an assessment of the extent to which the Corporation has, during the period, contributed to the attainment of the objects of this Act as set out in section 3; and**
- (d) in respect of the grain industry or such other primary industry or class of primary industries as is prescribed in the regulations, particulars of sources and expenditure of funds, including:**
- (i) commodity, cross commodity and regional classifications; and
 - (ii) funds derived from transfer of assets, debts, liabilities and obligations under section 144.
- (e) Accountability to representative organisations.**
- CRDC provides representative organisations a copy of the CRDC Annual Report as soon as practicable after the Corporation's annual report has been submitted to the Minister and tabled in Parliament.

APPENDICES

APPENDIX 6: Annual reporting requirements

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Standards of presentation	all pages
Constructed in the interests of users.....	all pages
Freedom from ambiguity and jargon.....	all pages
Appropriate tables, graphs etc.....	all pages
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Entering into of patents	nil
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NOTES



Cotton picking at Auscott, Narrabri. Photo courtesy Ruth Redfern.



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