Australian Government
Cotton Research and Development Corporation

Annual Operational Plan 2015–16

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Responsible Minister

The Hon. Barnaby Joyce MP, Minister for Agriculture

CRDC Board

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Vice Chair	Cleave Rogan
Executive Director	Bruce Finney
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Accountant	Emily Luff
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Executive Assistant	Dianne Purcell
Trainee Accountant	Elizabeth Eather

About CRDC

CRDC was established in 1990 and operates under the Primary Industries Research and Development (PIRD) Act 1989. This Act outlines the accountability of CRDC to the Australian Government and to the cotton industry, through Cotton Australia. CRDC is regionally based in Narrabri, NSW, at the centre of one of Australia's major cotton growing regions.

CRDC's purpose is to enhance the performance of the Australian cotton industry and community through investing in research and development, and its application. Cotton is the major agricultural crop grown in many rural and remote regions of QLD and NSW. It is a major employer and contributor to the local, state and national economy with annual exports currently worth in excess of $2 billion.

CRDC invests in cotton research, development and extension (RD&E) on behalf of Australian cotton growers and the Australian Government. In 2015–16, CRDC will invest $20.6 million into cotton R&D projects and will actively disseminate this research to growers through a range of mechanisms, including the industry's joint extension program, CottonInfo, which was established as a joint venture between CRDC, Cotton Seed Distributors and Cotton Australia in 2012.

CRDC will also fund and coordinate the development of technical and non-technical documents, guides and other information tools, workshops, seminars and field days for a range of purposes including research review and progression, information sharing or technology transfer to industry. CRDC acts as a formal and informal information source for stakeholders and client groups (facilitated by its location in a major cotton growing centre), through general industry media activities and the Corporation's website: www.crdc.com.au.

VISION	A globally competitive and responsible cotton industry
MISSION	To invest in RD&E for the world-leading Australian cotton industry
PLANNED OUTCOME	Adoption of innovation that leads to increased productivity, competitiveness and environmental sustainability through investment and development that benefits the Australian cotton industry and the wider community.

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Photo: NCEA

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Introduction

In 2015–16, CRDC will invest $20.6 million in RD&E in alignment with the priorities established under its five-year Strategic Research and Development (R&D) Plan 2013–2018. This will be the third year of operation under the strategy and follows a year of below average cotton production and revenue due to dry seasonal conditions. These circumstances have necessitated a reduction in R&D investment and use of financial reserves which were accumulated for the purpose of sustaining the cotton industry RD&E during drought.

These circumstances are clear reminders as to why CRDC is strategically focused on future proofing the industry against challenges to profitability, competitiveness and sustainability. In doing so, CRDC's five-year strategy ambitiously seeks R&D outcomes that can transform both the resilience and prosperity of the Australian cotton industry. We do this without losing sight of the fundamental importance of investing in the capacity of the Australian cotton industry to innovate, adapt and adopt the results of R&D.

More broadly, CRDC's strategy is based on connecting insights about changes in societal expectations and consumer demands with the evolving cotton sector issues, and identifies the critical importance of responding with better knowledge sharing and even stronger relationships between cotton farmers, the wider industry and the end cotton consumer.

CRDC's R&D investment is focused on five core programs: farmers, industry, customers, people and performance.

Our investment in research to benefit growers focuses on protecting the crop from pests as well as enhancing crop management for quality and yield outcomes.

Australian cotton farmers achieve exceptionally high yields - nearly three times the world average - but do so within an environment of rising input costs impacting on profitability. Farmers have relied upon annual productivity gains from improved varieties and management but the potential for ongoing gains is at risk as yields approach current genetic yield limits for cotton – hence CRDC's focus. Our strategy also places an emphasis on driving optimal resource efficiency, and in the next year, will be testing the feasibility of innovations to transform the future profitability of cotton production.

On an industry level, nationally, the Australian cotton industry generates significant wealth, with exports in excess of $2 billion annually. It also provides an economic foundation to many regional and remote economies with employment of up to 14,000 people. Despite this, the industry faces ongoing challenges from competition for land, water and labour, climate variability, a reliance on key technologies and, like all industries, is subject to a growing social and environmental awareness and scrutiny.

These challenges are equally opportunities for the Australian cotton industry given its acceptance of responsibilities for improved environmental performance and demonstrated capacity to act collectively. In response, the CRDC is investing in industry's biosecurity preparedness, stewardship of key production technologies and the responsible management of natural resources.

Photo: Ruth Redfern

The CRDC's strategy places an emphasis on landscape-scale management approaches and recognition of the inter-relationships with other industries. The strategy includes a commitment to proactively developing an understanding of emerging social and environmental issues, including changes in technology, so that the Australian cotton industry can be a global leader in sustainable agriculture into the future. Evidence of this being delivered was the development of the industry's first ever sustainability report last year, and a new research commitment to a landmark study of industry resilience in the coming year.

CRDC also invests in supply chain and customer research, and, as a result of our past contribution to this area, the industry has a greater understanding of the needs of customers in the markets for Australian cotton, and the value of our products. This knowledge has informed a new industry-led marketing initiative that seeks to secure access to preferred markets and increase demand along the supply chain for Australian cotton. This comes at a time when, globally, cotton's ongoing competitiveness as a fibre is subject to challenges from man-made fibres and the Australian cotton industry is critically exposed as one of the top five cotton exporters in the world.

In response, the CRDC is investing in research to better inform customers of the qualities of Australian cotton and differentiate the value of its products. The CRDC's strategy places an emphasis on ensuring customers can be assured of the fibre quality, sustainable practices and impact of Australian cotton production. The strategy includes a commitment to instigating R&D that can prepare industry for market changes, transform consumer demand and enable the Australian cotton industry to capture the full value if its products into the future.

Finally, CRDC will continue to invest in the capacity and capability of people and the adoption of research through a unique joint venture – a cotton industry collaboration - in extension; CottonInfo. In addition, our strategy places a greater emphasis on providing knowledge to underpin the development of an industry workforce strategy and includes a new commitment to measuring the performance of the industry and its RD&E to inform continuous improvement.

We recognise the importance of responding to stakeholder and corporate requirements for improvement to the efficiency and effectiveness of operations, and in doing so, CRDC is actively engaged with the national rural R&D effort to ensure its investments and activities are aligned and synergistic. CRDC's culture for collaboration is evident in the success of five project applications in combination with rural RDCs to the Australian Government's Rural R&D for Profit program.

Industry outlook

Following four consecutive above-average cotton crops, cotton production fell in 2014-15 due to a return to dry conditions and a resulting lack of water availability. Cotton production in 2014-15 is forecast by industry to reach 2.3 million bales (227kg) – down from the 3.9 million bales achieved the year prior.

Similarly, the outlook for 2015-16 is for a continuation of less favourable seasonal conditions and below average availability of irrigation water. Hence the forward estimates by the industry and ABARES are for a further reduction in cotton production levels in 2015-16.

Financial Outlook 2015-16

CRDC has adopted forecasts for lower levels of cotton production as a key parameter in forming its future financial budgets. As a result, CRDC is budgeting for lower levels of revenue and the use of financial reserves to sustain the commitment to increased investment in research activities under the five-year Strategic R&D Plan 2013–2018.

CRDC has budgeted for revenue of $10.86 million in 2015-16 and expenditure of $20.58 million, providing for a net loss of $9.72 million funded from reserves. With this loss the reserves will decrease to $30.82 million at 30 June 2016. Wherever possible, CRDC will aim to use its reserves to maintain research investment at a consistent level despite years where crop levels are below average due to climatic conditions. The use of CRDC's reserves complies with the organisation's Financial Reserves Policy which ensures the organisation maintains sufficient financial reserves to ensure the efficient and effective performance of its business, the achievement of its strategic R&D outcomes and capacity to meet its fiduciary responsibilities.

The current budget does not account for the 6 May 2015 announcement of CRDC's successful Smarter Irrigation for Profit project application to the Australian Government's Rural R&D for Profit program. The project was awarded additional funding of $4.0 million over four years commencing in 2014-15.

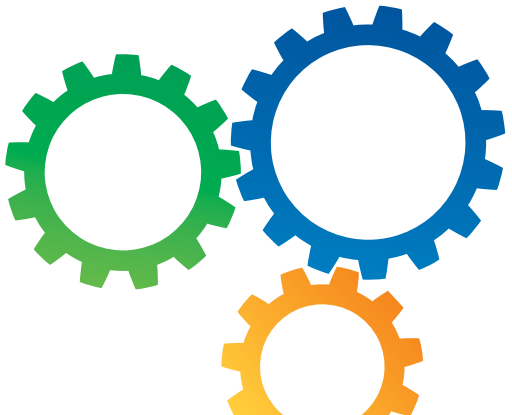
Revenue Sources

CRDC's revenue is drawn from two main sources:

1. 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 which separates the cotton lint from the seed. This occurs from March to September of each calendar year, so cotton levy revenue in any financial year is drawn from two consecutive cotton crops.
2. The Australian Government matches expenditure of levies on eligible R&D, capped at 0.5 per cent of the three year average gross value of production or the cumulative levy receipts, whichever is the lesser. The setting and collection of the industry levy is enabled by the *Primary Industries Levies and Charges Collection Act 1991* and the *Primary Industries (Excise) Levies Act 1999*.

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

Royalties from the sale of domestic and international planting seed, interest on investments, external grant revenue and research project refunds make up the balance of Corporation income.



Governance

CRDC is managed by a Board consisting of up to nine Directors. The Chair and five to seven non-executive directors are appointed by the Minister for Agriculture. The Executive Director is appointed by the Board. The CRDC Board sets the Corporation's strategic direction and delegates responsibility of day-to-day management to the Executive Director.

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

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

The Board's functions include:

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

Remuneration of Directors

The Chairperson and Non-Executive Directors are remunerated under the PIRD Act 1989 in accordance with such remuneration as is determined by the Remuneration Tribunal established under the Remuneration Tribunal Act 1973. The Remuneration Tribunal reviews and releases a determination each financial year under the "Remuneration and Allowances for Holders of Part-Time Public Office" determination in Schedule C, Table C1A Primary Industry Authorities.

Under the PIRD Act 1989, the Executive Director's remuneration is determined by the Board through the recommendation of the Remuneration Committee. The total budgeted remuneration for all Directors in 2015-16, including superannuation, is $452,045. CRDC committee members consist of directors and one external member for the Audit Committee.

Photo: Ruth Redfern

Photo: Ruth Redfern

Payment to representative bodies

The Corporation's industry representative body in 2015-16 is Cotton Australia. The role of the industry representative body involves:

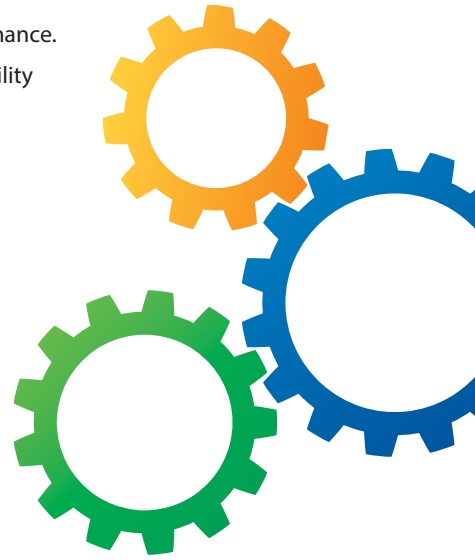
- Participation in the development and review of the five-year Strategic R&D Plan. This ensures CRDC's strategic planning continues to address evolving industry R&D needs.
- A meeting to receive and discuss the CRDC Annual Report for the preceding year. This enables the industry representative body to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

While CRDC does not pay a fee for service to the industry representative body it may fund discrete R&D projects and contribute to the expenses incurred as authorised under the PIRD Act. In 2015-16, CRDC has budgeted to pay Cotton Australia $17,000 for the direct meeting costs incurred in consultation activities involving its R&D advisory panels which consist of voluntary members (farmers, agronomists and ginners). The advice received from Cotton Australia's R&D advisory panels is used by CRDC in considering its research strategy, priorities and in making research investment decisions.

CRDC corporate standards

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

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



Addressing Industry and Government Research Priorities

Industry accountability

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

CRDC engages with Cotton Australia in a formal process of consultation in the development and implementation of the Strategic R&D Plan including R&D investments. This engagement ensures industry research priorities are regularly reviewed; emerging issues are actively considered; and facilitates the uptake of research in the form of best practices and the overall performance of the Australian industry.

Cotton industry priorities for R&D

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

Government accountability

CRDC is accountable to the Australian Government through the Minister for Agriculture. Government communicates its expectations of CRDC through Ministerial direction, enunciation of policy, administration of the PIRD Act, Science and Research Priorities and Rural Research and Development Priorities. CRDC responds to government expectations through regular communication, compliance with policy and legislated requirements, and the development of Strategic R&D Plans and Annual Reports.

Government research priorities

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

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

The Australian Government describes Science and Research Priorities and Rural Research and Development Priorities.

The Science and Research Priorities are:

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

The Rural Research and Development Priorities are:

- Productivity and adding value
- Supply chain and markets
- Natural resource management
- Climate variability and climate change
- Biosecurity

The Supporting Priorities of the Rural Research and Development Priorities are innovation skills and technology.

National Primary Industries RD&E Framework

The Australian, State and Territory Governments, rural R&D corporations, CSIRO, and universities have jointly developed the National Primary Industries Research, Development and Extension Framework to encourage greater collaboration and promote continuous improvement in the investment of RD&E resources nationally.

National research, development and extension strategies have been or are being developed for the following primary industry and cross industry sectors:

- beef, cotton, dairy, fisheries and aquaculture, forests, grains, horticulture, pork, poultry, sheep meat, sugar, wine, wool, and new and emerging industries;
- animal biosecurity, animal welfare, biofuels and bioenergy, climate change and variability, food and nutrition, soils, plant biosecurity and water use in agriculture.

CRDC, research organisations, industry and government are committed to the implementation of the Cotton Sector RD&E Strategy and five research priorities - Better Plant Varieties, Improved Farming Systems, People Business & Community, Product & Market Development and Development & Delivery. CRDC is committed to supporting the implementation of the cross sectoral strategies including climate change, soils, plant biosecurity and water use.

Photo: Ruth Redfern

CRDC Strategic R&D Priorities

Within the scope of stakeholder R&D priorities, CRDC has established five strategic outcomes to be achieved under its 2013-18 R&D Plan. These outcomes continue to be the focus for R&D investment under the 2015-16 Annual Operational Plan.

- Farmers: Cotton is profitable and consistently farmers' crop of choice.
- Industry: The Australian cotton industry is the global leader in sustainable agriculture.
- Customers: The Australian cotton industry captures the full value of its products.
- People: Capable and connected people driving the cotton industry.
- Performance: Measured performance of the Australian cotton industry and its RD&E drives continuous improvement.

Through focusing on these five strategic priorities the CRDC will achieve its corporate 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 will monitor, evaluate and report on the achievement of key performance indicators.

Program Key Performance Indicators	2014-15	2015-16
Industry productivity growth increased per hectare per annum	3%	3%
Industry reports to customer needs for sustainability indicators	Report	Report
Coverage of best management practice systems across Australian cotton industry	70%	75%
National RD&E Framework cotton and cross-sectoral RD&E strategies supported	Report	Report

RD&E Portfolio Balance and Resource Allocation

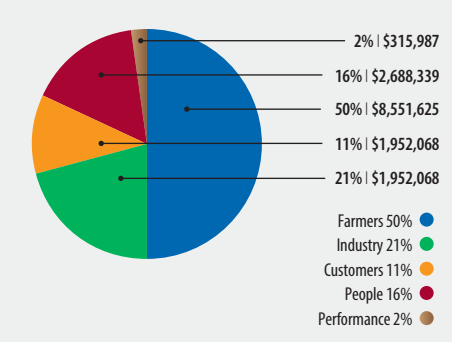
In 2015-16 the CRDC will invest $3.4 million in new research as part of its total portfolio of RD&E. This new investment amount is not inclusive of Rural R&D for Profit program grants which are detailed in the CRDC investments by program of RD&E.

This commitment is aligned with CRDC's planned total expenditure of $100 million over the five years of its 2013-18 R&D Plan and objective to achieve a balanced RD&E portfolio that considers distribution of investment across:

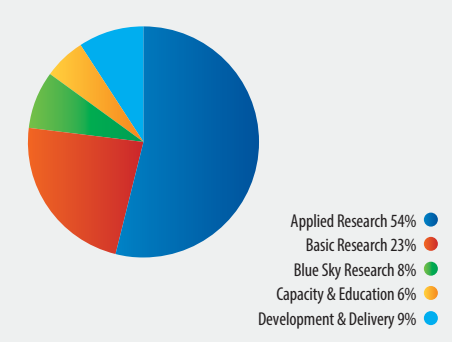
- The RD&E strategies.
- The type of research including basic, applied, blue sky, development and delivery.
- In-project risks.
- Researcher experience and capacity.
- Research providers.
- Timeframe to outcomes.
- The likely return on investment for projects and programs.
- R&D management.

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

CRDC 2015-16 portfolio investment balance



INVESTMENT BY FIVE PROGRAM AREAS:



INVESTMENT BY RESEARCH TYPE:

CRDC investments by program of RD&E

Farmers

Program outcome Cotton is profitable and consistently farmers' crop of choice
Measure of Success: Farmers increase productivity by 3 per cent per hectare per year

Outcome		Key tactics	R&D Investments 2015-16
SUCCESSFUL CROP PROTECTION			
Cotton crops protected from pest, weed and disease threats.	1.1.1	Monitoring and investigating the ecological behaviours and responses of cotton pest, weeds and diseases.	• Continuing and new research projects to describe pathogen populations and undertake surveillance of pest, weed and disease threats. • A continuing project to profile beneficial microorganisms and their manipulation in cotton growing soils to suppress cotton diseases and improve plant growth. • A continuing project to investigate the role of host-endosymbionant relationships in the regulation of silverleaf whitefly populations. • A continuing project investigating the predator-prey interactions for key cotton pests, silverleaf whitefly, mealy bugs and green vegetable bug. • Continuing projects researching key attributes of weed ecology to inform the evaluation of tactics for their management in cotton farming systems with a specific emphasis on glyphosate resistant weeds.
	1.1.2	Testing practices that deliver improved management of insect pests, weeds and diseases.	• Continuing and new research projects to improve management strategies for diseases of cotton. • Continuing and new research projects to improve integrated management strategies for established insect pests and build management strategies for emerging insect pests in cotton including mealybug, mirids and apple dimpling bug. • Continuing project to develop weed management practices that lower the risks of crop damage, occurrence of weed resistance to key herbicides and the weediness of volunteer cotton on cotton farms.
	1.1.3	Improving capacity, knowledge and adoption of techniques to successfully protect the cotton crop.	• New research to provide specialist agronomy, physiology and systems support for new and existing regions. • Continuing projects to package. information about the management of pests, weeds and diseases in a range of hard copy and electronic formats for use by consultants working with cotton farmers to make in-crop decisions. • Continuing projects to establish integrated pest management support in southern farming systems and technical capacity in crop protection for extension.
PRODUCTIVE RESOURCE EFFICIENCIES			
Inputs for cotton production are optimised.	1.2.1	Delivering benchmarks of on-farm resource use efficiencies.	• New research to increase cotton profitability through improved nitrogen use efficiency and reduced losses of nitrogen. • New research to improve irrigation practices in cotton, rice, sugar and dairy through Rural R&D for Profit program. • Continuing projects to assess greenhouse gas emissions from broadacre irrigated cropping systems. • New and continuing projects to benchmark cotton water use efficiencies, irrigation pump and energy efficiencies for a range of irrigation systems.

PRODUCTIVE RESOURCE EFFICIENCIES			
Inputs for cotton production are optimised.	1.2.2	Developing and proving decision systems and practices that deliver optimal resource efficiencies on cotton farms.	• New research aimed to improve seasonal forecasting to increase farmer profitability through Rural R&D for Profit program. • New and continuing research to advance the availability of and ability to interpret real-time data sources for improving irrigation scheduling. • New research to optimise the use and management of manures as a supplement to nitrogen fertiliser in southern NSW cotton growing regions. • Continuing projects to fully describe the carbon cycle in irrigated cotton and investigate the impacts of management practices on soil carbon in these farming systems. • New and continuing research to increase capacity in soil biology research in cotton systems. • Continuing research of critical soil nutrient concentrations and interactions in soils supporting irrigated cotton and development of best practice recommendations for phosphorus, potassium and sulphur fertiliser use. • A continuing PhD project to explore improvements to cotton plant root growth. • Continuing research to improve knowledge of nutrition management for high- yielding cotton varieties and improving nutrition via soil health. • A continuing project to develop and test strategies to improve cotton's yield reliability in the Central Queensland growing region.
	1.2.3	Developing new systems and tools to support farm decision-making processes.	• New research to investigate agronomy to support resilient cotton farming systems of the future. • A continuing project to develop an impact assessment framework for evaluating the impact of new harvesting technologies on the cotton farming system. • Continuing PhD project evaluating autonomous drones for tracking irrigation.
	1.2.4	Improving capacity, knowledge and adoption of techniques to optimise resource uses.	• New and continuing projects to evaluate and demonstrate techniques and technologies cotton farmers can use to improve water use efficiencies and optimise the energy requirements for irrigation. • Continuing projects that package information about the optimisation of input efficiencies into a range of hard copy and electronic formats for use by cotton farmers in planning and decision making. • A continuing project that appoints a professor of soil biology at UNE. • Continued projects to strengthen the Central Highlands production system and optimise water and energy use in Central Queensland. • The continued placement of a network development officer in the Upper Namoi Valley (a partnership between AgVance and CottonInfo). • A continuing project to conduct an economic risk analysis for carbon farming in the Australian cotton industry.
PROFITABLE FUTURES			
Innovations in cotton production.	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.	• A new project to add value to primary products and by products through the development of higher value animal feeds, chemicals and fuels through Rural R&D for Profit program. • A continuing project to investigate cotton diversification in Northern Queensland and other tropical areas of Australia. • Continuing projects to develop technologies that increase the efficiency with which irrigation can be applied to cotton and minimise on-farm water losses. • A continuing project to trial a monolayer and application system to reduce evaporation from large on-farm water storages. • Continuing projects to evaluate the application of sensor technology in insect and weed detection. • Continuing collaborative projects to discover and develop biopesticide and semiochemical compounds for controlling key insect pests of cotton. • New investment in blue sky research into on-farm technologies to drive future profitability.

Industry

Program outcome: The Australian cotton industry is the global leader in sustainable agriculture
Measure of Success: Industry can report against recognised sustainability indicators

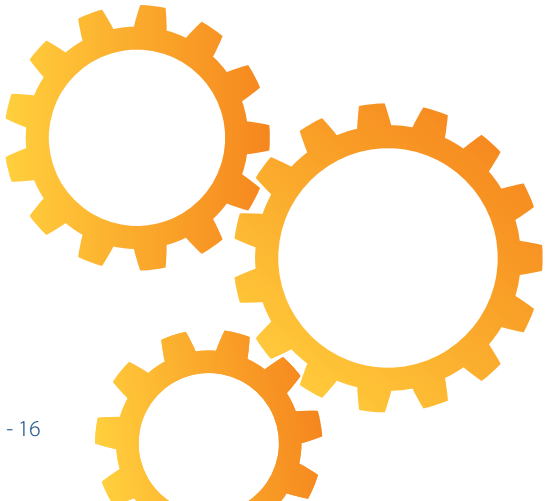
Outcome		Key tactics	R&D Investments 2015-16
RESPECTED STEWARDSHIP			
Industry protects its production technologies and its biosecurity.	2.1.1	Monitoring for and investigating changes in pest and weed susceptibility to biotechnologies and crop protection products used by the cotton industry.	• New research to manage Bt resistance and induced tolerance in Bollgard 3 cotton. • Continuing projects to provide Helicoverpa spp., whitefly, mirid, aphid and two spotted mite insecticide resistance monitoring. • Continuing and a new project to provide resistance monitoring of Helicoverpa spp. to Bt cotton. • Continuing projects investigating molecular genetic methods to detect neonictionoid resistance in cotton aphid and to predict the emergence of herbicide resistance in weed populations.
	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.	• Continuing research and development of weed management practices that lower the risks of resistance developing to key herbicides used in the farming system. • A continuing project undertaking commercial scale evaluation of 'moth busting' as a new tactic for delaying the development of Bt resistance in Helicoverpa spp. • Continuing research to model the evolution of Bt resistance in Australian Helicoverpa spp populations. • Continuing research to evaluate the efficacy of Bt resistance management tactics and optimise the deployment of refuge crops.
	2.1.3	Developing and supporting the industry's capacity to effectively steward key technologies and products.	• New project to ensure stewardship of biotechnology and crop protection products. • Continuing projects to building cross sectoral capacity for on-farm adoption of pesticide application best practice and spray drift prevention. • Continuing participation in the National Working Party for Pesticide Application. • Continuing projects that package information about the prevention of pesticide resistance and spray drift into a range of hard copy and electronic formats for use by the industry in planning and decision making. • A continuing project to develop industry recommendations for reducing the risk of aflatoxin contamination in Australian cotton seed.
	2.1.4	Supporting the industry's preparedness and ability to deal with biosecurity threats.	• New project providing surveillance and research for endemic and exotic virus diseases of cotton. • A new project to review the cotton industry Biosecurity Plan. • New and continuing projects provide industry wide surveillance for exotic disease threats. • Continuing projects scope and develop contingency plans for responding to key exotic disease threats. • A continuing project builds awareness of biosecurity threats and the handling of biosecurity incursions amongst cotton farmers, consultants and regionally-based industry personnel.

RESPONSIBLE LANDSCAPE MANAGEMENT			
Industry leads in managing natural assets.	2.2.1	Defining the values and drivers relating to the management of natural landscapes and systems in cotton growing regions.	• A continuing project to report on the Australian cotton industry's environmental, economic and social performance.
	2.2.2	Recording and demonstrating improved environmental performance of the cotton industry.	• Implementation of the recommendations of the Third Environmental Assessment of the cotton industry. • Two continuing projects to investigate management strategies to sustain riparian areas, floodplain and wetland ecosystems on cotton farms. • A new project on waterbirds in cotton landscapes. • A new project to develop a groundwater health index as an industry-wide monitoring tool.
	2.2.3	Identifying and proving integrated management strategies which deliver environmental and productivity gains.	• New research to better manage riparian corridors on cotton farms for multiple benefits. • Continuing projects to measure deep drainage and investigate salinization beneath irrigation fields at paddock and catchment scales.
	2.2.4	Researching the connectivity between cotton farms and natural systems in the landscape.	• New research to baseline the lower Namoi groundwater and evaluate Pilliga coal seam gas requirements. • A continuing project on how cotton farmers can take advantage of potential future ecosystems markets.
	2.2.5	Supporting initiatives and partnerships to improve the knowledge and capacity to manage natural landscapes and systems in cotton regions.	• Enhanced capability to focus on extension of carbon farming and ecosystem services. • A new project to support NRM technical capacity in industry extension.
SUSTAINABLE FUTURES			
An industry achieving its vision.	2.3.1	Scoping and investigating critical threats and opportunities which may influence the long term sustainability of the Australian cotton industry.	• A continuing investigation to improve prediction of cotton growth and production in a changing climate. • A continuing project to assess the impact of potential future climates on cotton production and to identify potential management strategies. • A continuing PhD project to investigate the next generation of rural landscape governance in Australia.
	2.3.2	Supporting innovative approaches to solve traditional industry issues and drive future sustainability.	• A continuing blue sky project to assess the resilience of the Australian cotton industry at multiple scales.

Customers

Program outcome: The Australian cotton industry captures the full value of its products
Measure of Success: Double the premium for Australian cotton

Outcome		Key tactics	R&D Investments 2015-16
ASSURED COTTON			
The integrity and qualities of Australian cotton set global benchmarks for customers.	3.1.1	Improving Australian fibre quality testing standards and procedures and the capacity to measure and manage contamination.	• Continuing and new projects to develop technology on ginning efficiency improvement by assessment of the gin stand and monitoring of cotton grade and contamination. • A continuing project to investigate innovations in spinning yarn and fabric development.
	3.1.2	Supporting the development and implementation of post farm gate BMPs.	• Continuing project aimed at improving the quality of Australian cotton through post harvest initiatives. • Continuing project to assess the impact on cotton quality of using round modules.
	3.1.3	Developing and implementing a standardised reporting system for Australian cotton product quality and traceability.	• Ongoing support for the adoption of BMPs for the classification of cotton.
	3.1.4	Benchmarking Australian cotton against key international programs for product stewardship and sustainability.	• A continuing project to research value chain sustainability and competitive advantage for Australian cotton. • A continuing project to develop a carbon calculator for cotton.



DIFFERENTIATED PRODUCTS			
Customers recognise the differentiated value of Australian cotton products.	3.2.1	Identifying opportunities for improvements in fibre quality and cotton products.	• A continuing PhD study to investigate improving length, strength and fineness of cotton. • A PhD study investigating the effects of cotton cellulose structure and interaction on dye uptake.
	3.2.2	Demonstrating the value of different fibre classes and defining fibre quality parameters that secure a premium market.	• Further trial market developments with mills and brand owners to evaluate the competitive advantages of Australian cotton.
	3.2.3	Developing customer-based partnerships for the development of higher value and novel products, which differentiate Australian cotton.	• A new project to investigate development of compression athletic sportsware using improved functionality cotton treatments. • A continuing project to investigate cotton and cotton/wool blend fabrics. • A continuing project to investigate the development of ever-dry, self-cooling cotton fabrics. • Further trial market developments with mills and brand owners to evaluate the competitive advantages of Australian cotton. • Integrated promotion of technologies that help differentiated Australian cotton.
COMPETITIVE FUTURES			
The demand for Australian cotton products is positively transformed.	3.3.1	Investigating existing and future markets for Australian cotton and communicate these findings to the Australian Cotton Industry.	• A new project to identify and optimise the cotton supply chain to drive efficiencies. • Continuing and new projects to develop technology on ginning efficiency improvement developed by assessment of the gin stand and monitoring of cotton grade and contamination. • A continuing project to develop options for improving dyeing efficiency. • New market research that supports industry preparedness for disruptive changes to the use of cotton.
	3.3.2	Facilitating the development of new technologies and systems to improve the competitiveness of Australia cotton.	• New feasibility studies to identify potential new products that would transform the cotton industry and its supply chains. • A new blue sky project to develop smart cotton/carbon fabric for electrical conductivity and reducing electromagnetic interference. • A continuing project to develop automated gin seed fingers. • New and continuing projects to identify opportunities for novel products and processes that could transform the demand for Australian cotton.

People

Program outcome: Capable and connected people driving the cotton industry

Outcome		Key tactics	R&D Investments 2015-16
WORKFORCE CAPACITY			
A skilled, educated and progressive industry workforce.	4.1.1	Investigating effective strategies for attracting, developing and retaining people in the cotton industry.	• A new project developing career pathways linking Agribusiness and universities. • A continuing project to establish a workforce development plan for the cotton industry for sustained competitive advantage. • A continuing PhD project to investigate the human capacity needs and management on cotton farms. • A new PhD study investigating retention strategies for growers and managers in the cotton industry. • A continuing project to develop more comprehensive opportunities for leadership development within the industry. • A continuing partnership with grower groups to develop an effective grower network in the Upper Namoi.
	4.1.2	Supporting initiatives which lead to the continuous improvement of human resource management including on-farm Workplace Health and Safety.	• A continuing project to review and update cotton farm safety resources and potential links to the *my*BMP system. • A continuing project to develop a cotton injury and safety profile. • A new project investigating the use of smart technologies for best practice Work Health and Safety by cotton growers.
	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.	• Investigate opportunities to build on previous research that enables the development of a longer term strategy for improved Aboriginal participation in the workforce.
	4.1.4	Supporting educational opportunities which increase the skills and knowledge of current workforces and will meet the needs of future workforces.	• A new project to support the UNE cotton production course providing ready for work graduates with cotton industry experience. • Continuing initiatives to encourage and develop young professionals for the cotton industry including the establishment of a PICSE centre for cotton. • A continuing post-graduate project to investigate the development and value of recognition of prior learning for cotton growers and managers. • A continuing project to build capacity in cotton farm employer driven staff development. • Continued training projects for ginning and managing cotton for highest quality as well as ongoing tertiary professional development course delivery. • Continuing support for the activities of the Cotton Education Officer. • A continuing project to support the delivery of the Cotton Production Course. • Ongoing support for scholarships including summer scholars, undergraduate and PhDs. • A continuing project with Cotton Australia to maintain cotton industry membership of the Primary Industries Education Foundation. • Ongoing support for the Department of Agriculture Science & Innovation Awards.

A skilled, educated and progressive industry workforce.	4.1.5	Creating opportunities for, and supporting the development of leadership skills.	• New and continuing projects which support specific industry and agricultural leadership development programs.
NETWORKS			
An industry connected by dynamic networks.	4.2.1	Establishing and empowering creative forums and initiatives which build relationships.	• A continuation of the Grassroots Grants program to encourage capacity building projects with local Cotton Grower Associations. • A new project seeking to develop strategies for future research in the Australian cotton industry.
	4.2.2	Supporting and participating in collaborative cross sectoral RD&E initiatives.	• Continued support for work under the Climate Change Research Strategy for Primary Industries (CCRSPI), the Water Use in Agriculture, Soils and Plant Biosecurity Cross Sector RD&E Plans. • Ongoing support for the cooperative partnership for farming and fishing occupational health and safety.
	4.2.3	Creating and facilitating opportunities for national and international RD&E exchange.	• Continued support for travel scholarships for research, capacity building and innovation focused purposes. • The development of a scientific exchange program to build knowledge and networks.
	4.2.4	Facilitating engagement with stakeholders for prioritising and capturing advice on RD&E issues.	• Support for the skill and knowledge development of RD&E advisory panels.
	4.2.5	Honing research expertise and the application of science from core research disciplines	• Continuing support for the Managing Climate Variability IV program and a cotton grower participant in the Cotton Climate Champion program. • Continuing projects which support research and industry advisory panels.
COMMUNICATION			
Stakeholder information needs are met.	4.3.1	Providing information for demand driven communication strategies and performance reporting.	• CottonInfo joint venture partnership with commercial and industry partners.
	4.3.2	Applying innovative communication methods.	• A new project to stimulate private sector extension in Australian agriculture to increase returns from R&D through Rural R&D for Profit program. • A continuing project to investigate use of spatial technologies in Australian cotton.

Performance

Program outcome: Measured performance of the Australian cotton industry and its RD&E drives continuous improvement

Outcome		Key tactics	R&D Investments 2015-16
BEST PRACTICE			
World's best practice underpins the performance of the cotton industry.	5.1.1	Supporting a best practice framework as the primary integrated planning, risk management, benchmarking, knowledge development and delivery system.	• Development and packaging of information derived from R&D. Ongoing development, support and enabling of the links with research, extension and *my*BMP facilitation. • A continuing project to facilitate linkages between research, extension and the industry's *my*BMP system. • A continuing project to ensure the cotton industry has a consistent, robust and credible audit certification system for *my*BMP. • Facilitation of linkages between research, extension and the industry's *my*BMP system.
	5.1.2	Promoting best practices through the CottonInfo Joint Venture.	• Continuing extension focussed projects to manage and deliver knowledge to encourage best management practice. • Implementation of campaign based initiatives within the CottonInfo Team to deliver on key target areas for R&D adoption. • A continuing project to comprehensively document and communicate best practice cotton production techniques using video and audio formats. • New and existing projects to provide resources for development and delivery of research results. • A continuing project to continue the development of a post-harvest BMP (including classing/ginning and harvesting).
MONITORING AND EVALUATION			
Industry and RD&E performance is captured.	5.2.1	Developing and implementing an internal M&E framework for evaluating portfolio balance and R&D performance.	• A continuing project developing a framework and benchmark for monitoring achievement of the CRDC's 2013-2018 Strategic Plan. • Facilitation of linkages between cotton and regional NRM bodies to incorporate prior learnings for M&E.
	5.2.2	Conducting annual industry surveys to capture practice change.	• Continuation of the Crop Consultants Association post season survey series together with a new project that establishes more interactive grower surveys and workshops. • A continuing project to develop an on-farm environmental resources survey. • A project to continue the delivery of the Boyce Cotton Comparative Analysis Reports.
	5.2.3	Establishing a framework through which industry performance can be nationally and internationally reported.	• A continuing project to agree and report on economic, environmental and social KPIs for the cotton industry. • *my*BMP as a system to record grower adoption of best management practices identified through R&D.

REVIEWS			
Continuous improvement in industry and RD&E performance.	5.3.1	Undertaking scientific discipline reviews of the industry's RD&E.	• New projects to review specific disciplines of the industry RD&E.
	5.3.2	Commissioning and participating in independent reviews of CRDC's RD&E and organisational performance.	• A new project to evaluate CRDC's People strategy.
	5.3.3	Commissioning independent reviews of the social, environmental and economic performance of the industry.	• New projects to review the social and economic performance of the industry.
	5.3.4	Participating in cross-sectoral RD&E impact evaluations and reviews.	• Participating in the Council of Rural RDC project evaluations of RD&E.

Financial tables 2015-16

Table 1.1 Resource Statement

Source	*Actual available appropriation* 2014–15 $'000	Estimate of prior year amounts available in 2015–16 $'000	Proposed at Budget 2015–16 $'000	Total estimate 2015–16 $'000
Opening balance/Reserves at bank	42,098	41,710	-	41,710
REVENUE FROM GOVERNMENT				
Special appropriations[1] *Primary Industries and Energy Research and Development Act 1989 s.30(3)* – Cotton R&D Corporation	18,192	-	8,804	8,804
Total special appropriations	**18,192**	**-**	**8,804**	**8,804**
Total funds from government	**18,192**	**-**	**8,804**	**8,804**
FUNDS FROM INDUSTRY SOURCES				
Levies[2]	8,467	-	4,455	4,455
less amounts paid to the CRF	(8,467)	-	(4,455)	(4,455)
Total	**-**	**-**	**-**	**-**
FUNDS FROM OTHER SOURCES				
Interest	1,623	-	825	825
Royalties	2,342	-	303	303
Other	2,151	-	1,047	1,047
Total	**6,116**	**-**	**2,175**	**2,175**
Total net resourcing for agency	**66,406**	**41,710**	**10,979**	**52,689**

1. The CRDC is not directly appropriated as it is a Corporate Entity. Appropriations are made to the Department of Agriculture which are then paid to CRDC and are considered 'departmental' for all purposes.
2. The levy is imposed and collected under the following legislation: *Primary Industries Research and Development Act 1989, Primary Industries (Excise) Levies Act 1999, Primary Industries Levies and Charges Collection Act 1991* and associated legislation.
Reader note: All figures are GST exclusive.
CRF – Consolidated Revenue Fund

Table 2.1 Budgeted Expenses for Outcome 1 for Corporate Entity

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

	2014–15 Estimated actual expenses $'000	2015-16 Estimated expenses $'000
PROGRAM 1.1: COTTON RESEARCH AND DEVELOPMENT CORPORATION		
Revenue from government		
Special appropriations	7,222	4,349
Special appropriations – Industry Levies	7,327	4,455
Revenues from other independent sources	5,268	2,052
Reserves	3,942	9,723
Total for Program 1.1	**23,759**	**20,579**
OUTCOME 1 TOTALS BY RESOURCE TYPE		
Revenue from government		
Special appropriations	7,222	4,349
Special appropriations – Industry Levies	7,327	4,455
Revenues from other independent sources	5,268	2,052
Reserves	3,942	9,723
Total expenses for Outcome 1	**23,759**	**20,579**
	2014-15	**2015-16**
Average Staffing Level (number)	**13.0**	**13.4**

Photo: Paul Grundy

Table 2.2 Program Expenses 2.2

	2014–15 Estimated actual $'000	2015-16 Budget $'000	2016-17 Forward estimate $'000	2017-18 Forward estimate $'000	2018-19 Forward estimate $'000
ANNUAL DEPARTMENTAL EXPENSES					
Cotton Research and Development Corporation	23,759	20,579	17,084	15,333	14,703
Total program expenses	**23,759**	**20,579**	**17,084**	**15,333**	**14,703**

Photo: Ruth Redfern

Table 3.2.1 Comprehensive Income Statement (Showing Net Cost of Services) *for the period ended 30 June*

	2014–15 Estimated actual $'000	2015–16 Budget $'000	2016–17 Forward estimate $'000	2017–18 Forward estimate $'000	2018–19 Forward estimate $'000
EXPENSES					
Employee benefits	1,882	2,053	2,138	2,219	2,305
Supplier expenses	1,269	1,398	1,441	1,498	1,504
Grants	20,498	16,988	13,365	11,536	10,754
Depreciation & amortisation	110	140	140	80	140
Total expenses	**23,759**	**20,579**	**17,084**	**15,333**	**14,703**
LESS					
OWN-SOURCE INCOME **Own-source revenue**					
Interest	1,200	825	575	525	500
Rental income	5	5	5	5	5
Royalties	2,342	303	539	637	687
Other	1,721	919	648	209	210
Total own-source revenue	**5,268**	**2,052**	**1,767**	**1,376**	**1,402**
Net cost of (contribution by) services	**18,491**	**18,527**	**15,317**	**13,957**	**13,301**
Revenue from Government[1]					
Commonwealth contribution	7,222	4,349	4,741	5,865	6,596
Industry contributions	7,327	4,455	4,849	5,974	6,705
Total revenue from Government	**14,549**	**8,804**	**9,590**	**11,839**	**13,301**
Surplus (Deficit) before income tax	**(3,942)**	**(9,723)**	**(5,727)**	**(2,118)**	**–**
Income tax expenses	–	–	–	–	–
Surplus (Deficit) after income tax	**(3,942)**	**(9,723)**	**(5,727)**	**(2,118)**	
Surplus (Deficit) attributable to the Australian Government	**(3,942)**	**(9,723)**	**(5,727)**	**(2,118)**	**–**

1 Revenue from government includes a Commonwealth contribution under the PIRD Act, and levies collected from industry by the Department of Agriculture for R&D activities.

Prepared on Australian Accounting Standards Basis

Table 3.2.2 Budgeted Balance Sheet *(as at 30 June)*

	2014–15 Estimated actual $'000	2015–16 Budget $'000	2016–17 Forward estimate $'000	2017–18 Forward estimate $'000	2018–19 Forward estimate $'000
ASSETS					
Financial assets					
Cash and cash equivalents	6,710	912	250	997	1,082
Trade and other receivables	2,000	2,000	2,000	2,000	2 ,000
Investments	35,000	31,000	26,000	23,000	23,000
Total financial assets	**43,710**	**33,912**	**28,250**	**25,997**	**26,082**
Non-financial assets					
Land and buildings	825	870	885	890	895
Property, plant and equipment	87	165	173	211	209
Intangibles	324	276	188	280	192
Other	10	10	10	10	10
Total non-financial assets	**1,246**	**1,321**	**1,256**	**1,391**	**1,306**
Total assets	**44,956**	**35,233**	**29,506**	**27,388**	**27,388**
LIABILITIES					
Payables					
Suppliers	30	30	30	30	30
Grants	4,000	4,000	4,000	4,000	4,000
Other	30	30	30	30	30
Total payables	**4,060**	**4,060**	**4,060**	**4,060**	**4,060**
Provisions					
Employee provisions	350	350	350	350	350
Total provisions	**350**	**350**	**350**	**350**	**350**
Total liabilities	**4,410**	**4,410**	**4,410**	**4,410**	**4,410**
Net assets	**40,546**	**30,823**	**25,096**	**22,978**	**22,978**
EQUITY					
Reserves	346	346	346	346	346
Retained surplus	40,200	30,477	24,750	22,632	22,632
Total equity	**40,546**	**30,823**	**25,096**	**22,978**	**22,978**

* Equity is the residual interest in assets after deduction of liabilities. Prepared on Australian Accounting Standards basis.

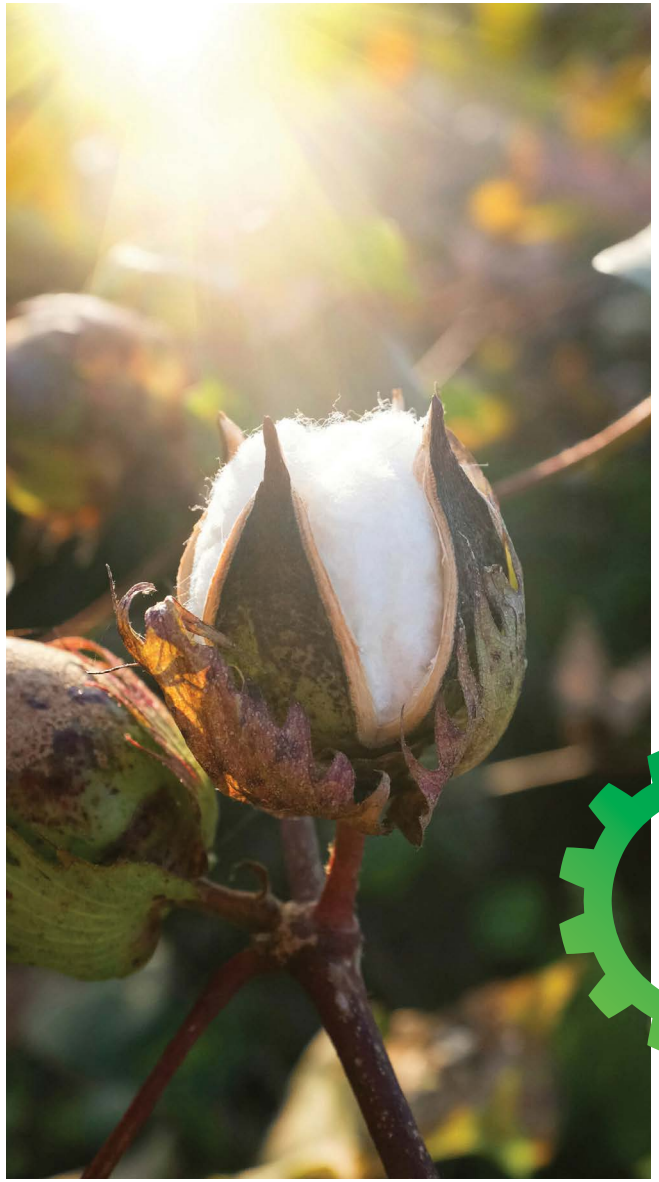


Table 3.2.3 Statement of Changes in Equity - Summary of Movement (Budget Year 2015-16)

	Retained earnings $'000	Asset revaluation reserve $'000	Total equity $'000
OPENING BALANCE AS AT 1 JULY 2015			
Balance carried forward from previous period	40,200	346	40,546
Adjusted opening balance	**40,200**	**346**	**40,546**
COMPREHENSIVE INCOME			
Surplus (deficit) for the period	(9,723)	-	(9,723)
Total comprehensive income	**(9,723)**	**-**	**(9,723)**
Of which:			
Attributable to the Australian Government	(9,723)	-	(9,723)
Estimated closing balance as at 30 June 2016	**30,477**	**346**	**30,823**

Prepared on Australian Accounting Standards basis.

Table 3.2.4 Budgeted Statement of Cash Flows *(for the period ended 30 June)*

	2014–15 Estimated actual $'000	2015–16 Budget $'000	2016–17 Forward estimate $'000	2017–18 Forward estimate $'000	2018–19 Forward estimate $'000
OPERATING ACTIVITIES					
Cash received					
Industry contributions	9,725	4,349	4,741	5,865	6,596
Revenue from government	8,467	4,455	4,849	5,974	6,705
Interest	1,623	825	575	525	500
Net GST received	2,009	1,737	1,370	1,240	1,141
Other	4,493	1,350	1,312	936	992
Total cash received	**26,317**	**12,716**	**12,847**	**14,540**	**15,934**
Cash used					
Employees	1,841	2,052	2,137	2,219	2,305
Suppliers	1 ,550	1,530	1,565	1,639	1,630
Grants	22,863	18,687	14,702	12,690	11,829
Other	30	30	30	30	30
Total cash used	**26,284**	**22,299**	**18,434**	**16,578**	**15,794**
Net cash from (used by) operating activities	**33**	**(9,583)**	**(5,587)**	**(2,038)**	**140**
INVESTING ACTIVITIES					
Cash used					
Purchase of property, plant and equipment	-	4,000	5,000	3,000	0
Total cash used	**-**	**4,000**	**5,000**	**3,000**	**0**
Cash used					
Purchase of property, plant and equipment	421	215	75	215	55
Investments	4,000	-	-	-	-
Total cash used	**4,421**	**215**	**75**	**215**	**55**
Net cash from (used by) investing activities	**(4,421)**	**3,785**	**4,925**	**2,785**	**(55)**
Net increase (decrease) in cash held	**(4,388)**	**(5,798)**	**(662)**	**747**	**85**
Cash and cash equivalents at the beginning of the reporting period	11,098	6,710	912	250	997
Cash and cash equivalents at the end of the reporting period	**6,710**	**912**	**250**	**997**	**1,082**

Prepared on Australian Accounting Standards basis.

Table 3.2.5 Capital Budget Statement

	2014–15 Estimated actual $'000	2015–16 Budget $'000	2016–17 Forward estimate $'000	2017–18 Forward estimate $'000	2018–19 Forward estimate $'000
PURCHASE OF NON-FINANCIAL ASSETS					
Funded internally from departmental resources[1]	421	215	75	215	55
Total	**421**	**215**	**75**	**215**	**55**
RECONCILIATION OF CASH USED TO ACQUIRE ASSETS TO ASSET MOVEMENT TABLE					
Total purchases	421	215	75	215	55
Total cash used to acquire assets	**421**	**215**	**75**	**215**	**55**

[1] Includes the following sources of funding: internally developed assets. Consistent with information contained in the Statement of Asset Movements and the Budgeted Statement of Cash Flows.

Photo: Melanie Jenson

Table 3.2.6 Statement of Asset Movement (Budget Year 2015-16)

	Asset Category (as appropriate)				
	Land $'000	**Buildings $'000**	**Other property, plant and equipment $'000**	**Computer software and intangibles $'000**	**Total $'000**
AS AT 1 JULY 2015					
Gross book value	180	689	227	538	1,634
Accumulated depreciation/amortisation and impairment	-	(44)	(140)	(214)	(398)
Opening net book balance	**180**	**645**	**87**	**324**	**1,236**
CAPITAL ASSET ADDITIONS ***Estimated expenditure on new or replacement assets***					
By purchase – other	-	60	105	50	215
Total additions	**-**	**60**	**105**	**50**	**215**
OTHER MOVEMENTS					
Depreciation/amortisation expense	-	(15)	(27)	(98)	(140)
Total other movements *As at 30 June 2014*	**-**	**(15)**	**(27)**	**(98)**	**(140)**
Gross book value	180	749	332	588	1,849
Accumulated depreciation/amortisation and impairment	-	(59)	(167)	(312)	(538)
Closing net book balance	**180**	**690**	**165**	**276**	**1,311**

Prepared on Australian Accounting Standards basis.

CRDC 2013-18 Strategic R&D Plan Summary

VISION *A globally competitive and responsible cotton industry*

MISSION *To invest in RD&E for the world leading Australian cotton industry*

OUTCOMES

Farmers	Industry	Customers	People	Performance
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

STRATEGIES

Successful Crop Protection Cotton crops protected from pest, weed and disease threats	**Respected Stewardship** Industry protects its production technologies and its biosecurity	**Assured Cotton** The integrity and qualities of Australian cotton set global benchmarks for customers	**Workforce Capacity** A skilled, educated and progressive industry workforce	**Best Practice** World's best practice underpins the performance of the cotton industry
Productive Resource Efficiencies Inputs for cotton production are optimised	**Responsible Landscape Management** Industry leads in managing natural assets	**Differentiated Products** Customers recognise the differentiated value of Australian cotton products	**Networks** An industry connected by dynamic networks	**Monitoring & Evaluation** Industry and RD&E performance is captured
Profitable Futures Innovation in cotton production	**Sustainable Futures** An industry achieving its vision	**Competitive Futures** The demand for Australian cotton products is positively transformed	**Communication** Stakeholder information needs are met	**Reviews** Continuous improvement in industry and RD&E performance

Glossary of terms used in the Australian cotton industry

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ACGRA	Australian Cotton Growers' Research Association (now merged with Cotton Australia)
ACIC	Australian Cotton Industry Council
ACIPA	Australian Centre for Intellectual Property in Agriculture
ACRI	Australian Cotton Research Institute
ACSA	Australian Cotton Shippers Association
AES	Aboriginal Employment Strategy
AGSOC	Agriculture Senior Officials Committee (formerly the Primary Industries Standing Committee)
ai/ha	Active ingredient per hectare
ALS	Australian long staple cotton
ANAO	Australian National Audit Office
ANCID	Australian National Committee on Irrigation and Drainage
App	An application, downloaded onto mobiles, computer tablets or smartphones
APVMA	Australian Pesticides and Veterinary Medicines Authority
ARLF	Australian Rural Leadership Foundation
ARLP	Australian Rural Leadership Program
AWAF	Department of Agriculture and Food, Western Australia
AWM	Area Wide Management
BMP	Best Management Practices program (also *my*BMP)
Bollgard II ®	Cotton varieties contain two genes resistant to Helicoverpa spp.
Bt	Bacillus thuringiensis (crystal protein gene expressed in Bollgard II ® cotton varieties, resistant to Helicoverpa spp.)
CA	Cotton Australia
CAC Act	Commonwealth Authorities and Companies Act 1997
CBA	Cotton Breeding Australia
CCA	Crop Consultants Australia Inc.
CCAA	Cotton Classers Association of Australia
CCRSPI	National Climate Change Research Strategy for Primary Industries
CDI	Corporate Development Institute
CGA	Cotton Grower Association
CMA	Catchment Management Authority
CMSE	CSIRO Materials Science and Engineering
Corporation, the	Cotton Research and Development Corporation
Cotton CRC	Cotton Catchment Communities Cooperative Research Centre (ceased operations 2012)
CottonInfo team	Team of Regional Development Officers, technical specialists and *my*BMP specialists, formed under a joint venture between CRDC, Cotton Australia and CSD.
CRC	Cooperative Research Centre
CRDC	Cotton Research and Development Corporation
CRRDC	Council of Rural Research and Development Corporations
CRRDCC	Council of Rural Research & Development Corporations' Chairs
CSD	Cotton Seed Distributors Ltd (a grower-owned cooperative)
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DA	Commonwealth Department of Agriculture
DAF	Queensland Department of Agriculture and Fisheries
DNRM	Queensland Department of Natural Resources and Mines
DU	Deakin University
EIQ	Environmental Impact Quotient
e-Learning	On-line learning, training and education
EM	Electromagnetic conductivity
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
EPOI	Environmental Performance Indicator
ESD	Ecologically Sustainable Development
F Rank	Measure of Fusarium wilt resistance
GM	Genetically modified
GMAC	Genetic Manipulation Advisory Committee

GOA	Groundrig Operators Association
GVIA	Gwydir Valley Irrigators Association
ha.	Hectare
Helicoverpa spp.	Cotton's major insect pests (H. armigera and H. punctigera)
Heliothis	Insect pest, more properly known as Helicoverpa spp. (see above)
HVI	High Volume Instrument
IBP	Industry Biosecurity Plan
ICAC	International Cotton Advisory Committee
ICT	Information and Communications Technology
IDM	Integrated Disease Management
IP	Intellectual Property
IPM	Integrated Pest Management
IRMS	Insecticide Resistance Management Strategy
Irrigation deficit	Millimetres of plant-available soil water removed at the time of irrigation
ISO	International Organisation for Standardization
IWM	Integrated Weed Management
IWUI	Irrigation Water Use Index
KPI	Key Performance Indicator (measure of success)
LCA	Life Cycle Assessment
LWA	Land and Water Australia (ceased operations in 2009)
MP	Member of Parliament
MU	Macquarie University
NCEA	National Centre for Engineering in Agriculture, University of Southern Queensland
NFF	National Farmers' Federation
NHT	Natural Heritage Trust (Australian Government)
NIPI	National Insect Pest Initiative
NPSI	National Program for Sustainable Irrigation
NRM	Natural Resource Management
NSW DPI	NSW Department of Primary Industry
NUEI	Nitrogen Use Efficiency Index
OGTR	Office of the Gene Technology Regulator
PGPA Act	Public Governance, Performance and Accountability Act 2013
PICSE	National Primary Industry Centre for Science Education
Pima	cotton Gossypium barbardense. Related to Egyptian cotton, having extra long and fine staple.
Pima cotton	Gossypium barbardense. Related to Egyptian cotton, having extra long and fine staples. Limited Australian production.
PIRD Act	Primary Industries Research and Development Act 1989
PISC	Primary Industries Standing Committee (renamed Agriculture Senior Officials Committee AGSOC)
QAAFI	Queensland Alliance for Agricultural and Food Innovation
QFF	Queensland Farmers' Federation
QTT	Quick Test Technology
QUT	Queensland University of Technology
RD&E	Research, development and extension
RDC	Research and Development Corporation
RIRDC	Rural Industries Research and Development Corporation
RMP	Resistance Management Plan
RRDCC	Rural Research and Development Chairs' Committee
SJV	San Joaquin Valley (California): the industry benchmark in the international marketplace
SLW	Silverleaf whitefly spp. species
spp.	species
TIMS	Transgenic and Insect Management Strategy Committee
UA	University of Adelaide
UNE	University of New England
'Upland' cotton	Gossypium hirsutum. Comprises the vast majority of the Australian cotton crop, with Pima cotton (see above) comprising the remainder
US	University of Sydney
USQ	University of Southern Queensland
UTS	University of Technology, Sydney
UWA	University of Western Australia
UWS	University of Western Sydney
WHS	Workplace Health and Safety
Wincott	Women's Industry Network – Cotton
WUE	Water use efficiency
WUiAg	Water Use in Agriculture strategy of Primary Industries Standing Committee (PISC)

Attachment A:

CRDC 2015-16 Projects List *Note: CRDC's list of projects is current as of May 2015 and may be subject to change.*

Project title	Project code	Researcher	Organisation	Start & Finish Dates	
Program one: Farmers					
Advancing integrated weed management in the Australian cotton and grains industries (CottonInfo technical specialist)	DAN1510		NSW DPI	Apr-15	Jun-18
Advancing VARIwise with autonomous irrigation (and a grower's guide)	NEC1401	Alison McCarthy	NCEA	Jul-13	Jun-16
Agronomic management for better fibre and textile quality	CSP1308	Michael Bange	CSIRO	Jul-12	Jun-16
Agronomy for resilient future cotton systems		Michael Bange	CSIRO	Jul-15	Jun-18
Applying plant-based measurements for irrigation in water-limited environments.	CSP1104	Onoriode Coast	CSIRO	Jul-12	Jun-16
Assessing the impacts of new harvesting technologies on cotton	NEC1301	John Bennett	NCEA	Jul-12	Dec-15
Assisting cotton industry diversification in coastal NQ & tropical Australia	CSP1302	Steve Yeates	CSIRO	Jul-12	Sep-15
Benchmarking water use efficiency and crop productivity in the Australian cotton industry (CottonInfo technical specialist)	DAN1505	Janelle Montgomery	NSW DPI	Jul-14	Jun-19
Carbon farming in the Australian cotton industry (CottonInfo technical specialist)	CFEO1401	Jon Welsh	CSD	Jul-13	Jun-17
Centre for Biopesticides & Semiochemicals: Development of new tools & strategies for IPM	DAN1404	Robert Mensah	NSW DPI	Jul-13	Jun-18
Centre for Biopesticides & Semiochemicals: Novel insecticides and synergists from endemic and exotic flora	UWS1401	Robert Spooner-Hart	UWS	Oct-13	Jun-18
Centre for Biopesticides & Semiochemicals: Semiochemical management for occasional pests of cotton and grains	UNE1404	Peter Gregg	UNE	Oct-13	Jun-18
Commercial development and evaluation of a machine vision-based weed spot sprayer	NEC1402	Cheryl McCarthy	NCEA	Jul-13	Jun-16
Commercial grower-led irrigation system comparison in the Gwydir Valley		Louise Gall	GVIA	Jul-15	Dec-17
Crop protection development specialist (CottonInfo technical specialist)	DAQ1502	Ngaire Roughley	QDAF	Jul-14	Jun-17
Determining optimum nitrogen strategies for abatement of emissions for different irrigated cotton systems	AOTG1401	Steve Kimber	NSW DPI	Jul-13	Jun-17
Development of a pump efficiency monitor for use in the Australian cotton industry	NEC1501	Phillip Szabo	NCEA	Jul-14	Jun-16
Development of Revolutionary "Float Actuated, Fully Automatic, Flow Regulating Valves" (Commissioned)	CRDC1514	Peter Cocciardi	Cocky Valves	Jul-14	Jun-16
Diseases of Cotton XI	DAN1403	Karen Kirkby	NSW DPI	Jul-13	Jun-16
Economic and risk analysis for carbon farming in the Australian cotton industry	CFEO1502	Janine Powell	NSW DPI	Jul-14	May-17
Enhancing IPM in cotton systems	CSP1401	Lewis Wilson	CSIRO	Jul-13	Jun-18
Establishing southern cotton IPM	DAN1501	Sandra McDougall	NSW DPI	Jul-14	Jun-17
Fusarium wilt management in cotton	DAQ1402	Linda Smith	QDAF	Jul-13	Jun-16
Future farm automation and robotics management			USQ	Apr-15	Jun-18

Identification of beneficials attacking silverleaf whitefly and green vegetable bug	CSP1303	Lewis Wilson	CSIRO	Jul-13	Jun-16
Improving cotton productivity with crop nutrition	CSP1403	Ian Rochester	CSIRO	Jul-13	Jun-16
Increasing profitability through improved nitrogen use efficiency and reducing gaseous losses of nitrogen		Peter Grace	QUT	Jul-15	Jun-18
Indirect emissions of nitrous oxide from broad acre irrigated agriculture	FTRG1401	Ben Macdonald	CSIRO	Jul-13	Jun-16
Integrated program to deliver automated, adaptive, precision irrigation system		Joseph Foley	USQ	Jul-15	Jun-20
Irrigation agronomy for tailored and responsive management with limited water		Rose Brodrick	CSIRO	Jul-15	Jun-18
Management of Solenopsis mealybug, mirids and apple dimpling bug in Bollgard® cotton	DAQ1501	Moazzem Khan	QDAF	Jul-14	Jun-17
Management options enhancing beneficial microbial functions in cotton soils	CSE1401	Gupta Vadakattu	CSIRO	Jul-13	Jun-16
Microbial solutions for sustainable cotton and soil health management	UNE1303	Lily Pereg	UNE	Jul-12	Oct-15
Monitoring greenhouse gas emissions from irrigated cropping systems	CLW1401	Ben Macdonald	CSIRO	Jul-13	Jun-16
Network Development Officer - Upper Namoi Valley (CottonInfo regional development officer)	CRDC1405	Katie Slade	UNCGA Agvance	Jul-13	Jun-16
Optimising management of manure in southern NSW cotton production		Wendy Quayle	CSIRO	Jul-15	Jun-18
Optimising water and energy use in the CQ irrigation sector (CottonInfo technical specialist)	DAQ1404	Lance Pendergast	QDAF	Jul-13	Jun-16
PhD: Enhancing resistance to salinity, drought and diseases in cotton using a single gene		Ben Schreiber	UNE	May-14	Apr-17
PhD: Host plant relationships of green mirids - is alternative control possible?	UQ1402	Justin Cappadonna	UQ	Nov-13	Nov-16
PhD: Microbial tools for advancing the management of soil and seedling health in cotton production systems	UNE1305	Sarah Cooper	UNE	Feb-13	Feb-16
PhD: Multiple host use and gene-flow in green vegetable bug relatice to cotton crop	UQ1403	Dean Brookes	UQ	Mar-13	Jun-16
PhD: Quantifying and mapping the impacts of herbicide drift on cotton (non-target crop)	USQ1404	Luz Cadavid	USQ	Dec-13	Dec-16
PhD: Self-guided drones for tracking irrigation in a cotton field	USQ1402	Derek Long	USQ	Mar-14	Mar-17
PhD: Soil-specific strategic irrigation: identifying saline-sodic water as a resource	NEC1403	Aaditi Dang	NCEA	Mar-14	Jan-17
PhD: The impact of irrigation methods and management strategies on nitrogen fertiliser recovery in cotton	UQ1502	John Smith	UQ	Jul-14	Dec-18
PhD: The physiology of cotton crop nutrition, shade & waterlogging	US1301	Najeeb Ullah	US	Mar-12	Sep-15
Phosphorus availability in raingrown cotton	UNE1501	Brendan Griffiths	UNE	Jul-14	Feb-16
Post doc: Cotton production in a future climate	CSP1501	Katie Broughton	CSIRO	Jul-14	Jan-18
Post doc: Hard to control weeds in northern farming systems - understanding key processes to improve control methods	DAN1402	Sudheesh Manalil Velaydun	NSW DPI	Jul-13	Jun-17
Post doc: Professor of soil biology	UNE1403	Oliver Knox	UNE	Jan-14	Dec-18
Resilient cotton-farming systems in irrigated vertosols: soil quality, carbon and nutrient losses, cotton growth & yield in long-term studies	DAN1503	Guna Nachimuthu	NSW DPI	Jul-14	Jun-17
Soil System Research – physical, chemical and biological processes for plant growth and nutrient cycling down the whole soil profile	UNE1601	Brian Wilson	UNE	Jul-15	Jun-18

Specialist agronomic, physiology and systems support for new and existing region		Steve Yeates	CSIRO	Jul-15	Jun-18
Staying ahead of weed evolution in changing cotton systems	UQ1501	Jeff Werth & Bhagirath Chauhan	QAAFI	Jul-14	Jun-19
Strengthening the Central Highlands cotton production system	DAQ1401	Paul Grundy	QDAF	Jul-13	Jun-16
The implications of 'big data' for Australian agriculture	CRDC1529	Mick Keogh	AFI	Apr-15	Mar-16
Viruses, vectors and endosymbionts: exploring interactions for control	UQ1305	Sharon van Brunschot	UQ	Apr-13	Jun-16

Program two: Industry

Baselining Lower Namoi groundwater and evaluating Pilliga CSG developments		Bryce Kelly	UNSW	Jul-15	Jun-18
Conventional insecticide resistance in Helicoverpa - monitoring, management and novel mitigation strategies in Bollgard III	DAN1506	Lisa Bird	NSW DPI	Jul-14	Jun-19
Cotton industry adaptation to extreme weather and climate change	UWS1301	Brajesh Singh	UWS	Jul-12	Dec-15
Critical thresholds for riparian vegetation regeneration in the northern Murray-Darling Basin	GU1401	Samantha Capon	Griffith University	Jul-13	Jun-16
Demonstration of novel evaporation mitigation technology in large scale trials	CRCP1401	David Solomon	CRC Polymers	Jul-13	Jun-16
Developing the groundwater health index (GHI) as an industry-wide monitoring tool	MQ1501	Grant Hose	MQ	Jul-14	Jun-17
Economic risk assessment of resistance management strategies for Bt cotton	CSE1404	Stuart Whitten	CSIRO	May-14	Jun-16
Helicoverpa egg collecting in cotton regions to support Bt and insecticide resistance monitoring	CCA1401	Fiona Anderson	CCA	Jul-13	Jun-16
Helicoverpa punctigera in inland Australia – what has changed?	UNE1502	Peter Gregg	UNE	Jul-14	Jun-17
Investigating the on-farm risks of aflatoxin contamination of cottonseed	DAN1406	Kathy Schneebeli	NSW DPI	Jan-14	Dec-16
Keeping pest populations lower for longer: Connecting farms and natural systems	CSE1501	Nancy Schellhorn	CSIRO	Jul-14	Dec-17
Managing Bt resistance and induced tolerance in Bollgard III using refuge crops		Mary Whitehouse	CSIRO	Jul-15	Jun-18
Managing Bt resistance, H.punctigera movements & cotton planting windows	CSE1306	Geoff Baker	CSIRO	Jul-12	Jun-16
Managing climate variability program	GRDC1401	Beverley Henry	GRDC	Jul-13	Jun-16
Managing riparian corridors on cotton farms for multiple benefits		Rhiannon Smith	UNE	Jul-15	Jun-18
Measuring deep drainage from a cotton/wheat trial	CLW1301	Anthony Ringrose-Voase	CSIRO	Jul-12	Jun-16
Monitoring to manage resistance to Bt toxins	CSE1402	Sharon Downes	CSIRO	Jul-13	Jun-16
National cotton NRM technical specialist (CottonInfo technical specialist)	CRDC1501	Stacey Vogel (Stacey Vogel Consulting)		Jul-14	Jun-17
National facility for cotton climate change research	CSP1402	Michael Bange	CSIRO	Jul-13	Dec-16
NCEDD - Stewardship of biotechnologies and crop protection (CottonInfo technical specialist)		Sally Ceeney	Consultant	Jul-15	Jun-18
PhD: Effects of climatic fluctuation and landuse change on soil condition in the lower Lachlan	US1403	Patrick Filippi	USYD	Mar-14	Mar-17
PhD: Evolution of viral diversity and virus ecology in the management of resistance to biopesticides	QUT1402	Chris Noune	QUT	Jan-14	Jun-17

PhD: Spatial & temporal importance of diffuse & stream recharge in semiarid environments: Implications for integrated water mgt	UNSW1403	Calvin Li	UNSW	Mar-14	Feb-17
PhD: Sustainable water extractions: Low flow refugia and critical flow thresholds	UNE1406	Marita Pearson	UNE	Jan-14	Dec-19
Resilience assessment of the Australian cotton industry at multiple scales	CRDC1502	Francesca Andreoni	Bel Tempo	Jul-14	Jun-17
Silverleaf whitefly resistance monitoring 2013-2016	DAQ1403	Jamie Hopkinson	QDAF	Jul-13	Jun-16
Substitutes for pupae busting-commercial scale trials of moth busting	UNE1301	Peter Gregg	UNE	Jul-12	Dec-15
Surveillance and studies for endemic and exotic virus diseases of cotton		Murray Sharman	QDAF	Jul-15	Jun-19
Surveillance for exotic cotton viruses: multiple targets in and nearby Australia	DAQ1405	Cherie Gambley	QDAF	Jul-13	Jun-16
The impact of improved water use efficiency on paddock and catchment health	DNRM1401	Mark Silburn	DNRM	Jul-13	Jun-16
The sustainable chemical control and resistance management of aphids, mites and mirids in Australian cotton: 2014-2019	DAN1507	Grant Herron	NSW DPI	Jul-14	Jun-19

Program three: Customers

A review of emission methodologies for the Australian cotton industry & development of a detailed study for NW NSW (Commissioned)	DAN1508	Pip Brock	NSW DPI	Jul-14	Dec-15
Breathable cotton for compression athletic wear		Maryam Naebe	DeakinU	Jul-15	Jun-17
Determining the shelf life of round modules and impact on cotton quality	CMSE1501	Menghe Miao	CSIRO	Jul-14	Jun-16
Developing renewable fine chemicals from cotton biomass		William Doherty	QUT	Jul-15	Jun-18
Enhancing and testing the Cotton Carbon Management Tool	UQ1503	Francois Visser	UQ	Jul-14	Jun-16
Ever-dry self-cooling cotton fabrics	DU1402	Tong Lin	DeakinU	Jan-14	Dec-15
Identifying the glass transition temperature behaviour of Australian cotton	CMSE1201	Chantal Denham	CSIRO	Jul-11	Dec-15
Measuring and managing fibre elongation for the Australian cotton industry	CMSE1504	Shouren Yang	CSIRO	Jul-14	Jun-16
Novel anti-wetting & self-sterilising cotton fabrics	DU1501	Xin Liu and Yun Zhau	DeakinU	Jul-14	Jun-17
Novel spinning technologies for fine and high quality Australian cotton yarns	DU1502	Xungai Wang	DeakinU	Jul-14	Jun-17
PhD: Effects of cotton cellulose structure & interactions on dye uptake	CMSE1308	Genevieve Crowle	CSIRO	Jul-12	Jun-16
PhD: High value bio-extractives and bioethanol from cotton gin trash	DAN1504	Mary Egbuta	NSW DPI	Jul-14	Aug-17
PhD: Improving length, strength and fineness of cotton fibre	DU1401	Rangam Rajkhowa	DeakinU	Jan-13	Jan-16
PhD: Low wax Australian cotton - reducing the scouring requirements of cotton fabric	CMSE1403	Katherine Birrer	CSIRO	Apr-14	Mar-17
Raising the quality of Australian cotton through post harvest initiatives	CMSE1503	Rene van der Sluijs	CSIRO	Jul-14	Jun-17
Smart cotton/carbon fabrics for electromagnetic interference shielding		Jin Zhang	DeakinU	Jul-15	Jun-18
The contribution of cotton cellulose crystallites to fibre strength	CMSE1502	Stuart Gordon	CSIRO	Jul-14	Jun-16

Program four: People

AACS 2015 Australian Cotton Researcher Conference	CRDC1520	Paul Grundy	AACS	Jan-15	Oct-15
Australian cotton production and best practice documentaries	DAQ1302	Paul Grundy	QDAF	Jul-13	Jun-16
Australian Rural Leadership Program			ARLP	Jul-15	Jun-16
CCRSPI	CCR1201	Heather Hemphill	RIRDC	Jul-13	Jun-16
Co-investment in PIEF Membership for the cotton industry	CA1503	Adam Kay	CA/PIEF	Jul-13	Jun-16
Collaborative partnership - primary industries health and safety	RIRDC1301	Simon Winter (Joint Partnership RIRDC)		Aug-12	Jun-17
Cotton Conference foundation sponsorship			CA	Jul-15	Sep-16
Cotton ginning training program	CMSE1302	Rene Van der Sluijs	CSIRO	Jul-12	Dec-15
Cotton industry leadership development strategy	RIR1401	Matt Linnegar	ARLF	Jul-13	Jun-16
Cotton industry young professionals program	USQ1501	Kay Lembo	USQ	Jan-15	Dec-15
CRDC Grassroots grants			CGAs	Jul-15	Jun-16
CRDC summers and honours scholarships				Jul-15	Jun-16
Developing education capacity for the Australian cotton industry (CottonInfo technical specialist)		Trudy Staines	CSIRO	Jul-15	Jun-18
Education and Development of the Cotton Industry	CGA1507	Emma Ayliffe	CGA	Dec-14	Dec-15
Horizon Scholarships 2013 - Alana Johnson	RIRDC1305	Alana Johnson	RIRDC	Apr-13	Dec-15
Horizon Scholarships 2013 - Charlie French	RIRDC1303	Charlie French	RIRDC	Apr-13	Dec-15
Horizon Scholarships 2013 - Emily Miller	RIRDC1306	Emily Miller	RIRDC	Apr-13	Dec-15
Horizon Scholarships 2013 - Jessica Kirkpatrick	RIRDC1302	Jessica Kirkpatrick	RIRDC	Apr-13	Dec-16
Horizon Scholarships 2013 - Paul Sanderson	RIRDC1304	Paul Sanderson	RIRDC	Apr-13	Dec-16
Horizon Scholarships 2014 - Alana Martin	RIRDC1404	Alana Martin	RIRDC	Mar-14	Dec-17
Horizon Scholarships 2014 - Felicity Taylor	RIRDC1401	Felicity Taylor	RIRDC	Mar-14	Dec-17
Horizon Scholarships 2014 - Grace Scott	RIRDC1402	Grace Scott	RIRDC	Mar-14	Dec-17
Horizon Scholarships 2014 - Michael Wellington	RIRDC1405	Michael Wellington	RIRDC	Mar-14	Dec-17
Horizon Scholarships 2014 - Sam Johnston	RIRDC1403	Sam Johnston	RIRDC	Mar-14	Dec-17
Horizon scholarships 2015 - Camilla a'Beckett	RIRDC1504	Camilla a'Beckett	RIRDC	Jul-15	Jun-17
Horizon scholarships 2015 - Scott Nevison	RIRDC1503	Scott Nevison	RIRDC	Jul-15	Jun-17
IREC field station upgrade (jointly funded with CSD)	IREC1501	Rob Houghton	IREC	Jul-14	Jun-17
Nuffield Farming Scholarship - Matthew McVeigh	CRDC1413	Matthew McVeigh	Nuffield	Oct-14	Sep-16

Nuffield Farming Scholarship - Nigel Corish	CRDC1412	Nigel Corish	Nuffield	Oct-13	Sep-15
Nuffield Farming Scholarship - Thomas Quigley	CRDC1516	Thomas Quigley	Nuffield	Jul-15	Jun-16
People in farming - employment starter kit	DA1502	Shane Hellwege	Dairy Australia	Jul-14	Jun-17
Peter Cullen Trust			Peter Cullen Trust	Jul-15	Jun-16
PhD: Career motivational factors of cotton growers' (attraction and retention)	USQ1401	Geraldine Wunsch	USQ	Jul-13	Dec-16
PhD: Human capacity needs and management on cotton farms	UNE1402	Will Winter	UNE	Jul-13	Jun-16
PhD: Investigating cotton farm workers' experiences of job satisfaction using social cognitive career theory	USQ1403	Nicole McDonald	USQ	Jan-14	Jan-17
Science innovation awards	ABA1501		ABARES	Jul-15	Jun-16
Smart technology for best practice work health and safety (WH&S) by cotton growers	US1501	Tony Lower	USYD	Jul-14	Aug-15
Soils cross-sectoral strategy	DAFF1401		Dept of Ag	Jun-14	Jun-17
Stimulating Private sector extension			UMelb	Apr-15	Jun-18
Summer/Honours Scholarship: Benefits of plastic clad cotton	US1504	Elizabeth Shakeshaft	US	Nov-14	Nov-15
Summer/Honours Scholarship: Investigation of soil properties that have changed root soil profile exploration in cotton	UNE1504	Fanny Tisseau Des Escotais	UNE	Jan-15	Nov-15
Summer/Honours Scholarship: Using the Green & Ampt infiltration model on cracking clay soils with CP&LM sprinklers	NEC1502	Simon Kelderman	NCEA	May-15	Jul-15
The impact of farm workforce turnover in the cotton sector	UM1501	Geoff Kuehne/Ruth Nettle	UMelb	Jul-14	Dec-15
UNE Cotton Production Course		Brendan Griffiths	UNE	Jul-15	Jun-18
Water cross-sectoral strategy				Jul-15	Jun-16
Workforce Development Strategy	CRDC1530	Ross Ord	AFSS	May-15	Jul-15
World Cotton Conference				Jul-15	Jun-16

Program five: Performance

'Science into best practice,' linking research with CottonInfo (CottonInfo technical specialist)	CSP1504	Sandra Williams	CSIRO	Jul-14	Jun-17
Annual Cotton Grower Practices Surveys: 2014, 2015 & 2016	RRR1501	Ingrid Roth	Roth Rural	Jul-14	May-17
Annual qualitative and quantitative surveys for the Australian cotton industry		Liz Todd	CCA	Jul-15	Jun-18
Boyce Cotton Comparative Analysis			BCA	Jul-15	Jun-16
Integrated economic environmental & social performance reporting of cotton industry	RRR1403	Guy Roth	Roth Rural	Jul-13	Jun-16

KEY

AACS	Australian Association Cotton Scientists
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
AFI	Australian Farm Institute
AFSS	Agri Food Skill Solutions
ARLF	Australian Rural Leadership Foundation
ARLP	Australian Rural Leadership Program
BCA	Boyce Chartered Accountants
CA	Cotton Australia
CA/PIEF	Cotton Australia/Primary Industries Education Foundation
CCA	Crop Consultants Australia
CGAs	Cotton Grower Associations
CRC Polymers	Polymers Cooperative Research Centre
CRDC	Cotton Research and Development Corporation
CSD	Cotton Seed Distributors Ltd
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DeakinU	Deakin University
Dept of Ag	Federal Department of Agriculture
DNRM	Queensland Department of Natural Resources and Mines
GRDC	Grains Research and Development Corporation
GVIA	Gwydir Valley Irrigators Association
IREC	Irrigation Research and Extension Committee
MQ	Macquarie University
NCEA	National Centre for Engineering in Agriculture
NSW DPI	NSW Department of Primary Industries
QAAFI	Queensland Alliance for Agricultural and Food Innovation
QDAF	Queensland Department of Agriculture and Fisheries
QUT	Queensland University of Technology
RIRDC	Rural Industries Research and Development Corporation
UMelb	University of Melbourne
UNCGA	AgVance Upper Namoi Cotton Growers Association and AgVance
UNE	University of New England
UNSW	University of New South Wales
UQ	University of Queensland
USQ	University of Southern Queensland
USYD	University of Sydney
UWS	University of Western Sydney

Photo: Melanie Jenson

Attachment B: Alignment of CRDC R&D expenditure in line with Government priorities

Table A

Research and development expenditure estimates 2015-16 across the Science and Research Priorities

Food ($'000)						Soil and Water ($'000)			Transport ($'000)			Cybersecurity ($'000)			
1.1.	1.2	1.3.1	1.3.2	1.3.3	1.3.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	4.4
$1,199	$1,896	$1,144	$1,464	$4,526	$236	$418	$2,324	$1,513	-	-	-	-	-	-	-

Energy ($'000)			Resources ($'000)				Advanced Manufacturing ($'000)			Environmental Change ($'000)			Health ($'000)				Total ($'000)
5.1	5.2	5.3	6.1	6.2	6.3	6.4	7.1	7.2	7.3	8.1	8.2	8.3	9.1	9.2	9.3	9.4	
-	$258	-	-	$274	-	$100	$141	-	$376	$248	$218	$560	-	$60	$10	$23	$16,988

Science and Research Priorities:

PRIORITY 1: Food

1.1 Knowledge of global and domestic demand, supply chains and the identification of country specific preferences for food (and fibre).

1.2 Knowledge of the social, economic and other barriers to achieving access to healthy Australian food (and fibre).

1.3 Enhanced food production through:

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

PRIORITY 2: Soil and Water

2.1 New and integrated national observing systems, technologies and modelling frameworks across the soil-atmosphere-water-marine systems.

2.2 Better understanding of sustainable limits for productive use of soil, freshwater, river flows and water rights, terrestrial and marine ecosystems.

2.3 Minimising damage to, and developing solutions for restoration and remediation of, soil, fresh and potable water, urban catchments and marine systems.

PRIORITY 3: Transport

3.1 Low emission fuels and technologies for domestic and global markets.

3.2 Improved logistics, modelling and regulation: urban design, autonomous vehicles, electrified transport, sensor technologies, real time data and spatial analysis.

3.3 Effective pricing, operation, and resource allocation.

PRIORITY 4: Cybersecurity

4.1 Highly-secure and resilient communications and data acquisition, storage, retention and analysis for government, defence, business, transport systems, emergency and health services.

4.2 Secure, trustworthy and fault-tolerant technologies for software applications, mobile devices, cloud computing and critical infrastructure.

4.3 New technologies and approaches to support the nation's cybersecurity: discovery and understanding of vulnerabilities, threats and their impacts, enabling improved risk-based decision making, resilience and effective responses to cyber intrusions and attacks.

4.4 Understanding the scale of the cyber security challenge for Australia, including the social factors informing individual, organisational, and national attitudes towards cyber security.

PRIORITY 5: Energy

5.1 Low emission energy production from fossil fuels and other sources.

5.2 New clean energy sources and storage technologies that are efficient, cost-effective and reliable.

5.3 Australian electricity grids that can readily integrate and more efficiently transmit energy from all sources including low- and zero-carbon sources.

PRIORITY 6: Resources

6.1 A fundamental understanding of the physical state of the Australian crust, its resource endowment and recovery.

6.2 Knowledge of environmental issues associated with resource extraction.

6.3 Lowering the risk to sedimentary basins and marine environments due to resource extraction.

6.4 Technologies to optimise yield through effective and efficient resource extraction, processing and waste management.

PRIORITY 7: Advanced Manufacturing

7.1 Knowledge of Australia's comparative advantages, constraints and capacity to meet current and emerging global and domestic demand.

7.2 Cross-cutting technologies that will de-risk, scale up, and add value to Australian manufactured products.

7.3 Specialised, high value-add areas such as high-performance materials, composites, alloys and polymers.

PRIORITY 8: Environmental Change

8.1 Improved accuracy and precision in predicting and measuring the impact of environmental changes caused by climate and local factors.

8.2 Resilient urban, rural and regional infrastructure.

8.3 Options for responding and adapting to the impacts of environmental change on biological systems, urban and rural communities and industry.

PRIORITY 9: Health

9.1 Better models of health care and services that improve outcomes, reduce disparities for disadvantaged and vulnerable groups, increase efficiency and provide greater value for a given expenditure.

9.2 Improved prediction, identification, tracking, prevention and management of emerging local and regional health threats.

9.3 Better health outcomes for Indigenous people, with strategies for both urban and regional communities.

9.4 Effective technologies for individuals to manage their own health care, for example, using mobile apps, remote monitoring and online access to therapies.

Table B

Research and development expenditure estimates 2015-16 across the Rural Research and Development priorities.

PRODUCTIVITY AND ADDING VALUE ($'000)	SUPPLY CHAIN AND MARKETS ($'000)	NATURAL RESOURCE MANAGEMENT ($'000)	CLIMATE VARIABILITY AND CLIMATE CHANGE ($'000)	BIOSECURITY ($'000)	SUPPORTING THE R&D PRIORITIES		TOTAL ($'000)
					INNOVATION SKILLS	PRIORITIES	
$7,017	$1,394	$2,349	$543	$2,210	$2,210	$736	$16,988

Photo: Alan Redfern

Australian Government

Cotton Research and Development Corporation

Postal: PO Box 282, Narrabri NSW 2390

Offices: 2 Lloyd Street, Narrabri NSW 2390

Tel: 02 6792 4088 **Fax:** 02 6792 4400 **Email:** research@crdc.com.au

Web: www.crdc.com.au

Cotton Research and Development Corporation
ABN: 71 054 238 316