



Australian Government
**Cotton Research and
Development Corporation**

Cotton Research and
Development Corporation

Annual Report 2006–07



THE RURAL RESEARCH AND DEVELOPMENT CORPORATIONS MODEL

The Rural Research and Development Corporations (RDCs) model is a unique Australian innovation. It was established and supported by the Australian Government to provide an industry-driven, market-responsive approach to rural innovation.

The fifteen Corporations, including CRDC, all take a leading national role in planning, investing in and managing research and development for their respective industries. RDCs are not research “grant” agencies, and our enabling legislation uniquely requires them to treat R&D as an investment in economic, environmental and social benefits to their industries and to the people of Australia.

Rather than focusing mainly on generating new knowledge for its own sake, RDCs strive to deliver high rates of return on research and development investment by influencing the full range of interactions along the innovation chain.

Striving for high returns on investment also leads RDCs to apply significant resources to translating research outputs into practical outcomes and to directly influence uptake of adoptable R&D.

RDCs are required to conduct their activities in accordance with strategic research and development plans and annual operational plans that take account of the needs of end-users and other stakeholders. The plans are approved at ministerial level.

Although RDCs fund basic research, a high proportion of activity is applied research and development – both short-term and long-term.

RDCs are fully accountable to their major stakeholders and to the wider community.



Australian Government

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LETTER OF TRANSMITTAL

8 October 2007
The Hon Sussan Ley MP
Parliamentary Secretary to the Minister
for Agriculture, Fisheries and Forestry
Parliament House
Canberra ACT 2600

Dear Ms Ley

It is with great pleasure that I submit the Corporation's Annual Report for 2006–07, prepared in accordance with the provisions of section 28 of the *Primary Industries and Energy Research and Development Act 1989* and section 9 of the *Commonwealth Authorities and Companies Act 1997*.

Under Section 9 of the *Commonwealth Authorities and Companies Act 1997*, the Directors of the CRDC are responsible for the preparation and content of the Annual Report being made in accordance with the Finance Minister's orders. The report of operations has been prepared in accordance with a resolution of the Directors on 7 August 2007.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Michael Logan', written over a light grey rectangular background.

Michael Logan
Chair

CONTENTS

EXECUTIVE SUMMARY

From the Chair and Executive Director	1
Corporate highlights	4
Triple bottom line highlights	5
Financial highlights	12
Collaboration and cooperation	15

CONTEXT

About CRDC	16
About the Australian cotton industry	20

STAKEHOLDER RELATIONS

The Australian Cotton Growers Research Association	22
The Australian Government	23
Meeting Government expectations	23
Australian Government research priorities	25

REPORT OF OPERATIONS

Research and Development	31
Program One: People and Knowledge	31
Program Two: Integrated Natural Resource Management	42
Program Three: Crop Protection	48
Program Four: Farming Systems	58
Program Five: Plant Breeding and Biotechnology	64
Program Six: Value Chain	69
Corporate Governance	74

FINANCIAL STATEMENTS

88

APPENDICES AND INDEX

Appendix One: CRDC Selection Committee Report	115
Appendix Two: Additional activities	116
Appendix Three: Tracking CRDC's position	118
Appendix Four: Research and Development portfolio	119
Appendix Five: Final Projects Reports 2006–07	125
Appendix Six: Acronyms and terminology	127
Appendix Seven: Legislative Compliance Index	129
Appendix Eight: Subject Index	131

FIGURES

Figure 1	Triple Bottom Line Investments by Program 2006–07	5
Figure 2	2006–08 Levy and Commonwealth Contributions	12
Figure 3	CRDC's 2006–07 Revenue by Source	13
Figure 4	2006–07 Expenditure by Type	13
Figure 5	Expenditure by R&D Program 2006–07	13
Figure 6	Production in drought affected years	20
Figure 7	CRDC NRM Investments in 2006–07	43
Figure 8	Annual quantities of insecticide and acaricide applied to the Australian cotton crop between 1995–96 and 2005–06	49
Figure 9	North West NSW river water samples containing herbicides used on cotton	52
Figure 10	Reduction in weed control methods since the introduction of Roundup Ready®	53
Figure 11	Percentage of growers who follow Integrated Weed Management guidelines	53
Figure 12	F-rank for 2006–07 under the old and new ranking system	55



Executive Summary

FROM THE CHAIR AND EXECUTIVE DIRECTOR



Looking back.....

The cotton industry, agriculture and rural Australia as a whole continued to be affected by drought and the 2006–07 season saw the smallest area planted to cotton for 20 years. Looking back, cotton production has been less than 50 per cent of normal levels in three of the last five years, a situation made worse by low cotton prices in \$A terms. Understandably, the impact of the current downturn is testing the resilience of a dynamic and innovative industry whose growers are noted for their willingness to adopt research outcomes.

Given these circumstances, it is remarkable that the latest estimate of cotton produced in the 2007 harvest is 1.2 million bales of largely high quality cotton, which will contribute over \$400 million to Australia's exports and offset the economic impact of drought on cotton-related businesses and communities. It is also noteworthy that internationally the Australian cotton industry continued to be recognised as a leader in the sustainable production of cotton.

The Corporation is, equally, not immune to the impacts of drought, which has meant a significant reduction in industry levies and Australian Government contributions. But given conservative budgeting, the benefit of financial reserves and prudent management of R&D expenditure, the Corporation has been able to maintain R&D investments at a level that underpins the delivery of the outcomes sought in the CRDC Strategic Plan 2003–08.

During the year the Corporation had to deal with some significant financial variations to the 2006–2007 Annual Operating Plan, with actual expenditure some \$2.2 million below the level we had budgeted for. Principal among these circumstances was notification by a major research provider that they had declined \$1 million in funds as previously requested and budgeted. Other major expenditure variations related to the commissioned research budget, with the delayed recruitment of six new regional Extension Officers, whose salaries had been provided for in the 2006–07 budget. In addition, CRDC's contribution to the National Program for Sustainable Irrigation, was met with carry-over money from the 2005–06 year instead of with the money budgeted for the 2006–07 year.

The Corporation considered whether to reallocate these funds but decided not to, given high levels of support for core R&D programs, the reduced revenue outlook and limited time to utilise funds in a manner that would deliver against CRDC's strategic objectives. It does, however, mean that end of year reserve funds are higher than budgeted.

Outcomes from several emerging areas of R&D were of note in 2006–07. The Australian cotton industry has given particular emphasis to its progress and preparedness in addressing the high profile issues of greenhouse gas emissions, carbon trading, energy use and its response or adaptation to climate change. CRDC-funded research is providing growers with agronomic guidelines to reduce their emissions and a simple greenhouse gas calculator, which is allowing them to calculate their greenhouse footprint. A more sophisticated calculator is under development. Measurements taken at Dalby and Narrabri within the CRDC-funded project have allowed Australia to argue for a lower emission factor of 0.5 per cent for irrigated cotton than the Intergovernmental Panel for Climate Change default benchmark of 1.25 per cent. This benchmark refers to the nitrous oxide produced as a percentage of total nitrogen applied to the crop.

In considering the issue of the farm carbon footprint created by energy and fertiliser use, CRDC has identified that there are few tools and little information for growers. We see significant opportunity for collaborative programs with other Rural R&D Corporations and Government, to give growers the capacity to audit their energy use across all their operations, as a starting point for improving their efficiency.

Current severe water shortages strengthened the cotton industry's determination to measure and improve its water use efficiency (WUE). In 2006 the industry adopted an aspirational industry-wide goal of doubled water use efficiency by 2015. A major review of water use benchmarking information and research, conducted by the Cotton Catchment Communities CRC, demonstrated the difficulty in using any single index to measure WUE across a whole industry. CRDC considers that demonstrating the industry's capacity to improve WUE is best achieved through using the Best Management Practice (BMP) Land and Water Management module to monitor practice change. A range of detailed case studies is being developed to demonstrate the application and benefits of these practice changes on individual farms.

The Australian Government-funded EMS Fibre Pathways project, which concluded in June 2006 after three years, sought to explore the opportunity for improved NRM outcomes through the creation of a point of market differentiation as a consequence of extending the BMP program into the entire production chain. Cooperation along the supply chain, from seed breeders through to growers, harvesters, ginners, merchants and shippers, is the key to increasing the quality and environmental assurances for Australian cotton. This project has facilitated ongoing and close cooperation between all these industry sectors and the process is nearing completion, with ginners adopting their own Best Management Practices code.

While the rate of uptake of BMP by growers has slowed, with drought as a significant factor, the program has been a major stimulant in improving the industry's environmental performance, public image and acceptance. CRDC is working with Cotton Australia to update the existing BMP manual and to develop e-BMP: an interactive electronic version of the BMP manual that will increase ease of use and accessibility for growers and offer those implementing BMP ease of management in assisting multiple growers. Through a new Australian

Government-funded EMS project, the industry will be developing a set of environmental performance indicators for cotton that are consistent with those being developed in the grains and beef industries. As many cotton farmers also are part of these industries, this is particularly important for whole-of-enterprise sustainability. Environmental performance indicators relevant to Regional NRM Bodies and Catchment Management Authorities, with resource condition targets linked to BMP information, are also being developed and will provide further information to the industry on its environmental performance.

The Corporation owes much to the retiring Chair Bridget Jackson for her seven years of service and notes its appreciation of the contribution of Government Directors Simon Smalley and Ian Robinson.



CRDC Board members Bruce Finney, Leith Bouilly, Dick Browne, TJ Higgins, Lisa Wilson and David Conners. Inset: Glenn Fresser

Looking forward...

With the cotton industry entering the 2007–08 season still suffering from persistent drought, the CRDC has budgeted on production of 1.0 million-bales and a 20 per cent reduction in expenditure in its Annual Operating Plan. The most recent indications are that due to lack of irrigation water, plantings may be significantly lower than in 2006–07. The challenge will be to maintain capacity within areas of high priority research and the excellent human resources that support it.

Nevertheless, the Corporation remains focused on strategically investing in research, development and adoption to enhance the performance of the Australian cotton industry. When the drought finally breaks the industry will be well positioned to take advantage of the new knowledge and tools generated from R&D.


The 2007–08 year is the last year of the Strategic Plan 2003–08. With a range of climatic and economic challenges facing the cotton industry, we have seen it as vitally important to work carefully, methodically and inclusively to develop the best possible Strategic Plan to address these challenges through to 2013.

As CRDC develops its Strategic R&D Plan for 2008–2013, we are giving serious consideration to a changing global and domestic environment, both commercial and technological. The Corporation has invested substantially in biotechnology and germplasm in the past on the promise of the benefits it would deliver for the industry and this has been outstandingly successful. But, globally, the increasing consolidation in ownership of germplasm and biotechnology traits represents new opportunities and threats for the Australian cotton grower. Similarly the trading environment for Australian cotton continues to be redefined by significant shifts in the international textile industry. The Corporation is scoping the opportunity to invest in R&D that

underpins the capacity of the Australian industry's supply chain and to add value to the Australian crop.

On 24 August 2007, the Parliamentary Secretary advised the appointment of a new CRDC Chair, Mr Mike Logan. Mr Logan is well known to CRDC through his leadership in environmental management, his best practice cotton enterprise and his directorships with one of our collaborative partners, Land and Water Australia, and Cotton Australia. We welcome Mike and look forward to the next year's operations under his guidance.

We commence the coming year with many challenges to consider but with optimism for the future of the Australian cotton industry and its capacity to adapt to change and to seize new opportunities.



Richard Browne
Acting Chair

Bruce Finney
Executive Director

MS BRIDGET JACKSON

Following seven distinguished years in the position, Bridget Jackson resigned as Chair of CRDC on 31 December 2006.

As Chair, Ms Jackson cemented a rigorous method to guide investment industry and public funding of research, development and extension. Underpinning her approach was an inclusive style that empowered both the Board and senior staff to excel in their work.

As Chair, Ms Jackson oversaw development of the important Strategic Plan 2003–2008 which for the first time embedded Triple Bottom Line accountability and reporting. She ensured this was achieved while guiding the Corporation during fluctuating industry fortunes and resources.

During her tenure, the Corporation's operational capacity grew to meet the escalating levels of rigour and performance demanded by the broader community as well as government and industry stakeholders.

In responding to the maturing of the cotton industry, Ms Jackson oversaw the independent environmental audit of the cotton industry.

She was, as a result, in a position to herald the excellent combined effort of producers and its research science in meeting and exceeding the cotton industry's march to environmental outcomes which clearly benefited and spilled over to broader regional and national communities.

Ms Jackson was highly regarded for her unswerving devotion to continuous improvement in governance including the adoption of the Corporation's first Board Charter and the development of a comprehensive policy on Intellectual Property.

The Board and staff of CRDC, and the wider cotton industry, thank Bridget Jackson for her guidance and contribution over the years and wish her well in her future endeavours.



Bridget Jackson with her son Angus at her official farewell in December 2006

CORPORATE HIGHLIGHTS

The reporting year saw the retirement of Bridget Jackson as Chair on 31 December 2006, with Dick Browne assuming the role of Acting Chair for the remainder of the reporting year. Government Director, Simon Smalley, resigned in March 2007, with Ian Robinson of the Department of Agriculture, Fisheries and Forestry taking his place. Mr Robinson attended two board meetings before the Primary Industries and Energy Research and Development Amendment Act 2007 terminated the position of Government Director in May 2007.

CRDC entered the second year of its relationship with the Cotton Catchment Communities CRC, which commenced operations in July 2005. CRDC is closely involved in most aspects of the new CRC's program. As the CRC's major financial partner, CRDC will provide it with \$4 million a year over its seven years of operation for research, development and extension projects that address both organisations' strategic objectives.

As part of its plan of continuous corporate improvement:

- The Board's Audit Committee completed a review of the Corporation's risk management framework and risk register in the first half of 2007, with a number of changes made and priorities identified. Some of the new and revised policies have already been formalised, including Terms of Employment, Equal Employment Opportunity and Harassment, Appropriate Internet and Email Access and Government Protective Security: that is, the security aspects of security assets, people and information, which will now all receive a security classification.
- As a consequence of this work, a new Risk Management Plan for 2007–08, will allow CRDC to better identify and manage risks. The 2007–08 year will see further policy development and implementation in areas such as overall protective security for the Corporation, including the business continuity/crisis management plan.
- Following an external review of Board operations, the Board Charter has been amended to better guide policy, procedures and responsibilities for Board members and staff.

- CRDC staff remained stable during the year with one vacant position, that of Communication Manager, filled by Rohan Boehm in October 2006. Rohan brings a number of years of experience in rural media and communications to the position.

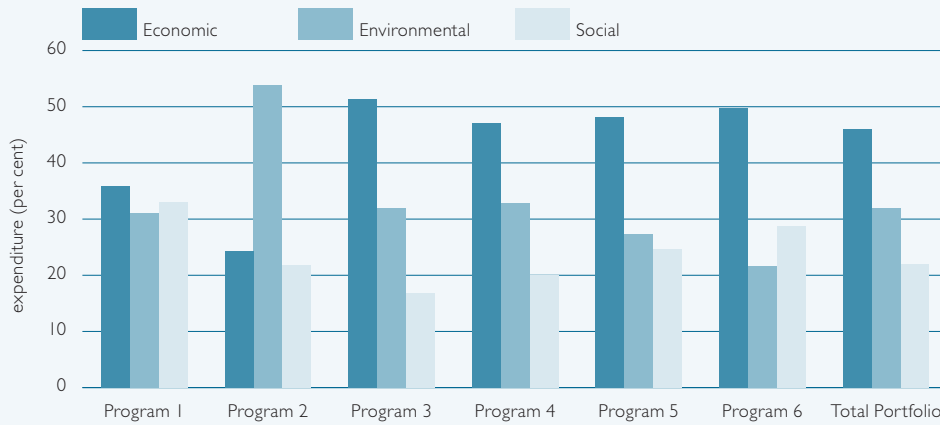


Communication Manager,
Rohan Boehm

- During the year, CRDC provided staff with training in diverse areas ranging from molecular transformation to communications and negotiations, business and finance, defensive driving and occupational health and safety. CRDC also paid fees for external university courses and governance programs.
- CRDC has received ten recommendations on priorities, gaps, overlaps and other issues important to future research arising out of an external review of the cotton disease research it funds. The review panel commended CRDC for supporting a portfolio of applied, strategic and basic research projects that has generally addressed the needs of the industry

TRIPLE BOTTOM LINE HIGHLIGHTS

Figure 1 Triple Bottom Line Investments by Program 2006–07



Tracking Environmental Performance

Planned Environmental Output

Sustainable production systems and catchments

Progress towards Planned Environmental Output

ENVIRONMENTAL OBJECTIVE

Industry-wide adoption of improved integrated pest management systems

TARGET

A 50 per cent reduction by 2008 in 2004 quantities of insecticide used

EVALUATION OF PROGRESS

Target has been met ahead of time through high levels of adoption and good stewardship of Bt cotton (Bollgard II®) and application of Integrated Pest Management (IPM) practices as evidenced through the continued reduction in insecticide use per hectare in conventional cotton: 2003–04 = 4.43 kilograms of active ingredient per hectare (kg ai/ha), 2004–05 = 3.34 kg ai/ha and 2005–06 = 2.56 kg ai/ha.

(Source: Cotton Consultants Australia Market Audits)

Progress during current 5 year period:

- 2003–04: 3.47 kg ai/ha
- 2004–05: 1.32 kg ai/ha (a reduction of 62 per cent from 2003–04)
- 2005–06: 1.01 kg ai/ha (a reduction of 71 per cent from 2003–04)
- 2006–07 data not yet available but insecticide use of less than 1 kg ai/ha is anticipated, due to low insect numbers and higher plantings of Bollgard II® varieties
- The period 2003–04 to 2005–06 showed a reduction of 62 per cent compared with the period 1998–99 to 2002–03, which had an average insecticide use of 5.12 kg ai/ha

ENVIRONMENTAL OBJECTIVE	
Industry-wide adoption of improved integrated weed management systems	
<p>TARGET</p> <p>A 20 per cent reduction by 2008 in 2004 quantities of residual herbicide used</p>	<p>EVALUATION OF PROGRESS</p> <p>Target met ahead of time.</p> <p>Cotton Consultants Australia report a 32.4 percent reduction in residual herbicide use since the introduction of Roundup Ready® Technology and strong support from cotton growers in the application of Integrated Weed Management practices.</p>
<p>A continued decline in riverine contamination by herbicides used only in cotton production</p>	<p>On target. Combined average detections of four residual herbicides used on cotton in north west NSW rivers have declined by 29 percent over the four seasons 2003–04 to 2006–07 compared with the previous five seasons (1998–99 to 2002–03).</p> <p><i>(Source: NSW Department of Natural Resources)</i></p> <p>This decline is thought to be due to the reduction in the use of these herbicides as a result of the adoption of Roundup Ready® technology and the reduced river flows associated with the drought.</p>

ENVIRONMENTAL OBJECTIVE	
Increased adoption of Best Management Practices (BMP) that meets legal requirements, industry benchmarks and catchment scale targets	
<p>TARGET</p> <p>80 per cent of cotton production audited against BMP Minimum Certification Standards by 2007</p>	<p>EVALUATION OF PROGRESS</p> <p>Achievement of target is lagging. Survey results (below) indicate that there is probably more to be gained in terms of demonstrating improved environmental outcomes by developing the capacity to report on the adoption of the BMPs and practice change, rather than the overall outcome of the BMP audit process.</p> <p>In March 2007, Cotton Australia estimated that 37 per cent of farm entities were either fully certified against BMP standards or had received a Pre-Certification Assessment and produced an estimated 45 percent of the national cotton crop.</p> <p>While having almost half of the total crop produced on farms that meet or are seeking to meet industry BMP standards is seen to be an excellent result for a voluntary environmental management system, it is clear the target set in 2003 is not likely to be achieved in 2007.</p> <p>New steps to speed up implementation:</p> <ul style="list-style-type: none"> • CRDC, Cotton Australia and the Cotton Catchment Communities CRC have agreed to appoint a BMP General Manager who will help to develop a new Business Plan for the industry's BMP program that seeks to improve the value proposition for cotton growers while continuing to achieve good environmental outcomes. • CRDC has commissioned the development of an electronic version of the BMP manual (e-BMP) and will continue the review process commenced in 2005–06 to revise the current edition of the manual. <p>A Cotton Consultants Australia survey, commissioned by CRDC and the CRC, relating to the BMP Land and Water Management module, showed a larger proportion of the BMP accredited growers:</p> <ul style="list-style-type: none"> • Measured Water use Efficiency in terms of bales per megalitre • Monitored their ground water • Measured soil sodicity • Assessed erosion risks • Used soil pits to monitor soil structure • Plant native trees in riparian areas • Provide alternative watering points for stock instead of creeks and rivers • Conducted soil tests every year or before every cotton crop

ENVIRONMENTAL OBJECTIVE	
Improved water use efficiency (WUE)	
<p>TARGET</p> <p>A 20 per cent improvement in farm WUE on farms by 2008, measured against the 2004 median, in bales per megalitre</p>	<p>EVALUATION OF PROGRESS</p> <p>As more information is gathered about on-farm water use efficiency, it has become apparent that attempting to compare water use efficiency improvement across the whole industry with the single measure expressed in this target is not very meaningful. A more effective approach will be to focus on the key best management practices for water management and ensure the industry continues to increase its uptake of these.</p> <p>Since this target was set in 2004, CRDC has contributed to initiatives within the cotton industry to improve water use efficiency. Significant progress on water use efficiency has been made through the industry's yield improvement, due to improved higher yielding varieties and continuous improvement in agronomy. This has been achieved with no net increase in the quantity of water required per hectare.</p> <p>An increased focus on improving the management of water on cotton farms is underway in the industry with all sectors – growers, consultants, irrigation specialists, researchers and extension staff – working towards better measurement of water use in order to understand where inefficiencies exist in their systems and where the most cost effective savings can be made.</p>

Tracking Economic Performance

Planned Economic Output

Profitability and international competitiveness

Progress Towards Planned Economic Output

ECONOMIC OBJECTIVE	
Improved yield (through improved management and breeding of higher yielding, disease, insect and herbicide tolerant cotton varieties)	
<p>TARGET</p> <p>A ten per cent improvement in cotton yield per hectare (two per cent annual or ten per cent over five years)</p>	<p>EVALUATION OF PROGRESS</p> <p>Target achieved ahead of time. Average Australian yields for cotton in the five seasons 1998 to 2002–03 were 6.94 bales per hectare. In the four seasons since 2003–04 the average yields has been 8.25 bales per hectare: a 19.4 per cent increase.</p> <p>Australian cotton farms have the world's highest yields for a major producer (30 per cent ahead of the nearest country).</p> <p>Insect resistant varieties carrying Bollgard II® technology from Monsanto were planted on 86 percent of the cotton area. Bollgard II® varieties have required only 18 percent of the insecticide quantities required to manage pests on conventional crops over the seasons 2003–04 to 2005–06. Similar trends for 2006/07 are anticipated.</p> <p>More options providing greater flexibility for weed management were introduced in 2006–07 with the release of Roundup Ready Flex® varieties and a limited release of Liberty Link® varieties.</p> <p>Availability and adoption of varieties with higher Fusarium wilt tolerance is increasing.</p>

ECONOMIC OBJECTIVE	
Improved cotton fibre quality that meets market and spinner needs	
<p>TARGET</p> <p>Evidence of continuous improvement in five key parameters measured in spinning mill benchmark surveys by 2007</p>	<p>EVALUATION OF PROGRESS</p> <p>Despite drought conditions, the quality of the 2006–07 crop was excellent and almost all micronaire in the acceptable range.</p> <p>The Australian Cotton Shippers Association (ACSA) has received feedback from key international clients concerned about the fibre micronaire of Australian cotton being too high. Many factors influence fibre micronaire including the climatic conditions under which the crop is grown and the characteristics of the varieties.</p> <p>CRDC has invested in a large Field to Fabric project focusing on understanding all key aspects of production on fibre quality. In 2007 this project was modified to ensure that issues relating to fibre fineness were examined.</p> <p>An initiative established under the cotton EMS Pathways project demonstrated the potential for marketing our BMP cotton by facilitating partnerships with overseas retailers. Japanese retailers, IZUMIYA (with 86 stores and a \$3.6 billion turnover), are now sourcing only Australian BMP cotton for their in-house environmentally branded 'Good-i' clothing.</p> <p>Ongoing development of improved technology for measurement of fineness and maturity continues with CRDC support.</p> <p>The development of new varieties is also a critical to the management of fibre fineness. The new variety Sicot 70BRF is being released for the 2007–08 season and will offer growers improved yield with improved fibre fineness.</p>
<p>Evidence that prices for Australian cotton remain above those for competitive cotton growths</p>	<p>Australian cotton remained consistently among the top prices listed for the highest category of upland cotton on the Liverpool Cotton Outlook 'A' index during 2006–07.</p>

ECONOMIC OBJECTIVE	
Increased profitability through better whole farm management	
<p>TARGET</p> <p>Evidence that profit margins are maintained or improving over time (2003 to 2008 both annually and trends over time)</p>	<p>EVALUATION OF PROGRESS</p> <p>Profitability trends on average performing farms are declining. The top 20 percent of farms are distinguished from the average by producing higher yields at lower cost. (Source: the CRDC-supported 2006 BOYCE Cotton Comparative Analysis 2006)</p> <p>Ongoing and widespread drought conditions and current low prices had a significant impact on whole farm profitability on most cotton farms in 2006–07.</p>

Tracking Social Performance

Planned Social Output

Empowered people and communities

Progress Towards Planned Social Output

SOCIAL OBJECTIVE	
Improved skills and qualifications of people at all levels of the industry	
TARGET	EVALUATION OF PROGRESS
<p>Between 2003 and 2008:</p> <ul style="list-style-type: none"> At least 15 new Post-graduates working in areas of high priority future need 	<p>Post-graduate targets will be met.</p> <p>New post-graduates commencing during the period number two in 2003–04; three in 2004–05; six in 2005–06; three in 2006–07, totalling 14 in all.</p> <p>CRDC funded a total of 21 post-graduate scholarships in 2006–07 for students undertaking scientific research relating to cotton or broader natural resource management, with three of the scholarships commencing during the year.</p>
<ul style="list-style-type: none"> At least ten new post-doctoral positions working in areas of high current need 	<p>Post-doctoral targets will be met.</p> <p>Since 2003, CRDC has supported 10 projects involving post-doctoral scientists. Of these, seven have been new post-doctoral projects.</p> <p>Since 2003, CRDC has supported 10 projects involving post-doctoral scientists. Of these, seven have been new post-doctoral projects. In 2006–07, CRDC had no new post-doctoral projects but continued funding three that commenced in 2005–06.</p>
<ul style="list-style-type: none"> 80 per cent of cotton growers having attended a relevant training course in OH&S, IPM or Water Management 	<p>The number of cotton growers is currently reduced by at least one third because of the ongoing drought, making the training target of 80 per cent less meaningful for the time being.</p> <p>The 'Cotton Field to Fabric Training Course: Managing for Quality through the Production Chain' was extended throughout the industry in 2006–07. 74 growers and other industry personnel attended three courses in 2006–07, with eight sponsored by CRDC. The course extended their knowledge of the entire production chain and their role within it in producing high quality fibre.</p> <p>CRDC funded seven researchers to travel overseas during 2006–07, with several individual projects including payment for researchers to undertake travel related to their research projects. In conjunction with the Cotton Catchment Communities CRC, CRDC will be supporting up to 15 researchers to travel to World Cotton Research Conference 4 in Lubbock, Texas, in September 2007.</p> <p>CRDC was a major sponsor of the 13th Australian Cotton Conference in August 2006. Among approximately 1200 participants were 305 growers and 55 consultants who attended plenary research sessions and Hands-On sessions in which small groups worked through a range of issues in-depth, with the researchers involved in those areas</p>

SOCIAL OBJECTIVE

Healthy and resilient communities in cotton producing regions

TARGET

Objective to be reached through combination of targeted areas:

- A reduction in the cotton industry’s environmental footprint (eg. reduced pesticide use, improved water use efficiency, reduced greenhouse gas production)
- Contribution to career opportunities in cotton producing regions
- At least a ten per cent reduction in cotton farm related injuries
- Improved industry economic viability

EVALUATION OF PROGRESS

This target is on track.

The adoption of biotechnology and sound integrated pest and weed management programs has contributed to an 82 percent reduction in the quantities of insecticide applied compared to conventional varieties and a 32 per cent reduction in total (residual and non-residual) in-crop herbicide use, addressing cotton’s impact on regional environments.

A major CRDC project is enhancing the water use efficiency extension effort. With better direct linkages to BMP, it targets whole farm water use efficiency and profitability. Research-driven improvements, combined with the extension efforts of the National Cotton Extension Team and its water specialists, have increased the industry’s water use efficiency by 11 per cent in recent years, but the industry has set further, more stringent goals.

An ongoing collaborative program continues to benchmark the contribution of nitrous oxide in irrigated cotton systems to greenhouse gas emissions. BMPs for minimising emissions have been identified and will be developed through further research.

CRDC assisted with coordination of the Moree Rotary ‘Careers in Cotton’ tour of the Australian Cotton Research Institute for 49 secondary school students from north west NSW.

CRDC-funded training material continues to be used by Farmsafe Australia in their farm OH&S courses.

CRDC-funded workshops in 2007 continued to explore the links between family, health, farm-related accidents and farm stability.

A 19 per cent increase in yields achieved in since 2003 compared to the average for the previous five seasons, lower chemical inputs, and continued improvements in the use of limited water supplies has helped to maintain returns in a period affected by both drought and low market prices.

SOCIAL OBJECTIVE	
Adoption of research outcomes that is leading to improved and more sustainable management practices	
<p>TARGET</p> <p>At least five adoption evaluations conducted per year by members of the National Cotton Extension Team</p>	<p>EVALUATION OF PROGRESS</p> <p>This target is on track</p> <p>CRDC sponsored workshops with Cotton Consultants Australia and ACGRA members in 2006 to identify the extension services regarded as having the highest value and priority. In 2006–07, members of the extension team used this information in the development of annual individual, regional and national plans.</p> <p>An evaluation of the <i>Cotton Pest Management Guide</i> by NSW Department of Primary Industries Namoi District Agronomist, Tracey Farrell, in late 2006 demonstrated that growers and consultants believe this annually produced publication provides relevant and useful information for the management of pests, weeds and biotechnology.</p> <p>CRDC has developed the capacity to conduct on-line surveys and has made this available to the extension team members for their own evaluation and assessment needs. An evaluation of the 2007 Extension Team Workshop outcomes was successfully conducted using this system, to demonstrate its use to team members.</p> <p>A cotton extension project within the Cooperative Venture in Capacity Building <i>On the Fast Track</i> project will develop an improved framework for team members to use in the development of their annual plans at individual, regional and national level and encourage a greater focus on capacity building of skills, knowledge and methodology for evaluation of the outcomes of extension activities and products.</p> <p>CRDC and the Cotton Catchment Communities CRC organised a Farming Systems Forum to identify research gaps and extension needs relating to on-farm energy use. Growers, consultants, researchers and other industry personnel who attended the forums identified a range of possible areas for future research and extension, which will inform planning decisions by both CRDC and the CRC.</p>

FINANCIAL HIGHLIGHTS

Revenue 2006–07

CRDC's revenue is drawn from two main sources. Cotton farmers pay a levy of \$2.25 for each 227-kilogram bale of cotton. The Australian Government matches expenditure of levies on eligible R&D, capped at 0.5 per cent of the gross value of production or the cumulative levy receipts, whichever is the lesser. Royalties from the sale of domestic and international planting seed, interest on investments and research project refunds make up the balance of Corporation income.

The drought-reduced production level means significantly decreased bale levy receipts for both 2006–07 and 2007–08. Combined with a sustained period of low cotton prices, this will continue to constrain Australian Government contributions. The Government's general matching of industry contributions has been limited to 0.5 per cent of the cotton industry's three-year average Gross Value of Production (GVP). The setting and collection of the industry levy is enabled by the *Cotton Levy Act 1982* and the *Primary Industries Levies and Collections Act 1991*.

Cotton levy revenue is collected at the point of ginning: that is, when cotton has been picked and delivered to cotton gins which then separate the cotton lint from the seed. This occurs from March to September of each calendar year, so that cotton

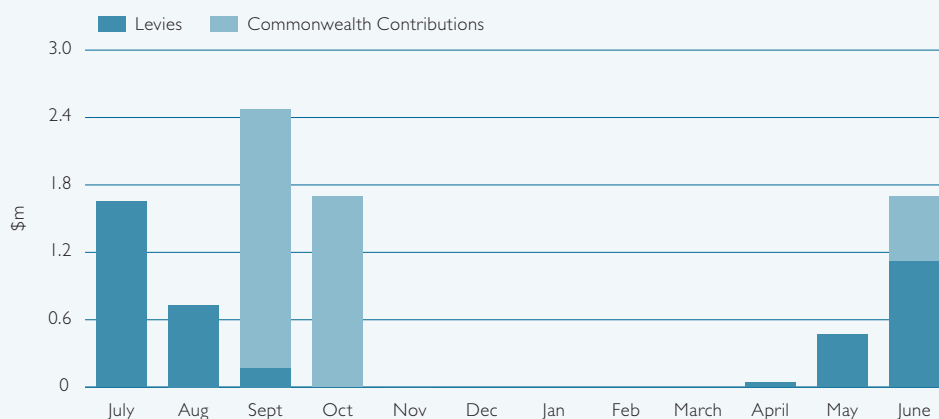
levy revenue in any financial year is drawn from two consecutive cotton crops.

Following a better than expected season in 2005–06, the 2006–07 growing season was badly affected by drought. Forecast production of 2.0 million bales for 2006–07, whilst conservative at the time, proved to be significantly higher than the estimated actual cotton crop size of 1.2 million bales (Source: ABARE, June 2007). As a consequence, revenue of \$11.51 million for 2006–07 is 26 per cent lower than the 2005–06 total of \$15.61 million and 13 per cent below budgeted income of \$13.23 million.

Total revenue of \$11.51 million for 2006–07 comprised:

- Industry levy revenue of \$4.17 million, which includes \$2.55 million (44 per cent) of the 2005–06 crop and \$1.62 million (60 per cent) of the 2006–07 crop.
- \$4.58 million of Australian Government matching of expenditure of levy money, which was capped when expenditure reached the 0.5 per cent of gross value of production of the cotton industry.
- \$1.29 million in royalties from sales of CRDC-funded CSIRO seed varieties, which is 27 per cent below budget.
- \$1.05 million from interest, which was 59 per cent above budget and \$0.161 million above the previous year.
- \$0.42 million from other sources, including project refunds and external grant revenue.

Figure 2 2006–07 Levy and Commonwealth Contributions



Expenditure by R&D Program*

	People and Knowledge	Integrated Natural Resource Management	Crop Protection	Farming Systems	Plant Breeding and Biotechnology	Value Chain	Total
No of projects	41	15	33	26	10	17	142
Program expenditure	\$1.33m	\$0.51m	\$3.41m	\$2.1m	\$1.3m	\$0.83m	\$9.48m

*Excludes Cotton Catchment Communities CRC untied cash contribution of \$100,000 and Corporate research activities of \$537,710.

Figure 3 CRDC's 2006–07 Revenue by Source

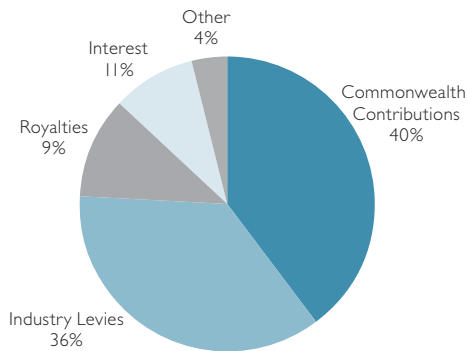


Figure 4 2006–07 Expenditure by Type

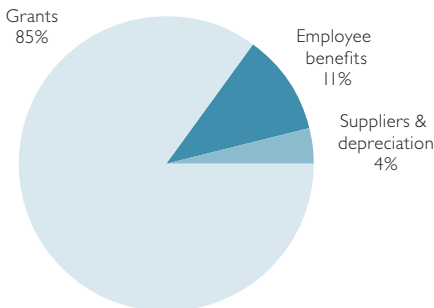
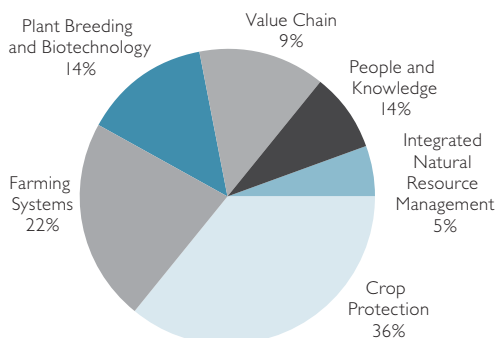


Figure 5 Expenditure by R&D Program 2006–07



Expenditure 2006–07

Total expenditure for 2006–07 was \$11.89 million, 16 per cent below budget expectations. Research expenditure on CRDC's six strategic research programs and research-related Corporate activities was \$10.12 million. Other areas of expenditure for the Corporation included employees and operational expenditure.

Financial position

CRDC reported an actual net deficit of \$0.378 million for 2006–07 as against a conservative budgeted deficit of \$0.924 million, which was based on water shortages for irrigated cotton at the time of budgeting and the effect this was expected to have on crop size. The 2005–06 and 2006–07 crops both contributed to the Corporation's 2006–07 income, with a better than anticipated crop size in 2005–06 but a little over half the estimated crop size in 2006–07.

The Corporation's total equity position of \$15.47 million at 30 June 2007 is a decline of \$0.37 million from the previous year, reflecting the impact of drought on revenue streams, combined with the need to maintain research project expenditure at sustainable levels. As a consequence, the Corporation was obliged to call on reserves to supplement research investment and operational needs, as has been the case in four of the previous five years, all of which have been affected by drought. The equity to expenditure ratio for 2005–06 was 77 per cent: which complies with the 75 per cent minimum ratio policy that enables the Corporation to maintain reserves at a sustainable level.

Triple Bottom Line Outcome and Outputs

Outcome		
<i>A more sustainable, profitable and competitive cotton industry providing increased environmental, economic and social benefits to regional communities and the nation</i>		
Total Budgeted Revenue:		\$13,234,537
Total Actual Revenue:		\$11,509,045
Total Budgeted Cost of Outputs:		\$14,158,469
Total Actual Cost of Outputs:		\$11,887,150

Output 1 – Economic	Output 2 – Environmental	Output 3 – Social
<i>Profitability and international competitiveness</i>	<i>Sustainable production systems and catchments</i>	<i>Empowered people and communities</i>
Actual revenue: \$5,294,161	Actual revenue: \$3,682,894	Actual revenue: \$2,531,990
Budgeted cost: \$6,664,966	Budgeted cost: \$4,478,648	Budgeted cost: \$3,014,855
Actual cost: \$5,468,089	Actual cost: \$3,803,888	Actual cost: \$2,615,173

Total cost is shown rather than total price because the Corporation is primarily funded through industry levies rather than on the basis of the price of its Outputs. Each research project and its funding contributes to one or more of the three Outputs. Total research expenditure for each Output is calculated, with the remaining expenditure attributed to the Outputs on a pro rata basis.

The coming year

Revenue

The difficult drought-affected conditions faced by the Australian cotton industry in recent seasons will continue to have a significant impact on levels of production. Most cotton regions have received some rain in May and June 2007 but it is too early to say with any confidence that this improves the season's outlook, as cotton planting does not occur until September.

Water availability will continue to be a significant constraint on production in the coming year, as will the continuing effect of low world cotton prices. Based on these factors, the Corporation is forecasting a total crop of one million bales for the 2006–07 crop, which will be harvested from March to May 2008 and ginned from March to September.

The Corporation has forecast an operating deficit of \$3.2 million for 2007–08, which will be funded from existing cash reserves. This reflects revenue of \$7.30 million (compared with 2006–07 revenue of \$11.51 million), with 73 per cent being derived from industry levies and Commonwealth government contributions. Levy revenue and Commonwealth

contributions for 2007–08 will be drawn from both the 2006–07 and 2007–08 crops. The size of levy and Government contributions is heavily reliant upon crop production, which is budgeted to be only one million bales for the 2007–08 crop. This follows on from a similarly low figure of 1.2 million bales in 2006–07, the other production year that contributes to income in the 2007–08 year. Continuing low international cotton prices will also have a negative impact on the Gross Value of Production (GVP). The Corporation expects that this will activate the PIERD Act 0.5 per cent of GVP legislative trigger, thus also limiting the Australian Government contribution.

Expenditure

As levels of income are still well below the pre-drought average, the Corporation's capacity to invest in R&D in recent years has been reduced and will fall further in 2007–08. Forecast expenditure for the coming year is \$10.5 million, down from \$11.89 million in 2006–07. This level of expenditure will produce an operating deficit of \$3.2 million. The operating deficit will be funded from the Corporation's reserves and will remain within expenditure to equity policy guidelines.

COLLABORATION AND COOPERATION

The joint Rural R&D Corporations and beyond

CRDC has long sought opportunities to undertake collaborative research with other Rural Research and Development Corporations (RDCs) and has been an enthusiastic participant in other joint activities, including R&D and communication. A great deal of collaboration and cooperation takes place through the Council of Rural Research & Development Corporations' Chairs, which is a forum for ensuring that the RDC model continues to contribute to a sustainable and profitable Australian agricultural sector. In October 2006, the Council appointed economic analysts, ACIL Tasman, to administer their secretariat.

The range of collaboration and cooperation by RDCs has extended significantly, with all the Corporations agreeing to share information and knowledge on common compliance and management issues through both formal and informal channels. As a successful example of this collaboration, in 2006–07 CRDC worked collaboratively on formulation of new research program management systems with the Rural Industries Research and Development Corporation, Land and Water Australia and the National Water Commission. The four organisations have bought the same software to administer research programs and worked collaboratively to ensure it functions efficiently. A joint tender for the purchase of software meant significant savings, with the cost of the software shared equally. The four organisations have agreed to work closely in implementing this program, through a continuous exchange of knowledge.

The Council of RDC Chairs has agreed to a consistent framework for evaluation of the R&D investments to provide more independent evaluation of the impact of the work of the RDCs and asked ACIL Tasman to develop a cost benefit framework that could be applied to selected areas of research by each RDC, with the combined results reported annually to the Council of Chairs and then on to other stakeholders.

CRDC has selected two areas of research for initial evaluation under the framework: the research that has supported the Australian Resistance Management Plan for Ingard® and Bollgard® biotechnology and IrriMate™, a furrow irrigation optimisation system developed through a CRDC project and now being commercially developed by the National Centre for Engineering in Agriculture. CRDC anticipates submitting up to four areas of CRDC research for similar evaluation during the coming year.

To define industry and broader community benefits of RDCs' activities, ACIL Tasman undertook analyses of 134 RDC projects undertaken between 2000 and 2007 and found that while around \$1 billion had been invested by the RDCs in these projects, this had generated net benefits of \$5.5 billion to industry and at least \$3 billion in spillover social benefits. These social benefits include improved water use efficiency, food safety, safer use of pesticides, advances in environmental and natural resource management and animal welfare.

Under the auspices of the Council of RDC Chairs, the RDC NRM Working Group – which includes representatives from the Australian Government Department of Agriculture, Fisheries and Forestry – developed a Natural Resource Management Reporting Framework to promote better reporting, collaboration and communication on natural resource management research.

With regard to broader research, development and extension, CRDC collaborated with 40 external organisations and individuals, detailed on page 41, in jointly funded activities. The major collaboration is with the Cotton Catchment Communities CRC, which CRDC provides with four million dollars each year for research projects that must meet the strategic objectives of both organisations. Other current collaborations are with the CSIRO, State and Australian Governments, universities, private enterprise organisations and other Rural R&D Corporations. In addition, CRDC collaborates with a range of government, research and private organisations within programs such as the National Program for Sustainable Irrigation and the Joint Venture for Capacity Building.



Context

ABOUT CRDC

Our Vision

A globally responsible cotton industry

Our Mission

Invest and provide leadership in research, innovation, knowledge creation and transfer

We aim to achieve this through:

A 'Triple Bottom Line' approach to planning, implementation and reporting that seeks to ensure economic, environmental and social benefits for the Australian cotton industry, cotton valley communities and the Australian people; and

A holistic, integrated and systematic approach to research and development.

Our Outcome

A more sustainable, profitable and competitive cotton industry providing increased environmental, economic and social benefits to regional communities and the nation.

We aim to achieve this by:

Making greater use of commissioned R&D

Seeking multidisciplinary approaches and integrated outcomes

Increasing co-investment and partnerships

Sharpening evaluation of projects

Using a triple bottom line framework for reporting outcomes

Broadening our range of research providers

Enhancing our communications with industry and the community

By working with our key research partners:

Cotton growers

CSIRO

Universities

The Cotton Catchment Communities

Cooperative Research Centre

Other Cooperative Research Centres

New South Wales Department of Primary Industries

Queensland Department of Primary Industries and Fisheries

Other State Government Departments

Rural Research and Development Corporations

The Cotton Consultants Association

Agribusinesses

And by addressing the research priorities of our key stakeholders:

The Australian people, represented by the Australian Government

Cotton growers and the Australian cotton industry, represented by the Australian Cotton Growers Research Association

Who we are

CRDC is based in Narrabri, New South Wales – the heart of one of Australia's major cotton growing regions. The Corporation is a research and development partnership between the Australian cotton industry and the Australian Government.



What we do

CRDC invests in and manages a portfolio of research, development and extension projects that seek to enhance the ecological, social and economic values associated with cotton production systems and to increase benefit to cotton industry participants, regional communities and the Australian people.

CRDC funds and coordinates the development of technical and non-technical documents, guides and other information tools and coordinates workshops, seminars and field days for a range of purposes including research review and progression, information sharing or technology transfer to industry.

CRDC produces a range of publications about corporate activities and operations and to disseminate research outcomes. It acts as a formal and informal information source for stakeholders and client groups (facilitated by its location in a cotton growing centre), through general industry media activities as well as through the Corporation's website, www.crdc.com.au.

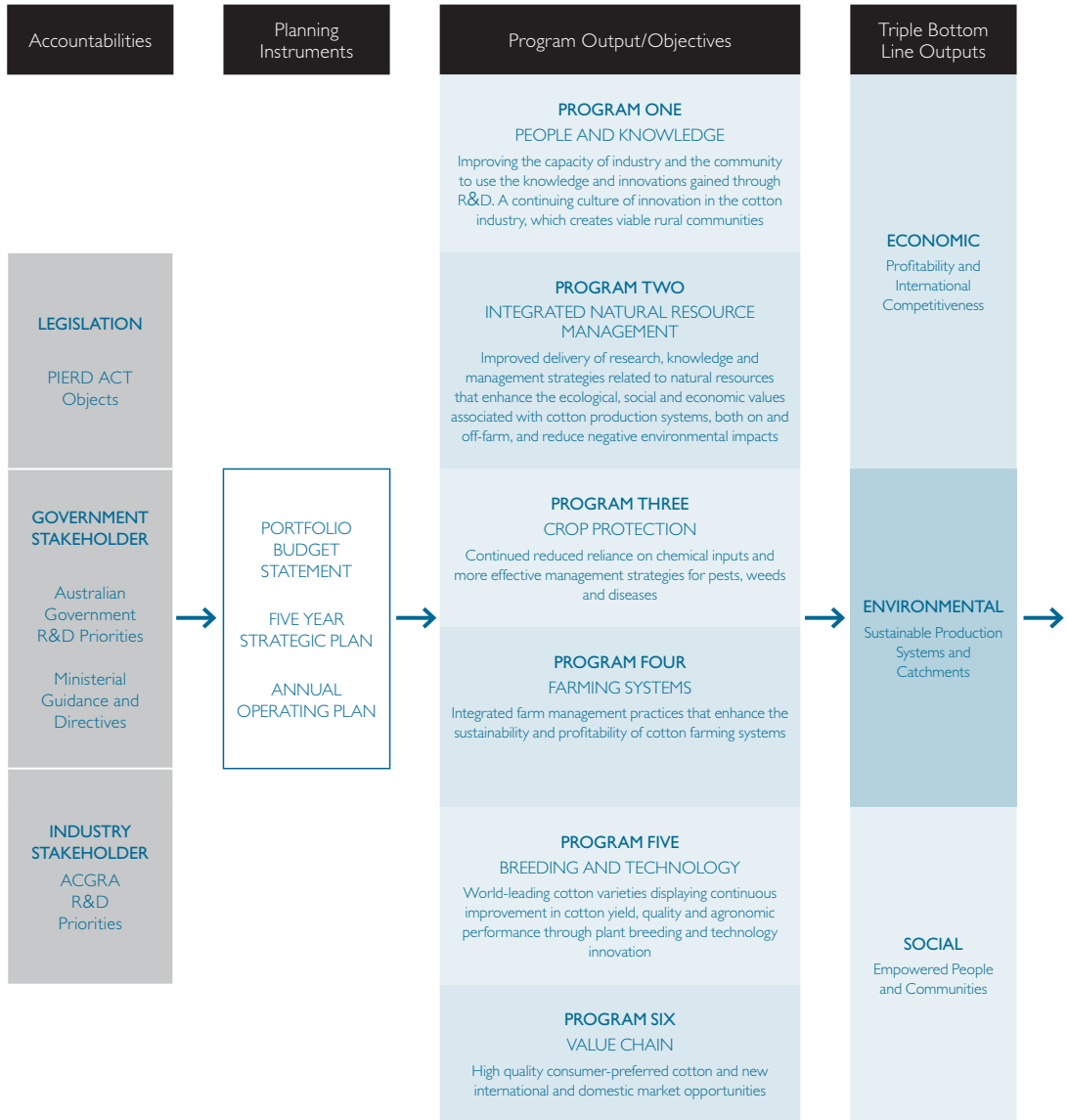
CRDC researchers are actively involved in the dissemination of research results, working with the CRDC-supported National Cotton Extension Team.

Our Corporate standards

Under the CRDC Statement of Principles, the Directors and staff of the Corporation:

- Are committed to excellence and productivity
- Are committed to providing the highest levels of accountability to stakeholders
- Will act legally, ethically, professionally and responsibly in the performance of their 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
- Are committed to the future of rural and regional Australia
- Comply with and promote best practice in corporate governance
- Are committed to meet all statutory obligations and accountability requirements in a comprehensive and timely manner.

Our Strategic Elements



Triple Bottom Line Objectives	Key Targets	Outcome
<p>Evidence that tools and knowledge products are contributing</p> <p>Employment of people in R&D</p> <p>Improved relative economic returns of cotton crops</p> <p>Increased returns per megalitre of water</p> <p>Increased yields per hectare and per megalitre of water</p> <p>Evidence of management options and farming practices that reduce costs or improve profitability</p> <p>Evidence that new cotton varieties are increasing yield, improving fibre quality and potential returns</p> <p>Improved fibre quality to reduce financial discounts received by growers</p> <p>Increased market opportunities evidence by market analysis of pricing demand for Australian cotton in the world market</p>	<p>A 10% improvement in cotton yield per hectare by 2008</p> <p>Evidence of continuous improvement in 5 key parameters measured in spinning mill benchmark surveys</p> <p>Evidence that prices for Australian cotton remain above those for competitive cotton growths in 2005 and 2007</p> <p>Evidence that profit margins are improving over time: 2003–2008 both annually and trends over time</p>	
<p>Reduced chemical inputs</p> <p>Improved water use efficiency</p> <p>Increased adoption of BMP</p> <p>Broader environmental coverage of BMP and recognition in the market place</p> <p>EMS evaluated as a farm management tool</p> <p>Improved trends in landscape and catchment indicators such as salinity, water quality and biodiversity</p> <p>Benchmark soil health and improved nutrient recover</p> <p>Published refereed science on environmental impacts of new transgenic technology</p> <p>Benchmarked greenhouse gas emissions, energy use and climate change impacts</p>	<p>A 50% reduction in 2004 quantities of insecticide used by 2008</p> <p>A 20% reduction on 2004 quantities of residual herbicide used by 2008</p> <p>Continued decline in riverine contamination by herbicides used only in cotton production by 2008</p> <p>80% of cotton production audited against BMP Minimum Certification Standards by 2007</p> <p>A 20% improvement in farm WUE against the 2004 median by 2008 measured in bales per megalitre</p>	<p>A more sustainable, profitable and competitive cotton industry providing increased environmental, economic and social benefits to regional communities and the nation</p>
<p>Improved skills and qualifications of people at all levels of the industry</p> <p>Scholarships to students</p> <p>Study exchanges and conference support for people at all levels of the industry</p> <p>Improved OH&S performance in workplaces and reduced health and injury risks</p> <p>Employment of people in R&D including age, gender trends and location</p> <p>More women in key industry roles</p> <p>Capacity building activities with industry, schools, universities and community groups that improve social capital</p> <p>Evidence of proactive stewardship of transgenic and conventional technology</p> <p>Collaborative links and partnerships established to improve knowledge exchange into and out of the industry</p> <p>High quality cotton (lint and seed) that meets market needs and consumer preference</p> <p>Improved perception of cotton production by the community</p>	<p>Between 2003 and 2008:</p> <ul style="list-style-type: none"> • At least 15 new Postgraduates in areas of high priority future need • At least 10 new Post-doc positions in areas of high current need • 80% of cotton growers having attended a relevant training course in OH&S, IPM or Water Management <p>Healthy and resilient communities in cotton producing regions though:</p> <ul style="list-style-type: none"> • A reduction in the cotton industry's Environmental footprint (eg. Reduced pesticide use, Improved water use efficiency, reduced greenhouse gas production) • Contribution to career opportunities in cotton producing regions • At least a 10% reduction in cotton farm-related injuries • Improved industry economic viability <p>At least 5 adoption evaluations conducted per year by members of the National Cotton Extension Team</p>	

ABOUT THE AUSTRALIAN COTTON INDUSTRY

Australia's modern cotton industry was established in north west NSW by a handful of pioneers in the 1960s. It progressed from these modest beginnings to become a valuable contributor to Australia's rural exports by the 1990s.



An early cotton picker – far different from today's machinery

There are normally about 1200 cotton farmers in Australia – representing 450 to 500 farming enterprises. Due to the drought conditions of recent years, indications are that there are currently fewer than 800 registered cotton farmers; however, should seasonal conditions and water availability return to normal, there is every reason to expect that the number of farmers will also return to previous levels. Unlike earlier decades, water shortages mean cotton has become an “opportunistic” crop for irrigation production: planted only when sufficient water is

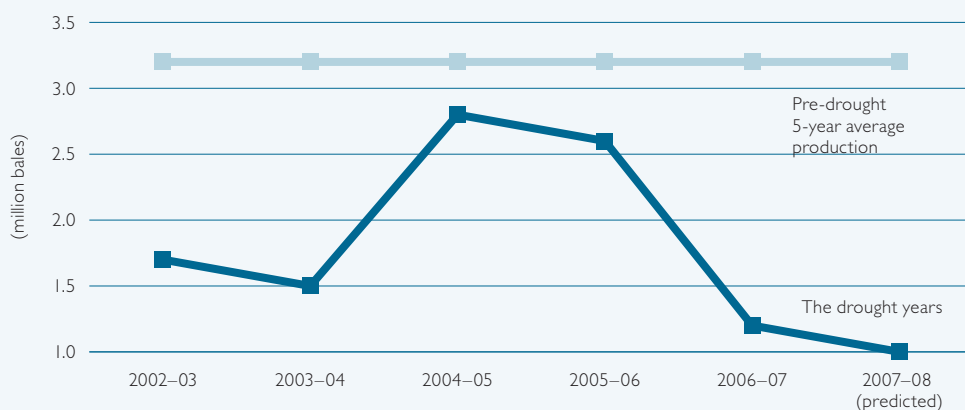
available and/or seasonal conditions are favourable. Dryland plantings have always been dependent on seasonal conditions, rising up to around 20 per cent in years of good rainfall and falling to almost nothing in 2006–07.

Today's cotton farms are typically 500 to 2000 hectares, highly mechanised, capital intensive and technologically sophisticated. The cotton industry is geographically concentrated: around 70 per cent of Australia's cotton is grown in New South Wales, with almost all of the remainder grown in Queensland. This concentration delivers a number of efficiencies but also makes the industry as a whole more susceptible to drought than other agricultural sectors, which operate over more diverse areas.

Under normal (non-drought) conditions, over 400,000 hectares of land is planted to cotton – producing about three million bales of cotton each year. The average yield for irrigated cotton in Australia is 1800 kilograms per hectare – the highest in the world and a 22 per cent increase over the past six years.

Australia grew about three per cent of the world's cotton prior to the current five-year drought but, at the same time, was the third largest exporter. Because almost all the cotton crop is exported, the Australian cotton industry operates in an environment of intense global competition and must continually improve operational efficiency, environmental sustainability and the quality of product if it is to remain competitive.

Figure 6 Production in drought affected years



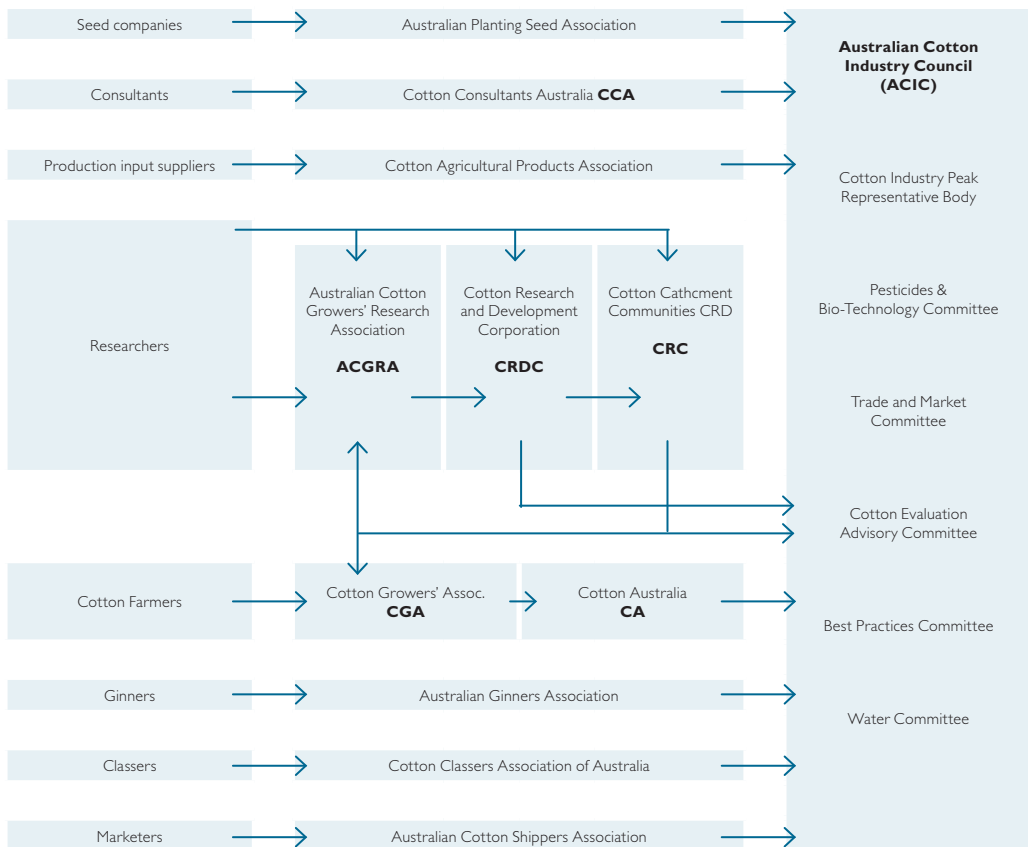
The economic and environmental health of the industry can be largely attributed to high quality collaborative research and development, much of it coordinated and funded by CRDC. That is why the continued CRDC R&D effort, in conjunction with the Cotton Catchment Communities CRC and its government and industry stakeholders, remains of paramount importance to the industry and an essential tool in maintaining and enhancing the security of international markets. This high level R&D relies on – and finds – a willingness on the part of growers and others through the value chain to adopt and implement new ideas, which results in an industry with a strong culture of innovation and continuous improvement.

The 2007 Harvest and Beyond

The Australian cotton industry has faced difficult drought affected conditions in recent seasons. Although the quality of cotton produced was high, the 2007 harvest figure is estimated at only 1.2 million bales. This is 0.8 million bales fewer than the pre-season forecast of 2.0 million bales and less than half the 2006 production of 2.6 million bales.

Water availability is still expected to be a constraint on production in the coming year; international prices well below the historical average and the Australian dollar at high levels, will continue to have a significant impact upon future cotton production. The forecast production of 1.0 million bales for the 2007–08 crop is less than a third of the pre-drought five-year average of 3.2 million bales.

Structure of the Australian Cotton Industry





Stakeholder Relations

THE AUSTRALIAN COTTON GROWERS RESEARCH ASSOCIATION

The Australian Cotton Growers Research Association (ACGRA) is the Corporation's legislated industry representative body, acting on behalf of the cotton industry.

ACGRA has been integral to each stage of formulation of the R&D program since the corporation was established, beginning with preparation of the five-year Strategic Plan, where a formal process allows ACGRA to ensure the industry's priorities are reflected. Each year ACGRA and CRDC hold a formal joint review of the current Strategic Plan to ensure its continuing relevance. Rather than review the current five-year plan in 2006–07, ACGRA worked with CRDC on development of the Corporation's new plan for 2008–2013.

Each year, ACGRA evaluates new project proposals and reviews the progress of continuing projects to assess whether they are meeting industry expectations. This process has been particularly valuable during the current extended drought, where priorities must be established and hard decisions made.

ACGRA has four R&D priorities that form part of CRDC's strategic planning:

- Invest in the skills, knowledge 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



Representatives from CRDC, the Cotton Catchment Communities CRC and Cotton Australia participate in an ACGRA meeting in June 2007

THE AUSTRALIAN GOVERNMENT

Meeting Australian Government expectations

On 1 March 2007, Ms Sussan Ley MP, Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, provided CRDC with her initial Statement of Expectations, as required by the Australian Government following the *Review of the Corporate Governance of Statutory Authorities and Office Holders* (Uhrig Review).

In her letter, Ms Ley outlined five areas of expectations involving roles, Government policies, performance reporting, communication and accountability. The Corporation responded with a formal Statement of Intent as to how it would meet these Government expectations. Both the Statement of Expectations and CRDC Statement of Intent can be found on the CRDC website, www.crdc.com.au.

While CRDC did not receive the Statement of Expectations until four months before the end of the 2006–07 reporting year and responded two months before the end of the reporting year, the Corporation was pleased to note that the Statement of Expectations corresponded significantly to the role and responsibilities that it had defined as essential to its operations. Below are the five general areas of Government expectation and how they are being implemented. Detailed information on this general outline of implementation can be found throughout the Report of Operations in this Annual Report.

Roles

CRDC is:

- Investing in research and development specifically intended to achieve economic environmental benefits to the industry, regional communities and the nation, as detailed in the Triple Bottom Line structure of the CRDC 2003–08 Strategic Plan and Annual Operating Plan 2006–07 and throughout this Annual Report, especially in the Report of Operations: Research and Development
- Continuing to develop its culture of innovation and sustain its industry leadership role in innovation, encouraging industry participation throughout the supply chain.

- Continuing communication, coordination and co-investment through the Council of Rural Research and Development Corporations, as well as directly with other Rural R&D Corporations to collaboratively address cross-cutting strategic R&D issues, including natural resource management, environmental management systems, irrigation best practice, capacity building and best practice management and administration

Government Policies

CRDC is:

- Incorporating the National Research Priorities and Rural R&D Priorities into its five-year and annual planning and reporting against them in its annual report
- Maintaining a close working relationship with industry and Government agencies
- Working with the Australian Government, principally through the Department of Agriculture, Fisheries and Forestry and Department of Finance and Administration to understand and adopt the appropriate reporting methodologies
- Incorporating the National Research Priorities and new Rural R&D Priorities into the deliberation and formation process for the CRDC Strategic Plan 2008–2013

Performance Reporting

CRDC is:

- Planning greater cost benefit and other appropriate analyses of research program and project investment performance
- Using its Annual Report as the major public vehicle to report performance, including efficiency and impact. This reporting highlights measures reflecting performance and outcomes for its Triple Bottom Line outputs, including spill-over benefits to the broader community
- Guided by its Strategic Plan 2003–2008, which is entering its final year; the measures of success it details will continue to be the foundation of its reporting to stakeholders. In addition, CRDC relies on ongoing directives from the Minister, Government and its Departments as the basis for its performance reporting obligations.

Communication

CRDC continues to:

- Communicate regularly with the Parliamentary Secretary, Secretary of the Department of Agriculture, Fisheries and Forestry and the relevant sections of the Department
- CRDC communicates regularly with its industry stakeholder, the Australian Cotton Growers Research Association, industry representative organisations (through the Australian Cotton Industry Council) cotton growers and consultants, and with communities in cotton growing regions
- Implement effective communication programs that convey and reflect the industry and public benefits of CRDC investments to its stakeholders and the broader community

Accountability

CRDC intends to comply fully with its obligations under the *Primary Industries and Energy Research and Development Act 1989* and the *Commonwealth Authorities and Companies Act 1997*.

CRDC:

- Provided its Annual Operating Plan 2007–08 and will provide this annual report within the required deadlines
- Expects to forward its Strategic Plan 2008–2013 to the Parliamentary Secretary for approval in March 2008, as required
- Provides regular information and prompt advice as to any significant events or issues affecting the Australian Government in relation to the cotton industry and the work of the Corporation

Australian Government Research Priorities

The Prime Minister released four National Research Priorities In December 2002, which were enhanced and refined in 2003 to take greater account of the contributions of social sciences and humanities research. The four priorities and their associated priority goals are:

A An environmentally sustainable Australia

- A1 Water – a critical resource
- A2 Transforming existing industries
- A3 Overcoming soil loss, salinity and acidity
- A4 Reducing and capturing emissions in transport and energy generation
- A5 Sustainable use of Australia's biodiversity
- A6 Developing deep earth resources
- A7 Responding to climate change and variability

B Promoting and maintaining good health

- B1 A healthy start to life
- B2 Ageing well, ageing productively
- B3 Preventive healthcare
- B4 Strengthening Australia's social and economic fabric

C Frontier technologies for building and transforming Australian industries

- C1 Breakthrough science
- C2 Frontier technologies
- C3 Advanced materials
- C4 Smart information use
- C5 Promoting an innovation culture and economy

D Safeguarding Australia

- D1 Critical infrastructure
- D2 Understanding our region and the world
- D3 Protecting Australia from invasive diseases and pests
- D4 Protecting Australia from terrorism and crime
- D5 Transformational defence technologies

Following their release, the Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry advised of revised Government priorities for rural research and development in March 2003:

- Sustainable natural resource management;
- Improving competitiveness through a whole of industry approach;
- Maintaining and improving confidence in the integrity of Australian agricultural food products;
- Improved trade and market access;
- Use of frontier technologies;
- Protecting Australia from invasive diseases and pests; and
- Creating an innovative culture.

Both sets of these Government research priorities were aligned with the *CRDC Strategic Plan 2003–2008* and all Annual Operating Plans devised under that Strategic Plan until 2006–07.

On 28 May 2007, the Parliamentary Secretary released new rural research and development priorities, which will be incorporated into the Corporation's planning and reporting in 2007–08, as well as the Strategic Plan 2008–2013. These are:

Productivity and Adding Value

Improve the productivity and profitability of existing industries and support the development of viable new industries

Supply Chain and Markets

Better understand and respond to domestic and international market and consumer requirements and improve the flow of such information through the whole supply chain, including to consumers

Natural Resource Management

Support effective management of Australia's natural resources to ensure primary industries are both economically and environmentally sustainable.

Climate Variability and Climate Change

Build resilience to climate variability and adapt to and mitigate the effects of climate change.

Addressing Australian Government research priorities

As can be seen from the tables above, each CRDC program addresses most of the National and Rural Research Priorities and some address all. Below is information about the principal contributions to these priorities in 2006–07; further details can be found throughout the Report of Operations – Research and Development.

National Priority

An environmentally sustainable Australia

Rural Priority

Sustainable natural resource management

Contributing R&D Programs

Programs One to Five

Principal contributing Inputs and progress towards Outcomes 2006–07:

INPUT	Investment in ongoing development and implementation of the Best Management Practices (BMP) program
Outcome	The CRDC-supported Cotton Extension Team, particularly the environment and water team members, provided technical support for Cotton Australia in delivery of the BMP Land and Water module
Outcome	Improved environmental performance and assistance to catchment and regional bodies in directing natural resource management incentives more effectively; many of the catchment bodies covering cotton valleys are becoming more involved in working with the BMP program to achieve best practice outcomes
INPUT	The BMP program undergoes continuous improvement and expansion; the BMP manual is being improved; e-BMP is being developed to improve accessibility
Outcome	The number of cotton farms involved in the BMP program at a pre-certification or full certification level, although impacted by the drought during 2006–07, continues to increase steadily
Outcome	BMP continues to make incremental gains in external recognition with both regulators and customers as a credible environmental management system
Outcome	Further progress was made with the Queensland Government in 2006–07 to enable cotton BMP to be recognised as an alternative to the Land and Water Management Planning process required under the state’s water licensing regulations

INPUT	Spray Drift Workshops, incorporating the latest R&D outputs
Outcome	Cleaner waterways both on and off farm
INPUT	Support for, and core participation in, the 13th Australian Cotton Conference
Outcome	Cotton farmers and consultants took back valuable information from CRDC-supported R&D to apply in their own cotton farming enterprises
INPUT	Support for development of Roundup Ready® cotton varieties, resistance strategies and integrated weed management
Outcome	Contamination of rivers by herbicides used in cotton has declined in direct relationship with the introduction of Roundup Ready® and Roundup Ready FLEX® cotton
INPUT	Research addressing deep drainage and salinity on-farm and at a catchment scale, and sodicity on-farm
Outcome	A better understanding of how to achieve sustainable groundwater use and catchment health
Outcome	Extensive information gathered on salinity risk will soon be available on GIS and able to predict where problems might occur
INPUT	Research on greenhouse gases and the cotton industry
Outcome	A simple greenhouse gas calculator (with a more sophisticated one under development) allows growers to calculate their greenhouse footprint
Outcome	Average nitrous oxide emissions in the cotton industry of measured at 0.5 per cent of applied nitrogen compared with the Intergovernmental Panel for Climate Change default benchmark of 1.25 per cent
Outcome	Information developed leading to increased awareness by growers of how optimised water, soil, pest and nutrient management can lower the amount of nitrogen fertiliser needed, and thus reduce input costs and greenhouse emissions at the same time
INPUT	A major water use efficiency research effort: development of more viable measurement; whole farm water use and efficiency linked to BMP; better irrigation timing and water placement
Outcome	Despite the impact of drought on the industry, this effort is progressing well and has demonstrated where water use efficiencies can be improved on-farm. A number of case studies demonstrate how cotton growers are benefiting as a result.

INPUT	Investment in CSIRO cotton breeding and biotechnology program
Outcome	Roundup Ready® varieties have assisted to achieve a 32 per cent reduction in residual herbicide use
Outcome	Bollgard II® varieties, averaged over three seasons, have required less than 18 per cent of the insecticide required for conventional crops

National Priority

Promoting and maintaining good health

Rural Priorities

Improving Competitiveness through a Whole of Industry Approach

Maintaining and improving confidence in the integrity of Australian agricultural, food, fish and forestry products

Improved Trade and Market access

Contributing R&D Programs

Programs One, Two, Four, Five and Six

Principal contributing Inputs and progress towards Outcomes 2006–07:

INPUT	Collaborative research with over 40 key partners, along with collaboration with a large number of organisations through programs such as the National Program for Sustainable Irrigation, Cooperative Venture in Capacity Building and Farm Health and Safety Joint Venture; a contribution of four million dollars to the Cotton Catchment Communities CRC for research that addresses both organisations' strategic needs
Outcome	A wide range of gains: environmental (eg, sustainable irrigation), economic (eg, financial benchmarking) and social (eg, community benefits, capacity building, Farm Health & Safety)

INPUT	Support for the CSIRO plant breeding and biotechnology program. This includes development and progress towards commercialisation of healthier cotton seed oil
Outcome	Cotton varieties delivering better quality fibre, attracting a premium in the market and more attractive to spinners
Outcome	Continued improvements in the Fusarium wilt resistance measure (F-rank) of major CSIRO-bred commercial varieties: 100 per cent of the varieties sown in NSW in 2006–07 had an F-rank of 100 or more, compared to 89 per cent in the previous season
Outcome	Biotechnology and Integrated Pest Management have delivered major reductions in on-farm pesticide use. High levels of adoption of insect resistant and herbicide tolerant cotton varieties have led to significant reductions in worker and farm family exposure to toxic agricultural chemicals.
Outcome	Very low to zero chemical residues detected on cotton seed, lint and cotton gin trash derived from transgenic cotton crops.
INPUT	A major EMS Fibre Pathways project, which finished in 2006–07
Outcome	BMP extended throughout the value chain from field to fibre has delivered opportunities for enhancing the differentiation of high quality Australian cotton in the international market
Outcome	Japanese retailer ISUMIYA is successfully marketing garments made exclusively from Australian BMP cotton under their environmentally-branded in-house "Good-!" label and developed a new range in 2006–07

National Priority

Frontier technologies for building and transforming Australian industries

Rural Priorities

Use of frontier technologies

Creating an Innovative Culture

Contributing R&D Programs

All Programs

Principal contributing Inputs and progress towards Outcomes 2006–07:

INPUT	Investment in the CSIRO cotton breeding and biotechnology program (cotton remains the only major rural industry in Australia using biotechnology)
Outcome	Cotton varieties with a range of enhanced characteristics are using less insecticides and herbicides, and have increased quality and yield and resistance to pests and disease
Outcome	The CottTech suite of cotton biotechnology projects concentrate on fundamental science and allows researchers to undertake more creative and original research
Outcome	Early stage quality assurance for new transgenic traits means Australian researchers gain commercial access to them within six to twelve months of their commercial release in the USA
INPUT	Implementation of recommendations from a major 2005–06 review of Extension, Education and Training
Outcome	The establishment of new generalist and specialist positions, rigorous evaluation of activities and collaboration and coordination with other organisations such as Catchment Management Authorities. Each cotton valley now has its own Extension Officer
INPUT	21 new and continuing post-graduate scholarships; 3 post-doctoral projects and one Honours project
Outcome	Skills in a range of cotton-related and natural resource management areas that will enhance the capacity of the cotton industry and wider agricultural sector
INPUT	A total of 19 sponsorships for growers, industry personnel, tertiary and secondary students and others to conferences and exhibitions in Australia and overseas, as well as leadership courses in Australia
Outcome	Increased human capacity across the cotton industry

INPUT	Logistical support for women in the cotton industry (through Wincott – Women in Cotton); financial support for women to undertake leadership courses
Outcome	Women now hold senior positions across the cotton industry and associated organisations such as Natural Resource Management bodies and Catchment Management Authorities, R&D organisations and industry bodies. Many more women now have the confidence to compete for entry to leadership courses because of participation in CRDC-supported Wincott activities

National Priority
Safeguarding Australia

Rural Priority
Protecting Australia from invasive diseases and pests

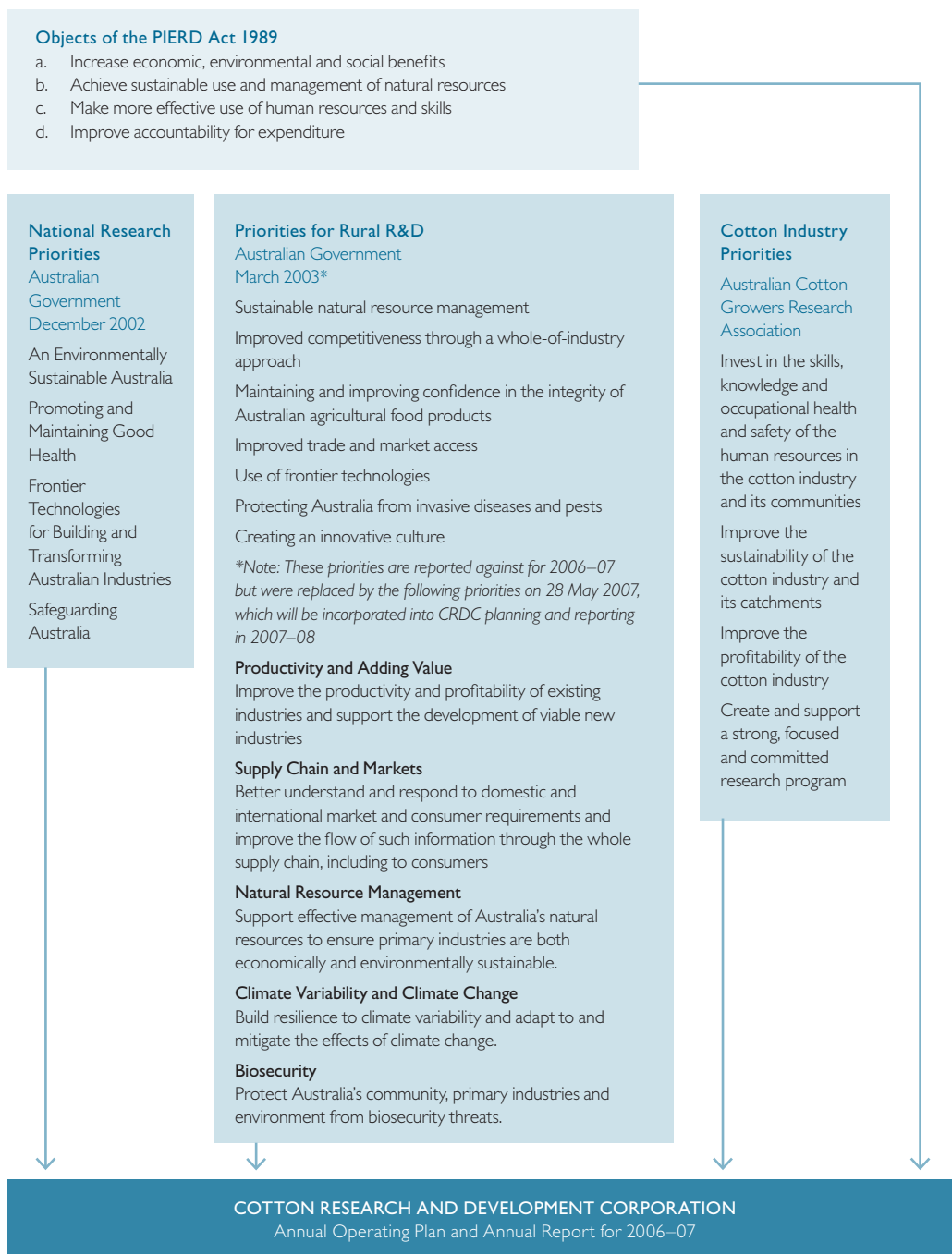
Contributing R&D Programs
Programs Three

Principal contributing Inputs and progress towards Outcomes 2006–07:

INPUT	Core participation in the ACGRA-coordinated development of a cotton industry biosecurity plan
Outcome	A Cotton Industry Biosecurity Plan (IBP), which will involve all stakeholders, including government agencies, industry, and the public in minimising the risks posed by exotic organisms through actions such as exclusion, eradication, and control.
INPUT	Research relating to endemic or potential disease threats
Outcome	Reports of new infestations of the major cotton disease, Fusarium wilt, slowing, principally due to research-driven improved management and hygiene practices
INPUT	Research relating to endemic or potential insect threats
Outcome	Earlier CRDC-funded research allowed for prompt and effective management of silverleaf whitefly when new areas were affected in 2006–07
Outcome	Biopesticides developed with CRDC funding support show potential for control of green mirids and should provide significant environmental benefits when commercialised

INCORPORATING STAKEHOLDER PRIORITIES

In developing the Strategic Plan 2003–2008, CRDC was guided by all the elements in this diagram in formulating its programs, planned outcomes and strategies to achieve those outcomes. In turn, they were integral to the Annual Operating Plan 2006–07, the implementation of that plan and reporting for the year.



REPORT OF OPERATIONS

Research and Development

PROGRAM ONE

People and Knowledge

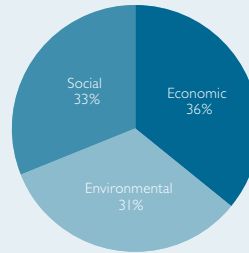
THE PROGRAM AT A GLANCE

Objective

To improve the capacity of industry and the community to use the knowledge and innovations gained through research and development. A continuing culture of innovation in the cotton industry, creating viable rural communities

Number of projects 2006–07:	41
Compared with 2005–06:	58
Expenditure in 2006–07:	\$1,330,365
Compared with planned expenditure:	\$1,695,494
Compared with 2005–06:	\$1,478,697

Triple Bottom Line investments



Outcome

Innovative people in the cotton industry and community creating a sustainable industry and viable regional communities

Strategies – CRDC Strategic Plan 2003–2008	Measures of Success
1 Support and coordinate a highly trained, efficient and effective cotton extension team	Evaluation of outcomes of activities conducted by the extension team
2 Foster the professional development of innovative and highly trained researchers, extension and technical officers, administrators, consultants and growers	Evidence of improved skills and qualifications of researchers, extension and technical personnel, administrators, consultants and growers
3 Foster the development of opportunities for women in the cotton industry	Women in key industry roles
4 Continue to develop a variety of effective decision support systems that support the implementation of research and extension outcomes and shorten the time to adoption	Evidence that the use of decision support systems is leading to the adoption of research outcomes and improved practices
5 Support the ongoing development of information packages and tools that consolidate and disseminate research outcomes	Evidence that the use of information packages and tools is leading to the adoption of research outcomes and improved practices
6 Promote safe, healthy workplaces through the adoption of appropriate Occupational Health and Safety work practices	The OH&S performance of industry workplaces is improving
7 Facilitate effective coordination and partnerships with research and development providers, industry and community organisations	Implementation of outcomes in partnership with a variety of research and development providers

Background

The modern Australian cotton industry contains, overall, probably the most highly trained and highly skilled people working in agriculture today. One of the keys to this level of expertise has undoubtedly been CRDC's long-term investment in people and their capacity to access and use knowledge. The Corporation will continue to give a high priority to supporting our people to conduct research, transfer research outcomes and improve the skills and capacity of the whole industry and its local communities.

STRATEGY I

Support and coordinate a highly trained, efficient and effective cotton extension team

One of the factors contributing to the success of the cotton industry in Australia has been the capacity and willingness of its workforce and communities to acquire new skills and knowledge. This effort has been greatly aided by the industry-wide National Cotton Extension Team, managed by the Cotton CRC and funded with significant contributions from CRDC.

2006–07 saw further implementation of recommendations arising from a major Review of Extension, Education and Training, undertaken by CRDC and the Cotton CRC in 2005. Six new positions created on the team mean that each cotton valley now has its own extension officer, funded principally in NSW by CRDC through the NSW Department of Primary Industries, and on a shared basis with the Queensland Department of Primary Industries. The new Regional Extension Officer positions were appointed near the end of the 2006–07 year. A Healthy Soils Extension Specialist has been appointed as part of a cotton project under the National Heritage Trust Initiative – Healthy Soils for Sustainable Farms.

The Extension Team now has formal links to Catchment Management Authorities and Cotton Australia, which enables coordinated and collaborative activities in each region and avoids duplication.

With the increased level of staffing and involvement with other organisations, planning is underway to promote the work of the Extension Team. An Extension Team workshop held in May 2007 produced plans for the next twelve months, including

regional planning with all cooperating organisations. A national planning team worked on future plans for industry-wide issues at the workshop and these will flow to regional areas.



The work of regional extension officers covers a wide range of activities, including in-field assistance for growers

A CRDC-sponsored Silverleaf whitefly workshop brought together leading industry and research specialists, along with scientists from CSIRO, NSW Department of Primary Industries and Queensland Department of Primary Industries in the lead-up to the 2006–07 season, seeking to better understand the complexities of whitefly management and formulate strategies for more effective control in the newly-affected cotton growing areas. A roadshow, developed as a result of the workshop, was delivered in Dalby, Goondiwindi and St George in late September, with approximately 75 growers and consultants attending.

Spray drift workshops with a total of 54 participants were held in six locations (Trangie, Narrabri, Moree, St George, Goondiwindi, Dalby and Cecil Plains) in May 2007, as part of an extension project funded by CRDC and the Grains Research and Development Corporation (GRDC). Following a very positive evaluation by participants, further workshops are planned for 2007.

MEASURES OF SUCCESS

- Major Extension, Education and Training review led to establishment of new generalist and specialist positions, rigorous evaluation of activities and collaboration and coordination with other organisations, including Catchment Management Authorities

- All major cotton regions now have an Extension Team agronomist
- The Cotton Extension Team, particularly the environment and water team members, provided technical support for Cotton Australia in delivery of the BMP Land and Water module, improving the breadth and depth of on-farm environmental management

STRATEGY 2

Foster the professional development of innovative and highly trained researchers, extension and technical officers, administrators, consultants and growers

The 13th Australian Cotton Conference, organised by the Australian Cotton Growers Research Association (ACGRA), was held in August 2006. It targeted the major issues of cotton farm profitability, opportunities for Australian cotton along the value chain and the cotton industry's contribution to the economic, environmental and social outcomes of regional communities.

In the past, CRDC has funded production of the conference proceedings and sponsored the participation of a number of industry and research personnel. In 2006 ACGRA also requested CRDC support for key research and extension activities at the conference to promote awareness, knowledge and benefits of CRDC-funded R&D and enhance

adoption of these R&D outcomes in the cotton industry. A highlight of these activities was the very popular "Hands-on Research" segment in which conference participants were able to choose up to 3 "hands-on" sessions to attend from a list of 17 topics. The wide-ranging topics on offer for the 2006 Cotton Conference were:

- Storage losses: what can I do?
- Irrigation of high retention cotton
- Overhead irrigation optimisation
- Whole-farm water management
- Aquaculture on cotton farms
- Better (GM) cottonseed oils?
- Calculating the cost of your refuge
- Keeping your lint clean!
- Farming systems and fibre quality
- Making smart fertiliser decisions
- Integrated Fusarium management
- Black root rot
- Mirids and Green Vegetable Bugs: sucking your profits all the way to the gin
- Whiteflies
- Keeping herbicides on target: drift responses and nozzle selections
- Simple environmental tests to assess farm water quality
- Soil biology basics

Australian Cotton Conference "Hands-On" workshops give growers and consultants close contact with researchers



FEATURE

Dr Angus Crossan has a long-term relationship with CRDC, beginning with a PhD scholarship in the 1990s. Here, he reflects on the benefits CRDC travel grants have provided to him and, subsequently, to cotton R&D in Australia

The benefits to my research of travel I undertake as a cotton researcher are immeasurable. Recently, I have been supported by CRDC to attend the Field to Fabric course, run by CSIRO in Geelong. The year before that I was able to attend the US Beltwide Cotton Conference in New Orleans to present a paper on the Environmental Benefits of Roundup Ready® Cotton, and then to visit United States Environmental Protection Agency researchers in Washington, en-route to a leading research group in The University of Guelph, Canada.

The Field to Fabric course broadened my understanding of the cotton supply chain substantially. As an environmental chemist specialising in risk assessment and environmental remediation, I am eager to learn as much about all aspect of cotton production as possible to provide better insight for my research. The opportunity to travel to Geelong and meet with the CSIRO fibre quality team had extra benefits, as it facilitated collaboration on ensuring quality cotton free from pesticide residues in cottonseed and lint, with the details of this research to be reported shortly.

The other valuable aspect of travel is that it enables interaction with international experts working within the same scientific field. This was the case when I visited the University of Guelph and spent a month working with Professor Keith Solomon, a world leader in pesticide risk assessment. Such visits ensure that the research we do for the CRDC and the Australian cotton industry is up-to-date. Scientific development usually occurs on a global scale, and relevant

peers cannot always be found locally. International collaboration maintains the quality and relevance of our research.

The Australian cotton industry retains its world leading status through research and development and a key aspect of successful research is good science through collaboration. Travel grants enable scientists to maintain productive interaction with peers, continue professional development and sustain our level of expertise to meet the ever increasing and varied challenges.



Angus stands on a "mesocosm" – a test pond two metres deep – frozen solid during his visit to the University of Guelph, Canada. A range of species is added to the ponds to assess the toxic effect of compounds in a controlled environment



Students were impressed with the wide range of careers available in the cotton industry

CRDC continues to assist with activities aimed at promoting careers in the cotton industry, such as a Moree Rotary 'Careers in Cotton' tour of the Australian Cotton Research Institute for 49 secondary school students from north west NSW. Guest speakers covered a range of potential careers in the industry, including farm work, computer-related careers, natural resource management, entomology, laboratory work, advanced scientific research and office work.

For the first time, CRDC has awarded two scholarships for the Cotton Production Course offered by the Cotton CRC and The University of New England. This course is the only one of its type in Australia and lasts for four years, with four study units developed by cotton researchers and other industry personnel. Matt McVeigh from Dalby and David Wilson from Moree won the inaugural scholarships on a highly competitive basis.

CRDC is part of the Cooperative Venture in Capacity Building (CVCB), which is managed by the Rural Industries Research and Development Corporation (RIRDC). The CVCB's On the Fast Track project takes an action-research approach, where participants will work with mentors and learn from each other's experiences to apply capacity building principles to their own programs using the principles developed in CVCB research projects. It has brought together key capacity building project managers and practitioners across the CVCB member organisations, which cover a range of rural industries, to enhance their capacity to choose (invest), design, support and evaluate their capacity building efforts. It should prove particularly valuable to the cotton industry as a training ground for both practitioners and mentors.

CRDC has taken an active role in the Fast Track project and will gain first hand experience in capacity building with eight projects aimed at increasing the

confidence of the industry about capacity building so that future R&D investments that require industry uptake are seen and successfully adopted. This includes a project that will ensure that synergistic benefits are obtained from the various projects.

CRDC also extended its capacity building support across the cotton industry by awarding a total of 19 sponsorships for growers, industry personnel, tertiary and secondary students and others to conferences and exhibitions in Australia and overseas, as well as leadership courses in Australia. These activities are providing a significant social spillover benefit by enhancing the skills base in local communities, as well as the cotton industry and other agricultural industries where these skills may be used in the future.

CRDC sponsored eight growers to attend the Cotton Field to Fabric Training Course: Managing for Quality through the Production Chain course held at CSIRO Textile and Fibre Technology in Geelong. This unique course covers global perspectives on the market and distribution, yarn manufacture, fabric formation, marketing, dyeing and finishing, fibre properties, quality assurance, agronomy impacts, picking, ginning and classing. Much of the information contained in the course is a result of CRDC-sponsored research, development and extension outputs.

Demand for the *Field to Fabric* course has been strong, with three courses held in 2006–07, attended by 74 industry participants. This marks a strong and ever-growing recognition within the industry that the task does not end when the cotton leaves the farm: that it is important to maintain quality through the production chain. In the coming year, the course being held in July 2007 has 35 participants, of whom 10 are international students. A further course will be held in November 2007.

Participants comment on the Field to Fabric course

“Yield has been king in the past but we need a high quality product to go hand in hand with this, otherwise we will not be able to match the cheaper growths around the world.”

*Damien Erbacher,
Dawson Valley cotton consultant*

“It was good to see the end products because, as growers, sometimes we don’t appreciate the business we are in – we are in the retail fashion industry.”

*Lyndon Mulligan,
Moree cotton farmer*



CRDC funded a total of 21 post-graduate scholarships in 2006–07 for students undertaking scientific research relating to cotton or broader natural resource management. Three of the scholarships commenced during the year, with 18 continuing from earlier years. CRDC is also funding three post-doctoral projects and one honours project.

CRDC funding allowed seven researchers to travel overseas during the reporting year. In addition, funding for a number of individual projects included payment for researchers to undertake travel related to their research projects.

The CRDC-funded cotton industry National Training Coordinator, Mark Hickman, works with a range of organisations and individuals to deliver industry training, which must meet two criteria: that it is quickly responsive to current industry needs and aligns with national competencies associated with the Australian Quality Training Framework. This ensures that the latest research is incorporated into training and that industry personnel receive

formal qualifications they can use in the future. As part of his duties during the past twelve months, Mark has been working with Cotton Australia on Cotton Basics, a program which provides training to enable young people and those new to the industry to increase their mix of skills in areas ranging from tractor driving to farm safety and basic agronomy.



CRDC-funded National Training Coordinator Mark Hickman ensures industry training aligns with the Australian Quality Training Framework

His other emphasis is on assisting organisations that are developing training applicable to the cotton industry, so that the training has vocational recognition. As the industry’s focal point for training, Mark has been able to develop an increasing relationship with the Queensland Department of Education, Training and the Arts. He provided advice to the Rural Skills Strategy Advisory Group and FarmBis Queensland on how best to deliver and develop training and resources for the future.

Competencies selected for the Irrigated Cotton/Grains Management Course align well to the water component of the BMP Land and Water Management module and to the units required to achieve credentials as a Certified Irrigation Manager. Producers who attend and pass the assessment associated with this course will have the ability to contribute their newly acquired qualifications in a number of different fields.

The first of the Cotton and Grains irrigation management workshops was delivered in May 2007 in Central Queensland, with 15 participants. The workshop focused on irrigation benchmarking and water budgeting for water use efficiency. In an evaluation of the workshop, participants identified that the workshop had been both relevant and practical to their needs.



An irrigation management workshop in May 2007 is the first of a number that will cover all aspects of best practice irrigating to achieve water use efficiency

Other irrigation workshops planned for the near future will cover on-farm water storages and distribution systems, planning, plant and water interactions with scheduling, pump performance and efficiency, advance scheduling/plant interactions, furrow optimisation and soils relationship with respect to irrigation techniques.

Eight of the Water Team members, who will deliver water training to the industry, participated in a 'train the trainer' event in 2007.

MEASURES OF SUCCESS

- The Cotton Field to Fabric Training Course: Managing for Quality through the Production Chain course gives participants a useful perspective on where they fit in the production chain. The course for July 2007 was fully booked well ahead – a sign of the value growers and consultants place on it
- 1,300 industry and related personnel who attended the research-focused 13th Australian Cotton Conference will take back valuable information on sustainability and profitability to their cotton growing enterprises
- CRDC funded a total of 21 post-graduate scholarships in 2006–07 in cotton and natural resource management related areas, with three commencing in 2006–07
- The Cooperative Venture in Capacity Building is improving skills of rural industries personnel and demonstrating the strength of the Rural R&D Corporations model
- Seven travel grants and 19 industry sponsorships in 2006–07 allowed national and international collaboration, and important knowledge acquisition

STRATEGY 3

Foster the development of opportunities for women in the cotton industry

Wincott (Women in Cotton) was established in the 2002–03 year with seed funding and practical assistance and facilitation from CRDC. This funding continued at a decreasing rate until 2004–05. Wincott became self-sustaining in 2005–06 and was also able to abolish membership fees in that year, due to sponsorship arrangements with commercial companies.

2006–07 has seen the organisation achieve a raised profile and credibility within the industry, which in turn has seen more women become involved. Wincott has received new financial sponsorship from sources such as banks, telecommunications companies, accounting firms, seed and chemical companies and the Cotton Catchment Communities CRC and is on a firm financial footing.

As an indication of its industry credibility, Wincott was granted funding from a number of conservation organisations to hold Biodiversity Field Days in Goondiwindi and Mungindi in June 2007

Six women (out of a total of 21 young people) have been chosen from a highly competitive field of applicants to undertake the Future Cotton Leaders Leadership Program, an initiative of Cotton Australia, supported by the Australian Government Department of Agriculture, Fisheries and Forestry and CRDC. All six are Wincott members and three of the women are active in Wincott activities and committees: Meg Kummerow of Dalby, and Rose Roche and Sandy Young of Narrabri.

CRDC staff members continue to provide a range of logistical support to Wincott to facilitate its information dissemination through newsletters and information days.

For the third year, CRDC has sponsored participants in the 'Industry Partnerships – Corporate Governance for Rural Women' initiative, with Meg Bennet and Victoria Cush selected as the cotton industry representatives on the 2006 course. The program allows rural women to undertake industry recognised corporate governance training to assist them to develop the skills, knowledge and networks required to take a more active or representative role in their industry. Scholarship holders will receive mentoring from established industry leaders during the twelve months following completion of the course.

MEASURES OF SUCCESS

- Women now hold senior positions across the cotton industry and associated organisations such as Natural Resource Management bodies and Catchment Management Authorities, R&D organisations and industry bodies
- Many more women now have the confidence to compete for entry to leadership courses because of participation in CRDC-supported Wincott activities

STRATEGY 4

Continue to develop a variety of effective decision support systems that support the implementation of research and extension outcomes and shorten the time to adoption

A range of computer and web based decision support tools have been developed over many years with CRDC funding support. Outcomes from an evaluation of these tools in 2005 were reported in the CRDC Annual Report 2005–06. The evaluation sought feedback from cotton growers and consultants on how much use they made of these tools and how much they valued them. The results showed that both use and value varied considerably, depending on the tool. While this evaluation only addressed some of the decision support tools and did not consider the extension and training services associated with this program, it did highlight the need to ensure user needs were adequately identified when new tools were being planned and existing ones upgraded.

With the encouragement of the ACGRA, CRDC sought the support of the researchers to establish a Decision Support Steering Group consisting of representatives of key stakeholder (researchers, growers, consultants, Cotton CRC, CRDC, and Cotton Australia). Two meetings of this Group took place in 2006 and the ensuing discussion provided the decision support researchers with guidance on the development of potential future decision support tools and possible improvements to a range of existing tools and decision support extension services. During the year a consultant was also appointed with joint funding support from CRDC and CSIRO to work with members of the decision support development team on how to enhance their product and service delivery.

In light of the findings of the review, together with reduced R&D funding because of the drought,

CRDC is not providing financial support for the Decision Support Program in the 2007–08 year, apart from the salary of one researcher.

MEASURES OF SUCCESS

- A Decision Support Systems Steering Group, established with CRDC funding, is providing guidance and support to the decision support systems developers to enhance their products and service delivery

STRATEGY 5

Support the ongoing development of information packages and tools that consolidate and disseminate research outcomes

Australian cotton often attracts a premium because it meets spinners' requirements for quality and consistency. FIBREpak, which was launched by CSIRO in January 2007, utilises a great deal of research funded by CRDC in recent years. It contains information for all those involved in managing fibre quality, from pre-planting to processing: growers, managers, agronomists, consultants, retailers, ginners, classers, merchants and shippers.

The Knowledge Management in Cotton and Grains Project, funded by the National Program for Sustainable Irrigation (NPSI), CRDC and the Grains Research and Development Corporation (GRDC), contains a commitment to develop a grains component for WATERpak, which was developed with CRDC funding. Development of the new component is underway at present and WATERpak will underpin related training.

CRDC is working in collaboration with Cotton Australia to develop e-BMP, an interactive electronic version of the cotton industry's BMP manual, and update the existing BMP manual. The e-BMP project will reduce the cost of distributing paper-based manual content and updates and provide integration with current industry research and best practice through excellent and relevant content management system and categorisation that enables growers to comply with BMP audit requirements. The e-BMP project will also offer Cotton Australia Grower Services Managers and Best Management Practices Implementation Officers ease of management in assisting multiple growers with the implementation of best practice. These officers are also able to offer growers practical help and incentives to implement BMP.

A new electronic version of a Water Use Efficiency benchmarking tool, developed with CRDC funding support, will enable cotton growers to estimate their on-farm water use efficiency. The application provides a simple tool and first step to assessing whole farm water use efficiency; however, it is important for growers to recognise that it is not a replacement for more the extensive, accurate and comprehensive on farm measurement of the whole farm water balance that can be provided by irrigation professionals.

MEASURES OF SUCCESS

- The cotton industry's BMP program is being enhanced in a number of ways to improve its efficacy and uptake: the BMP manual is being fully revised and e-BMP, an electronic interactive version, will make BMP more accessible and provide a valuable tool for Cotton Australia in implementing the program
- The Cotton Catchment Communities CRC continues to distribute a range of material developed with CRDC support: ENTOpak (incorporating the IPM Guidelines), NUTRIpak, WEEDpak, SPRAYpak, WATERpak, FIBREpak and a searchable edition of the COTTONpak CD Rom containing all the 'Paks' and other information packages
- Information packages and tools are sent to growers and consultants only when specifically requested, so that distribution numbers have a high correlation with actual use

STRATEGY 6

Promote safe, healthy workplaces through the adoption of appropriate Occupational Health and Safety work practices

CRDC continued its investment in the joint venture Farm Health and Safety R&D program, managed by the Rural Industries Research and Development Corporation. An independent evaluation of a future program was completed in early May 2007. Overall, the program received good feedback, although the evaluation highlighted the difficulty of specifying the number of lives saved or injuries prevented because of the program.

RIRDC provided funding bodies with an investment plan stating parameters, goals and expected outcomes. A number of organisations, including CRDC, indicated a drought-related inability to

commit to an increased funding level and RIRDC is evaluating whether a further phase can be funded.

A comprehensive review of the cotton industry Best Management Practices (BMP) program, completed in 2006, looked at whether Occupational Health and Safety (OH&S) should be included in BMP. While a final decision on this issue still needs to be made by the industry, the review suggested that general OH&S principles could be readily included in BMP. However, the review also concluded that the inclusion of more detailed specific OH&S requirements, other than those already identified in the pesticide application and handling modules, would overcomplicate BMP and be outside the scope and expertise of BMP's environmental auditors.

CRDC continued its support for the Sustainable Farm Families project, which addresses personal health and safety issues important to farming families. Workshops held in Wee Waa and Dalby received a very positive evaluation from participants.

"This course arms us with knowledge to make informed decisions regarding our health and wellbeing. We now have a tool to measure our health and can work towards improved health and prevent illness"

"This was an opportunity to become more aware of health that effects us personally and be able to make informed decisions about what to do for health and happiness"

Sustainable Farm Families workshop participants



MEASURES OF SUCCESS

- Spray Drift Workshops are helping to ensure safer workplaces and healthier farm families and local communities
- CRDC continued to co-fund the Farm Health and Safety joint venture with other rural R&D Corporations, to prevent injuries and deaths on farms
- CRDC-supported Sustainable Farm Families workshops are helping farming families manage personal health and safety issues

STRATEGY 7

Facilitate effective coordination and partnerships with research and development providers, industry and community organisations

As with the previous year, CRDC's major collaboration was with the Cotton Catchment Communities CRC. CRDC provided four million dollars to the CRC, with all but \$100,000 of that tied to specific projects which were required to address both CRDC's and the CRC's strategic objectives. CRDC has maintained its funding commitment to the CRC for 2007–08 in the face of an overall 20 per cent cut to its R&D budget, caused by a drought-related decline in income: an indication of the great importance it places on the partnership.

CRDC is one of 14 funding partners of the National Program for Sustainable Irrigation (NPSI), which also includes irrigators, water authorities, research agencies, commodity groups and state and Australian Government departments. CRDC is also supporting the training program developed under the NPSI and GRDC-funded Knowledge Management in Irrigated Cotton and Grain project.

The Corporation continues to work closely with Catchment Management Authorities and other regional bodies. As part of the Rural Research and Development Corporations' Natural Resource Management working group, CRDC helps to develop and coordinate plans to communicate with these organisations on natural resource management research and extension issues.

CRDC participates in the Cooperative Venture in Capacity Building and Innovation in Rural Industries (CVCB) with the Australian Government Department of Agriculture, Fisheries and Forestry, the Murray-Darling Basin Commission and other Rural R&D Corporations. Further details about the CVCB can be found above under Strategy Two. CRDC also participates in the Joint Venture Farm Health and Safety, managed by RIRDC.

Once again, CRDC supported production of the joint Cotton Comparative Analysis with Boyce Chartered Accountants and the Cotton Catchment Communities CRC. Produced each year, this publication helps cotton producers to financially benchmark their operations against best practice.

In addition to collaborative projects such as those described above, CRDC works with other R&D Corporations at both strategic and conceptual levels and seeks opportunities to further increase the range of collaborative research projects and programs. Further information on this collaboration can be found in the introductory section of this report.

CRDC staff continued to play a major role in the development of a culture of communication and collaboration across all aspects of the cotton industry, including a number of pivotal industry roles such as program leadership within the Cotton Catchment Communities CRC and the Australian Cotton Industry Council (ACIC). Two CRDC staff members are Directors of the Australian Cotton Centre in Narrabri. CRDC also provides industry committees with guidance on a range of key issues.

MEASURES OF SUCCESS

- Collaborative research is underpinning a range of gains: environmental (e.g., sustainable irrigation), economic (e.g., financial benchmarking) and social (e.g., community benefits, capacity building, Farm Health & Safety)
- CRDC had over 40 key partners in 2006–07, along with collaboration with a large number of organisations through programs such as NPSI, CVCB and Farm Health and Safety Joint Venture

CRDC's key R&D partner organisations and individuals in 2006–07

Government	Cotton industry	CRCs	Universities or University Centres	Private Enterprise	Other RDCs
CSIRO Plant Industry	Cotton Australia	Cotton Catchment Communities CRC	National Centre for Engineering in Agriculture	A & A Williams	Grains R&D Corporation
CSIRO Entomology	Australian Cotton Growers Research Association	CRC Irrigation Futures	University of Adelaide	Australian Cotton Exhibition Centre (ACEC)	Rural Industries R&D Corporation
CSIRO Textile and Fibre Technology	Australian Cotton Ginners Association	Weeds CRC	Australian National University	Australian Rural Leadership Foundation	Land & Water Australia
NSW Department of Primary Industries	Australian Cotton Shippers Association		University of NSW	Boyce Chartered Accountants	Other RDCs associated with the CVCB and F, H & SJV
Queensland Department of Primary Industries & Fisheries	Australian Cotton Industry Council		University of New England	Bill Gordon Consulting	
Australian Government Department of Agriculture, Fisheries and Forestry	Cotton Consultants Australia		University of Queensland	Hassalls & Associates	
Victorian Department of Primary Industries	Women in Cotton (Wincott)		Queensland University of Technology	Dan Hickey	
Queensland Department of Natural Resources and Mines	Cotton Classers Association of Australia		University of Sydney	Ralph Schulzé	
National Water Commission			LaTrobe University	Rebecca Smith	
			University of Southern Queensland	Kevin Bodnaruk	
			Griffith University	Cotton Seed Distributors Limited	

PROGRAM TWO

Integrated Natural Resource Management

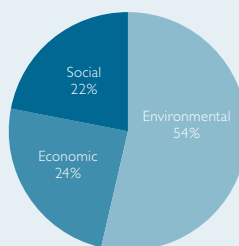
THE PROGRAM AT A GLANCE

Objective

Improved delivery of research, knowledge and management strategies related to natural resources that enhance the ecological, social and economic values associated with cotton production systems, both on and off farm, and reduce negative environmental impacts

Number of projects 2006–07:	15
Compared with 2005–06:	22
Expenditure in 2006–07:	\$509,298
Compared with planned expenditure:	\$771,032
Compared with 2005–06:	\$791,757

Triple Bottom Line investment 2005–06



Outcome

Increased ecosystem health, community wellbeing and economic wealth of cotton growing regions and a reduction of the negative environmental impacts on cotton production systems

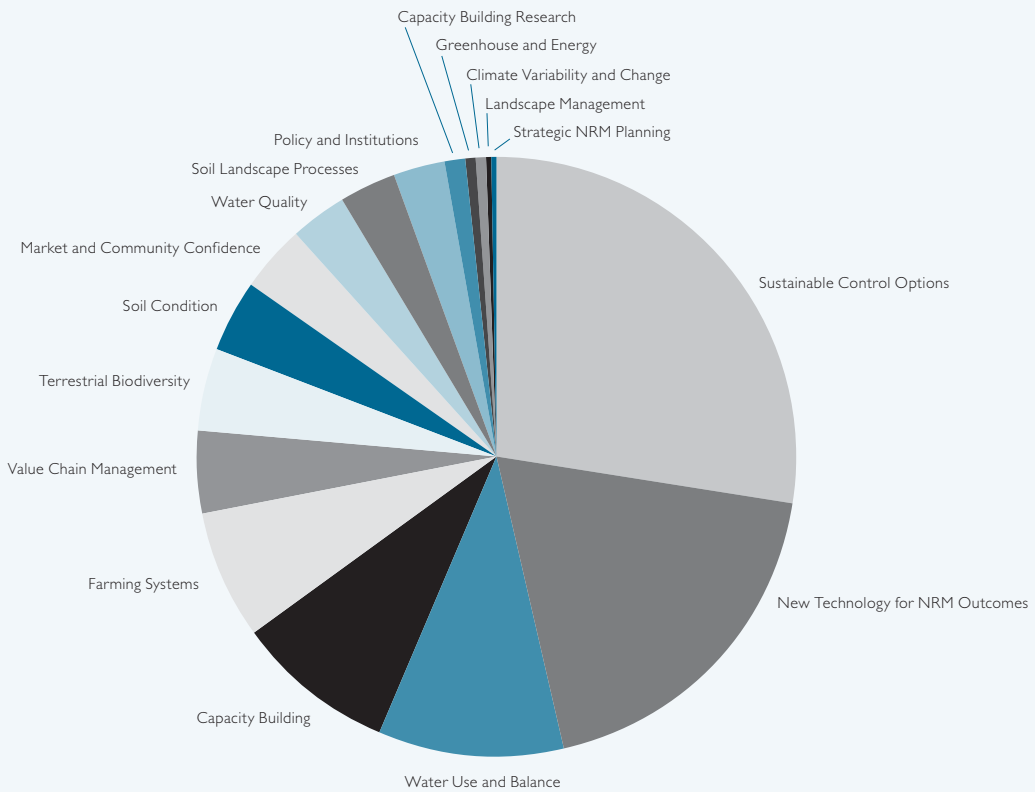
Strategies – CRDC Strategic Plan 2003–2008	Measures of Success
1 Incorporate a broader range of environmental issues in the Cotton BMP program, and facilitate their adoption	Increased adoption and broader environmental coverage of the Cotton BMP program
2 Investigate and evaluate environmental management systems as an industry-led approach to improved natural resource management	An evaluation of environmental management systems as a farm and natural resource management tool
3 Support multi-disciplinary approaches to developing farm management strategies that complement catchment and landscape outcomes in relation to salinity, water quality and quantity, and biodiversity	Improved trends in landscape and catchment indicators such as salinity, water quality and biodiversity. Project and funding links with other catchment and landscape programs related to biophysical targets and sustainability. Improved perception of cotton production by the community
4 Facilitate the necessary environmental impact research for any new transgenic traits introduced into cotton varieties	Publication of refereed environmental impact research in scientific journals related to new transgenic traits
5 Investigate the potential impact of climate change on cotton production, benchmark the industry’s contribution to greenhouse gas emissions, energy use, and develop integrated management strategies to reduce emissions	Benchmarked greenhouse gas emissions, energy use and potential climate change impacts

Background

Australian cotton farmers spend more than any other agricultural industry on natural resource management: an average \$244,000 per farm per annum, compared to the wider agricultural sector average of \$28,000 (Source: *Natural Resource Management Survey 2004–05, Australian Bureau of Statistics*). The Australian cotton industry must maintain economic viability for growers through sustainable farming systems if it is to claim genuine ‘triple bottom line’ sustainability.

Natural Resource Management (NRM) has been a major strategic focus for CRDC over recent years, with the R&D effort ranging from field to catchment scale. The past decade has seen remarkable improvements in pesticide use and pest management, as well as improvements in water use efficiency, vegetation and land management, waste recycling and disposal, wildlife management and biodiversity. Research projects within this program seek to enhance and extend these benefits in coming years.

Figure 7 CRDC NRM Investments in 2006–07*



* Based on a National Research Priority-derived reporting framework developed by a joint Rural R&D Corporations' NRM working group

STRATEGY I

Incorporate a broader range of environmental issues in the Cotton BMP program and facilitate their adoption

The Best Management Practices (BMP) program is the Australian cotton industry's environmental management system. Work continues to expand and improve BMP and increase its uptake, although this task has been made more difficult by several years of drought.

Consultants completed a comprehensive review of the BMP program in mid-2006 and addressed a range of issues:

- Development of draft BMPs for managing greenhouse emissions, gained from current CRDC-funded research
- A review of legal and industry policy positions in regard to BMP guidelines
- A reduction in the information overlap between BMP modules
- An investigation into the viability of including more comprehensive Occupational Health and Safety issues in BMP
- An investigation into the possibility of linking BMP to other industry environmental management systems, quality assurance programs and catchment management targets

As part of the review process, an ongoing comprehensive review of the BMP manual is identifying where improvements can be made for the next edition.

CRDC is working in collaboration with Cotton Australia to develop e-BMP and update the existing BMP manual. The e-BMP project will provide an interactive electronic version of the BMP manual, which will reduce the cost of distributing paper-based manual content and updates and provide integration with current industry research and best practice through a content management system.

The e-BMP project will make it easier for growers to comply with BMP audit requirements and offer Cotton Australia Grower Services Managers and Best Management Practices Implementation Officers ease of management in assisting multiple growers with the implementation of best practice.

The Cotton Extension Team, particularly its environment and water team members, provided technical support for Cotton Australia in delivery of the BMP Land and Water module, improving the breadth and depth of on-farm environmental management.

What is BMP?

Best Management Practices, or BMP, is the Australian cotton industry's commitment to continuous improvement focused on reducing the impacts of cotton farming on the natural environment, neighbours, workers and the community; in other words, its environmental management system. The BMP program is a coordinated industry effort, with CRDC managing the development and Cotton Australia managing the implementation and auditing.

Best Management Practices helps cotton growers:

- Identify and manage environmental risks
- Create a safe workplace for staff
- Design cotton farms that minimise environmental impact
- Use pesticides in a safe and responsible manner
- Use all available options to control pests
- Minimise usage of, and recycle, water
- Store and handle chemicals safely
- Contribute to catchment targets through individual on-farm improvements.

MEASURES OF SUCCESS – STRATEGY I

- A comprehensive review of the BMP manual is determining where improvements can be made in the next edition
- Interactive e-BMP is under development and will reduce distribution costs
- The number of cotton farms involved in the BMP program at a pre-certification or full certification level was impacted by the drought during 2006–07, but continues to increase steadily
- Ongoing implementation of the BMP Land and Water Management module is encouraging improved environmental performance and assisting catchment and regional bodies to direct NRM incentives more effectively

STRATEGY 2

Investigate and evaluate environmental management systems as an industry-led approach to improved natural resource management

As Strategy One reporting testifies, the development and adoption of the Best Management Practices (BMP) program as the Australian cotton industry's environmental management system means Strategy Two has essentially been accomplished. BMP continues to gain environmental credibility for the cotton industry with external stakeholders such as government.

Catchment Management Authorities (CMAs) and Regional Bodies regard on-farm practice change – the major BMP objective – as integral to achieving improvements at a catchment level. As a consequence, many of the catchment bodies covering cotton valleys are becoming more involved in working with the BMP program to achieve best practice outcomes.

Despite its benefits and strong support from industry bodies and external stakeholders, the uptake of BMP has been steady rather than rapid. In March 2007, Cotton Australia estimated that 37 per cent of farm entities were either fully certified against BMP standards or had received a Pre-Certification Assessment (*Source: Cotton Australia*). Based on their production in 2004–05, these farms produced an estimated 45 percent of the national cotton crop. While having almost half of the total crop produced on farms that meet or are seeking to meet industry BMP standards is seen to be an excellent result for a voluntary environmental management system, it is clear the target CRDC set in 2003 – 80 per cent of cotton production audited against BMP Minimum Certification Standards by 2007 – is not likely to be achieved.

Feedback obtained from growers by CRDC, Cotton Australia and the Cotton CRC over the last year indicates that a majority believe they comply with most BMPs and do not find there are sufficient benefits or incentives to warrant demonstration of this by going through the BMP audit process.

In response CRDC, Cotton Australia and the Cotton Catchment Communities CRC have agreed to appoint a BMP General Manager who will help to develop a new Business Plan for the industry's BMP program that seeks to improve the value proposition for cotton growers while continuing to achieve good environmental outcomes. In addition

to this, CRDC has commissioned the development of an electronic version of the BMP manual (e-BMP) and will continue the review process commenced in 2005–06 to revise the current edition of the manual.

In 2005–06 CRDC and the Cotton CRC commissioned Cotton Consultants Australia to survey cotton growers on a range of their current practices. Application of the BMPs in the Land and Water module of the BMP manual were among the practices reviewed. Of the 122 growers who responded, 45 percent indicated they were BMP accredited while the remaining 55 percent were not. When the two groups were compared, a larger proportion of the BMP accredited growers:

- Measured Water use Efficiency in terms of bales of cotton produced per megalitre of water
- Monitored their ground water
- Measured soil sodicity
- Assessed erosion risks
- Used soil pits to monitor soil structure
- Plant native trees in riparian areas
- Provide alternative watering points for stock instead of creeks and rivers
- Conducted soil tests every year or before every cotton crop

These results indicate that there is potentially more to be gained in terms of demonstrating improved environmental outcomes by developing the capacity to report on the BMPs themselves rather than the overall outcome of the audit process.

MEASURES OF SUCCESS

- CRDC, Cotton Australia and the Cotton Catchment Communities CRC are revising the BMP manual and adopting additional measures to strengthen BMP: a BMP General Manager who will develop a BMP Business Plan and an electronic version of BMP is being developed to make the program more accessible
- BMP continues to make incremental gains in external recognition with both regulators and customers as a credible environmental management system
- Further progress was made in 2006–07 with the Queensland Government to enable cotton BMP to be recognised as an alternative to the Land and Water Management Planning process required under the state's water licensing regulations

- An initiative established under the cotton EMS Pathways project demonstrated the potential for marketing our BMP cotton by facilitating partnerships with overseas retailers. Japanese retailers, Izumiya, are now sourcing only Australian BMP cotton for their in-house environmentally-branded 'Good-i' clothing

STRATEGY 3

Support multi-disciplinary approaches to developing farm management strategies that complement catchment and landscape outcomes in relation to salinity, water quality and quantity, and biodiversity

CRDC-funded research seeks to understand the threats of salinity and the impact of deep drainage on production efficiency and the broader environment. On-farm irrigation practices are critical in managing the quality of water and soil, not only on the farm but also within the catchment, with the possible movement of resulting saline or other soil solutes off-farm and into the catchment area. At a field level, research is targeting the management of new irrigation techniques. This work extends to improving the management of whole-farm efficiency, including not only the furrow irrigation itself but also on-farm water storages and channel delivery systems, which have been implicated as major contributors to deep drainage through seepage. This work is reported further in Program Four: Farming Systems.

At a catchment scale, CRDC research investments are focused on understanding the impacts of on-farm deep drainage on catchment water quality. Scoping studies supported by CRDC have indicated that future management of water resources must encompass surface and groundwater systems and their interaction. Key research priorities identified are surface-groundwater interactions as they influence aquifer recharge and discharge, understanding the processes of deep drainage and aquifer recharge in terms of salinity and solute transport: that is, the impact on water quality.



Martin Andersen (left) and Bryce Kelly of the University of NSW have established new data on the important relationships between surface and groundwater, pointing to better ways to manage these resources sustainably

A new project, being conducted in collaboration with Queensland Murray Darling Committee, is seeking to understand the impact of water balance and deep drainage under irrigation on the catchment. It involves a drilling and survey program, which will involve 30 new monitoring bores across the Border Rivers and Mooni River catchments.

MEASURES OF SUCCESS

- Declines in herbicide contamination in rivers correlates with changes in residual herbicide use as a result of increased planting of Roundup Ready® and Roundup Ready FLEX® varieties.
- Information collected on deep drainage is helping to gain an understanding of sustainable groundwater use and catchment health
- A CRDC and Cotton Catchment Communities CRC publication on designing on-farm water storages is aiding in pesticide bioremediation and improved biodiversity on farms

STRATEGY 4

Facilitate the necessary environmental impact research for any new transgenic traits introduced into cotton varieties

The development of genetically modified cotton varieties has been a high priority for CRDC over recent years and this investment has produced excellent returns by way of greatly reduced dependence on pesticides to combat pests and diseases. This has brought economic benefits by reducing the cost of chemicals and improved the environmental performance of the Australian cotton industry.

Bollgard II® technology comprised 86 per cent of the cotton area planted in 2006–07 and industry figures demonstrate that the quantity of pesticide applied to Bollgard crops is only 18 per cent of that applied to conventionally bred crops, also delivering greatly reduced pesticide residues on gin trash, cottonseed and lint. A CRDC-funded project has evaluated pesticide residues in seed cotton, lint and gin trash from Bollgard II® varieties compared with conventional varieties. This work is likely to result in a peer-reviewed article.

CRDC has also invested in a research project with CSIRO and the Cotton Catchment Communities CRC to investigate rhizosphere interactions of GM and non-GM cotton cultivars. This project aims to identify specific bacteria and fungi present in the rhizosphere and whether there are measurable differences in the functions and processes that these soil biota perform between varieties and, in particular GM and non-GM varieties. Specifically, the research seeks to identify whether there is any difference in the relative contribution of these varieties to the rate of nitrification of soil nitrogen, the plant's efficiency in plant nitrate uptake and, consequently, their impact on greenhouse gas emissions.

MEASURES OF SUCCESS

- Research has shown reduced insecticide residues from gin trash, cotton seed and lint from Bollgard II® cotton compared to conventional cotton

STRATEGY 5

Investigate the potential impact of climate change on cotton production, benchmark the industry's contribution to greenhouse emissions and energy use and develop integrated management strategies to reduce emissions

Australia produces approximately two per cent of global greenhouse emissions and agriculture is the second highest contributor at 18 per cent. In irrigated cropping, nitrous oxide from the breakdown of soil nitrogen is the most significant greenhouse gas. The cotton industry emitted an estimated 241 gigagrams (0.2 million tonnes) of CO₂-e in 2005, which was approximately 0.3 per cent of total agricultural emissions (Source: AGO [2007] *Australian Greenhouse Gas Emissions Information System*). With research supported by CRDC, emissions from cotton soils with average nitrogen application have been

measured at around 0.5 per cent of nitrogen applied as nitrous oxide. This is substantially lower than the Intergovernmental Panel on Climate Change (IPCC) standard benchmark of 1.25 per cent, which is applied across worldwide agricultural industries in the absence of local data.

During 2006–07, CRDC-funded research continued to measure the contribution of nitrous oxide under irrigated cropping systems to the industry's greenhouse emissions. The researchers have found that, on average, one third and in some cases up to half of nitrogen fertiliser applied is lost every season, with most of it returning to the atmosphere as nitrogen and a small percentage as nitrous oxide. This has been estimated to cost Australian cotton growers a total of \$32 million annually, as well as having obvious environmental consequences. Thus, the optimisation of nitrogen fertiliser use not only provides a cost benefit to the grower but also reduces greenhouse emissions significantly. Initial results indicate that high cotton yields are not necessarily achieved by applying higher rates of nitrogen but rather by having a well integrated farming system in which water, soil, pest and nutrient management are all optimised.

The greenhouse emissions research project has also developed a simple greenhouse calculator, which is available via the Cotton Catchment Communities CRC website (www.cotton.crc.org.au). The calculator allows users to select a region and then enter their own inputs of irrigation or dryland cropping areas, nitrogen rates and fuel use in order to generate a greenhouse gas emission estimate. A more sophisticated greenhouse gas calculator is under development within the project, as is a life cycle analysis of cotton in relation to greenhouse gas production and energy use.

MEASURES OF SUCCESS

- A simple cotton greenhouse gas calculator arising from CRDC-funded research is available on the web for use by growers and consultants and allows them to calculate their emissions, with a more sophisticated calculator under development
- Research that confirmed nitrous oxide emissions in the cotton industry are approximately 0.5 per cent of applied nitrogen has allowed Australia to report using a lower emission factor of 0.5 per cent for irrigated cotton than the Intergovernmental Panel for Climate Change default benchmark of 1.25 per cent

PROGRAM THREE

Crop Protection

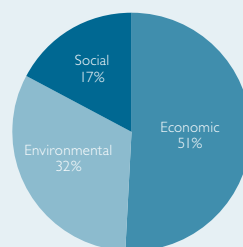
THE PROGRAM AT A GLANCE

Objective

Improved integrated management of major pests, weeds and diseases, reflected by continued reductions in chemical insecticide and residual herbicide inputs to crops; and responsible management of transgenic technology

Number of projects 2006–07:	33
Compared with 2005–06:	32
Expenditure in 2006–07:	\$3,415,363
Compared with planned expenditure:	\$3,127,766
Compared with 2005–06:	\$3,316,613

Triple Bottom Line investment



Outcome

Continued reduced reliance on chemical inputs and more effective management strategies for pests and weeds

Strategies – CRDC Strategic Plan 2003–2008	Measures of Success
1 Improve integrated non-chemical and chemical management of insect and mite pests	Evaluations on the adoption and outcomes of integrated practices, products and technologies, which improve returns, use less chemicals, reduce on and off site environmental impacts as well as any social outcomes
2 Improve integrated non-chemical and chemical management of weeds	Evaluations on the adoption and outcomes of integrated practices, products and technologies, which improve returns, use less chemicals, reduce on and off site environmental impacts as well as any social outcomes
3 Develop practices and technologies that reduce the spread and impact of cotton diseases	Reduced distribution, presence and impact of diseases
4 Ensure the development of resistance is minimised through the design and implementation of resistance management strategies for both insecticides and transgenic technologies	Monitor resistance levels with an aim to either avoid or keep resistance levels in pests and weeds at manageable levels
5 Ensure the benefits of transgenic crop technology are maximised through responsible management based on sound scientific risk assessment	Transgenic crop surveys and reports on performance, management and risk assessment

Background

The cotton industry was the first agricultural industry in Australia to move successfully to the commercial use of biotechnology. This has seen the dawn of a new era for crop protection throughout the industry but also the emergence of new challenges and opportunities, which are being addressed through a sustained and targeted R&D effort within this program.

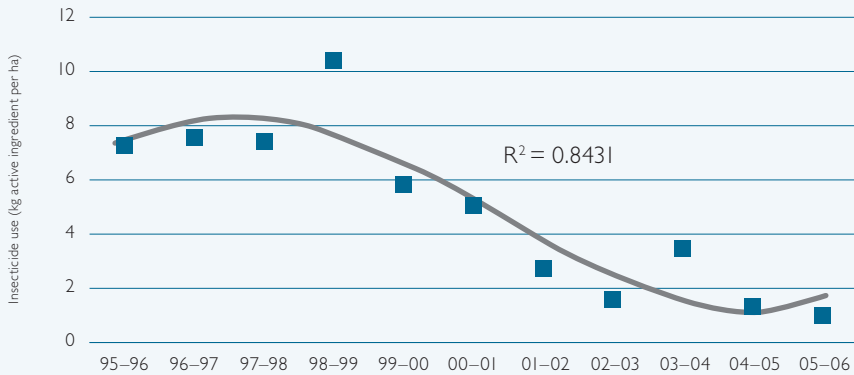
The introduction of GM cotton has made a significant contribution to the dramatic reduction in the quantity of pesticides applied to Australian cotton crops over the past six years. The 2006–07 season saw the widespread planting of Bollgard II® cotton (two-gene *Bt* technology); 92 per cent of the cotton varieties planted across all regions contained both the Bollgard II® and Roundup Ready® genes.

Despite the great success in reducing pesticide use, some pesticides are still required to control insects and weeds. These are managed within

Integrated Pest Management and Integrated Weed Management programs, developed with CRDC support.

A new spray drift management strategy has been devised for the northern grains region, covering the central west of NSW through to central Queensland. This strategy aims to ensure sprays stay within the crop for which they are intended and do not damage neighbouring crops. In particular, it aims to minimise 2,4-D drift from grains crops to cotton and glyphosate drift from Roundup Ready® cotton onto summer cereal crops. This strategy was put into operation for the first time in the 2006–07 season and has been extremely successful. In addition, spray drift workshops were held in six locations in May 2007 as part of an extension project funded by CRDC and the Grains Research and Development Corporation (GRDC). This work has an identifiable community spillover benefit in ensuring local communities are free from spray drift.

Figure 8 Annual quantities of insecticide and acaricide applied to the Australian cotton crop between 1995–96 and 2005–06



(Source: Cotton Consultants Australia annual surveys)

FEATURE

Milestone in Biosecurity Planning

CRDC was actively involved in the development of the Cotton Industry Biosecurity Plan (IBP), which was launched in November 2006. The new plan addresses important Australian Government research priorities, including protecting Australia from exotic pests and diseases.

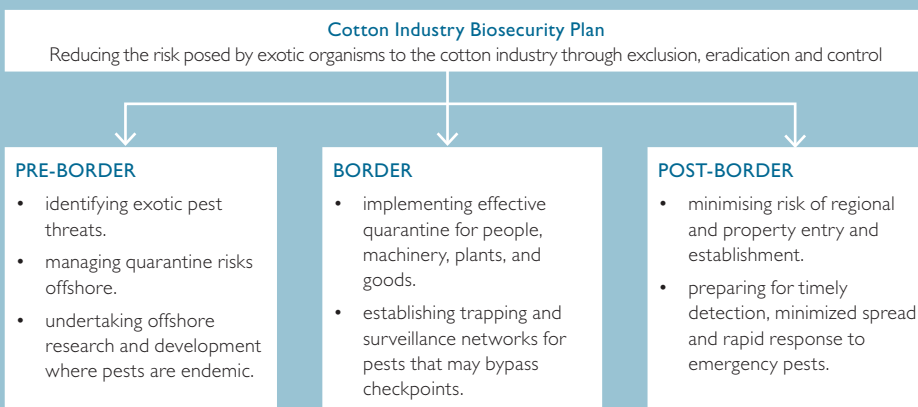
Industry biosecurity planning aims to minimise risks posed by exotic organisms through actions such as exclusion, eradication, and control. Effective industry biosecurity relies on the involvement of all stakeholders, including government agencies, industry, and the public.

The Australian Cotton Growers Research Association (ACGRA) convenes the Cotton Industry Biosecurity Group, which developed the Cotton IBP, with Plant Health Australia playing

a coordinating role. CRDC-funded researchers in the fields of pathology and entomology contributed the knowledge and research capacity that underpinned its development.

The Cotton IBP will provide a framework for the Australian cotton industry to manage biosecurity risks, ensuring that pest threats are minimised and that there is a capacity to respond if emergency plant pests for cotton are detected.

The IBP identified pests that affect the cotton industry worldwide, such as the Boll weevil and exotic forms of Bacterial blight, and categorised these where appropriate to gain pre-agreement on government and industry shares of costs involved in mounting an approved emergency response. The plan prioritised pests according to their risk to Australia’s cotton producers and determined measures to minimise the threat were they to reach our borders.



Achieved through effective partnerships between industry, government and the community



Andrew Inglis AM, Chair of Plant Health Australia, (centre), launched the Cotton IBP in November 2006 at the Dalby farm of CRDC Director, Glenn Fresser. With him are ACGRA Chair, Hamish Millar (left) and Chris Adriaansen, General Manager of Plant Biosecurity, Queensland Department of Primary Industries and Fisheries

STRATEGY I

Improve integrated non-chemical and chemical management of insect and mite pests

The Bollgard II® technology performed well in the 2005–06 season, in which pest pressure was high in many cotton growing regions. As expected, the technology continued to perform well in the 2006–07 season, when *Helicoverpa* pressure was relatively light, principally due to severe drought conditions. Nevertheless, many conventional crops required a number of sprays for *Helicoverpa* control, whereas Bollgard II® crops required none.

An effect of reduced insecticide spraying of Bollgard II® crops for *Helicoverpa* has been an increase in the incidence of some sucking pest species such as mirids, green vegetable bugs and silverleaf whitefly. Silverleaf whitefly outbreaks were reported at St George and in sections of the Gwydir valley. Experience gained from a previous outbreak of this pest in central Queensland, and based on CRDC-funded research and extension, allowed a rapid and effective response to these outbreaks in southern areas.

In addition to this Bt technology, an important tool for managing insect pests is using Integrated Pest Management (IPM), developed with CRDC support in recent years. This involves a range of agronomic tools such as refuge crops that attract the pests away from cotton.



Beneficial insects are an important part of IPM and care is taken to preserve them. Here, a lynx spider efficiently disposes of a *Helicoverpa* pupa

Silverleaf whitefly has been identified as a major pest on every continent. It was first discovered in Australia in the early '90s and arrived with resistance to most organophosphates, carbamates and synthetic pyrethroids. Whitefly is a known carrier of the exotic cotton leaf curl disease and vigilance is

required to ensure that Australian cotton remains free of this disease.

CRDC is continuing its investment into the management of this troublesome pest species, a key to which is a dedicated IPM approach to the management of other sucking insect pests. It is known that inappropriate selection of insecticides for these pests can lead to the flaring of silverleaf whitefly populations that is, cause numbers to build up more rapidly. Other CRDC funded research has led to the release of a parasitic wasp, *Eretmocerus hayati*, in cotton growing districts to aid in the biological control of this troublesome pest.

CRDC sponsored a workshop in the lead-up to the 2006–07 season, to better understand the complexities of whitefly management and formulate strategies for more effective control in the newly affected cotton growing areas. Arising out of the workshop, a travelling roadshow in late September advised growers and consultants on effective whitefly management, with approximately 75 growers and consultants attending in Dalby, Goondiwindi and St George.



Severe boll damage caused by silverleaf whitefly

Green mirids continue to prove problematic in Bollgard II® cotton systems, requiring chemical control. CRDC research has developed threshold guidelines for the control of mirids, to minimise pesticide use and continues further ecological studies to understand mirid behaviour.

A NSW Department of Primary Industries project, co-funded by CRDC, has developed biopesticides (fungal isolates) for the biological control of green mirids. This project is now entering the commercial development stage and has the potential to deliver significant environmental benefits through the reduced use of chemical sprays.

MEASURES OF SUCCESS

- *Bt* cotton market share increased to 90 per cent in 2006–07, up from 80 per cent in 2005–06, demonstrating the usefulness and effectiveness of the technology, which requires 18 per cent of the insecticide required for conventional cotton to manage all pest species.
- The greatly reduced use of insecticides delivers great environmental benefits, including healthier rivers and thus delivers a spillover benefit to regional communities that rely on these rivers
- Earlier CRDC-funded research allowed for prompt and effective management of silverleaf whitefly when new areas were affected in 2006–07
- Biopesticides developed with CRDC funding support show potential to control green mirids and should provide significant environmental benefits when commercialised

STRATEGY 2

Improve integrated non-chemical and chemical management of weeds

Up to 20 per cent of the crop is grown as dryland (non-irrigated) cotton in years with normal rainfall; however, virtually no dryland cotton was grown in 2006–07 because of drought conditions. This meant, of course, that there were very few weeds associated with the dryland production. This was also the case to some extent in irrigated farming systems; however, where crops were planted, irrigation water still contributed to weed growth regardless of rainfall levels.

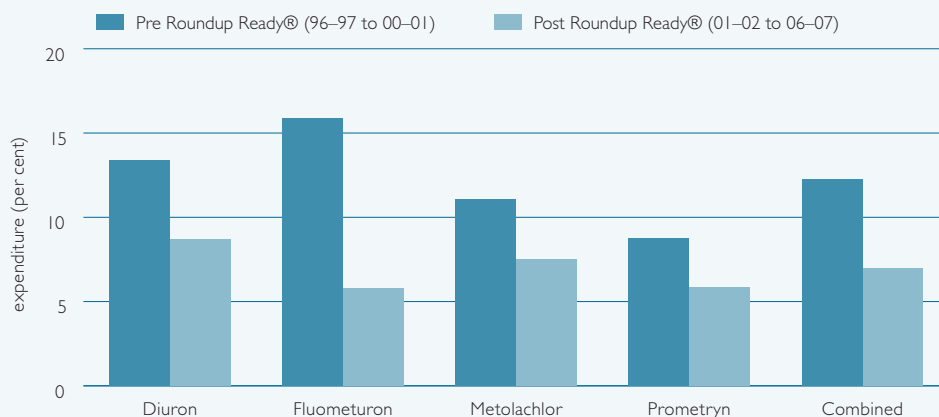
Combined average detections in north west NSW rivers of four residual herbicides used on cotton have declined by 29 per cent (Source: NSW Department of Natural Resources) over the four seasons 2003–04 to 2006–07 compared to the previous five seasons (1998–99 to 2002–03).

This decline is thought to be due to the reduction in the use of these herbicides as a result of the adoption of Roundup Ready® technology and the reduced river flows associated with the drought. The accompanying graph shows the percentage of river samples contaminated with four herbicides for the five seasons pre-Roundup Ready® release compared with the six years post-release. This indicates a significant environmental benefit for regional communities.

Management practices used for weed control in cotton are broader than herbicide use and it is important that the alternatives to chemicals continue to be used by cotton growers within an integrated system. Integrated Weed Management (IWM) is a proactive weed management system based on the latest research findings and has a number of important aims:

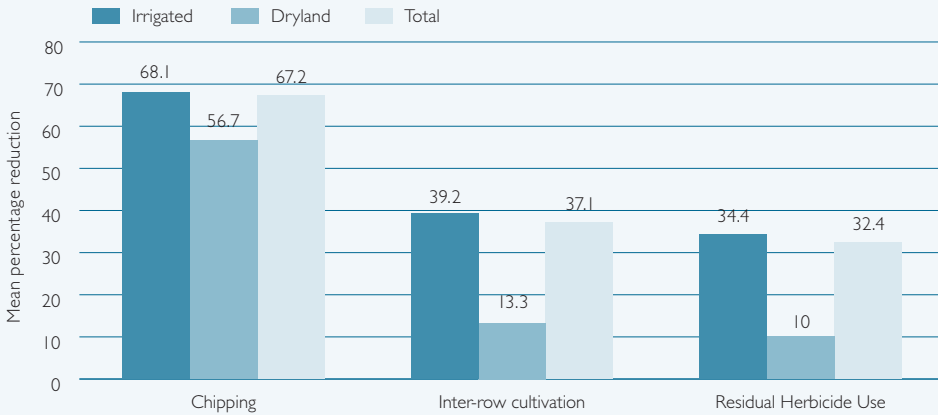
- To control all weed species at some point in the annual cycle in the farming system, using a range of methods (such as herbicides from different modes of action, strategic cultivation, hand chipping, rotation crops) but without relying on any one method completely
- To reduce the size of the weed seed bank
- To improve system sustainability by reducing reliance on the prophylactic use of residual herbicides.

Figure 9 North West NSW river water samples containing herbicides used on cotton



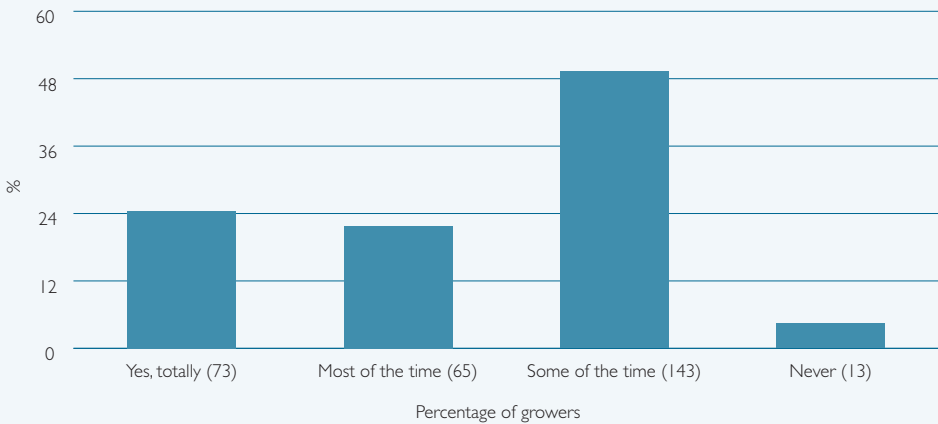
Source: NSW Department of Natural Resources

Figure 10 Reduction in weed control methods since the introduction of Roundup Ready®



Source: Cotton Consultants Australia 2006 survey

Figure 11 Percentage of growers who follow Integrated Weed Management guidelines



Source: Cotton Consultants Australia 2006 survey

IWM continues to be the central focus of weed research in cotton, with WEEDpak the principal resource and repository of information. In 2006–07, 15 new weed sets were added to the identification and information guide, bringing the total to 89, with full information on biology and ecology now provided for all species. The updated version of WEEDpak is available via the CRC website, as well as on the CRC’s COTTONpak CD. In addition, WEEDpak is available in a printable version on the website. The accompanying graph shows the changes occurring in cotton farming systems due to the introduction of Roundup Ready® cotton varieties. These reductions, while beneficial from both the environmental and economic perspectives, indicate an increasing reliance on glyphosate for weed

control; hence the importance of integrated weed management to minimise resistance risks.

The majority of Australian cotton growers use integrated weed management practices in managing weeds on their farms. This is particularly important as the next generation of herbicide tolerant cotton varieties become available to growers. These technologies, including Liberty Link® cotton and Roundup Ready® Flex cotton, offer full tolerance to specific herbicides and need to be managed carefully to ensure that resistance to the herbicides does not develop. CRDC, in conjunction with ACGRA, assists in the development of robust crop management plans to minimise resistance risks associated with these important technologies

Fleabane is an increasing weed problem across a number of farming systems, including cotton. CRDC is funding a new PhD project looking specifically at the ecology and management of this weed in cotton farming systems. CRDC is also co-funding, with the Cotton Catchment Communities CRC and the Australian Weed CRC, a project aimed at better managing fleabane in dryland farming systems when cotton is rotated with grain crops such as wheat and sorghum.

Following five seasons of Roundup Ready® cotton varieties, the 2006–07 season saw the first, although limited, commercial release of Roundup Ready FLEX® cotton varieties. These extend the period during which the non-residual herbicide glyphosate can be applied to control weeds. Approval has now been given by the Agricultural Pesticides and Veterinary Medicines Authority (APVMA) and Office of the Gene Technology Regulator (OGTR) for the introduction of Liberty Link® cotton, which allows the use of a different non-residual broad-spectrum herbicide, glufosinate ammonium, for weed control. This will control a different range of broad leaf weed species, as well as minimising the risks of herbicide resistance.

CRDC is funding a research project with the Cotton Catchment Communities CRC to determine application timing of glyphosate in Roundup Ready® and Roundup Ready FLEX® systems to minimise the risk of herbicide resistance. This project will also provide weed presence thresholds (based on both the type and size of the weeds present), below which no spraying is required.

A PhD project, recently completed, has found that the use of glyphosate alone in Roundup Ready cotton to control barnyard and liverseed grasses is likely to contribute to herbicide resistance; however, the project found that if glyphosate is used as part of an integrated weed management strategy, no resistance occurs. The results of this work were then used to formulate a crop management plan for Roundup Ready® and Roundup Ready FLEX® cotton.

MEASURES OF SUCCESS

- Integrated Weed Management (IWM), based on the latest research findings, continues as the main weed control focus – with fewer than ten per cent of growers not using IWM at all
- Increased adoption of Roundup Ready® cotton to 75 per cent of the area planted in 2006–07, indicative of the benefits this technology brings to weed management

- Further reductions in the overall quantities of residual herbicides applied to cotton farming systems in 2006–07 provided environmental benefits.
- In 2006–07, 89 weed sets included in WEEDpak (up from 74) with information on the biology and ecology provided for all weeds (up from 43)
- Full commercial release of seed containing Roundup Ready FLEX® technology in the 2006–07 season is providing a wider window for glyphosate application, bringing greater flexibility in weed control options
- Limited commercial release of Liberty Link® cotton varieties will increase the range of broad leaf weed species that can be controlled, while minimising resistance risks

STRATEGY 3

Develop practices and technologies that reduce the spread and impact of cotton diseases

In early 2007, CRDC commissioned a review of the cotton disease research it funds and manages. The review was conducted by Dr Eileen Scott, Associate Professor in the Department of Crop Protection, The University of Adelaide and Lester Burgess, former Dean of Agriculture at The University of Sydney and now Honorary Professor in the Faculty of Agriculture, Food and Natural Resources, working with Bill Tyrwhitt, Chair of the ACGRA Crop Protection Committee.



The disease review panel consulted widely before formulating ten recommendations for future research directions

The Panel commended CRDC for supporting a portfolio of applied, strategic and basic research projects that has generally addressed the needs of the industry and encouraged the Corporation to "...continue to support such a balanced portfolio,

with industry benefit as a key criterion in assessing relevance of research proposals.”

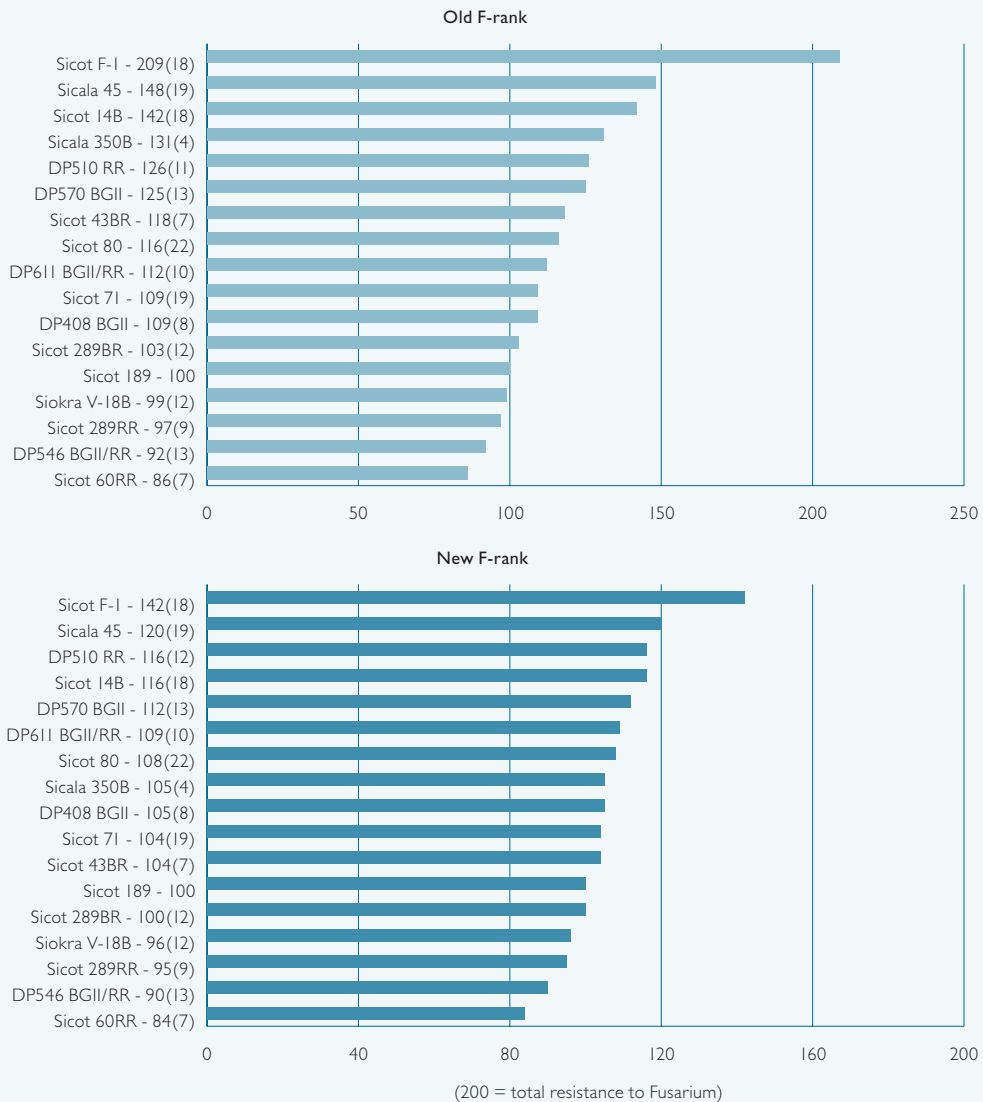
CRDC is now consulting with the researchers and others involved in this area regarding ten recommendations arising out of the review as to the priorities, gaps, overlaps and other issues important to future research.

Tobacco Streak Virus, which is endemic in parthenium weed, has been found in sunflowers, chickpeas and mung beans in central Queensland. This virus has been found in cotton in other regions of the world,

making it a potential threat to the Australian cotton industry. CRDC, through the pathologists it funds, is monitoring cotton in these regions and the Cotton Industry Biosecurity Group is developing a response plan.

The soil borne diseases Fusarium wilt and Black root rot were once again problematic in the 2006–07 season. Fusarium has spread further throughout cotton growing areas, although the number of reports of new infestations has slowed. A new form of the disease has been identified and there

Figure 12 F-rank for 2006–07 under the old and new ranking system



is uncertainty as to the likely impact of this strain on production. Ongoing research at the molecular level, combined with increased understanding of the biology and ecology of the pathogen, continue to deliver constant improvements in field management.

Research projects into Fusarium wilt include ecology, field management, novel sources of resistance and conventional breeding objectives. The search for novel resistance genes and markers continues and researchers are optimistic of providing industry with solutions to this disease. In the shorter term, there has been widespread adoption of improved farm hygiene practices to slow the spread of Fusarium, based on research and extension activities supported by CRDC.

In measuring the resistance of particular cotton varieties to Fusarium (the F rank), there have been considerable variations obtained from some trials in recent seasons. Under the original system for calculating an F rank it is possible to get F ranks of up to 1900. Such values contribute to high standard errors and variable means and make interpretation of F ranks difficult. Under the new ranking system, developed by the industry's Fuscom Committee, the maximum rank is 200, which indicates full resistance. The graphs on the previous page show the F rank for 2006–07 under the old and new ranking system.

In the 2006–07 season, 100 per cent of the crops sown in NSW were with varieties that had an F-rank of 100 or more (under the new ranking system), compared to 89 per cent in the previous season and only 12 per cent in 1999–2000 (*Source: Cotton Seed Distributors 2007 Variety Trials report*).

Black root rot continues to spread and is now found on the majority of cotton farms. While it does not have the same impact on cotton as Fusarium wilt, it predisposes the crop to insect infestation as well as making it more sensitive to weed pressure. CRDC-funded research evaluated a new seed treatment (Bion[®], Syngenta Crop Protection Pty Ltd) that initiates the natural self-defence mechanisms of cotton. This seed treatment is now being used commercially in the Australian cotton industry to provide enhanced protection against both Black root rot and Fusarium. In addition, CRDC-funded researchers at The University of New England are looking to identify genes that may confer a high level of resistance to Black root rot for Australian cotton varieties.

MEASURES OF SUCCESS

- Research is aiding in the development of a compound that utilises the plant's own defence mechanisms to resist infection by disease
- Fewer new detections of Fusarium wilt reported, principally due to research-driven improved management and hygiene
- Improvements in germplasm with higher F ranks (a measure of resistance to Fusarium) is allowing growers to plant back into fields known to have Fusarium
- Continued improvements in the F rank of major commercial varieties: 100 per cent of the varieties sown in NSW in 2006–07 had an F-rank of 100 or more, compared to 89 per cent in the previous season

STRATEGY 4

Ensure the development of resistance is minimised through the design and implementation of resistance management strategies for both insecticides and transgenic technologies;

and

STRATEGY 5

Ensure the benefits of transgenic crop technology are maximised through responsible management based on sound scientific risk assessment

Monitoring for resistance and developing an understanding of the mechanisms that lead to resistance in conventional insecticides and the Bt proteins are crucial research areas of CRDC investments. Resistance management strategies are formulated through wide industry consultation to ensure the sustainability and stewardship of the technologies and chemistries available for insect control in the cotton industry.

The successful and widespread adoption of Bollgard II[®] in the 2006–07 season is a measure of the importance of this technology to industry for both improved productivity and environmental reform. The industry recognises that the improved quality of life on cotton farms and the reduced environmental footprint of cotton production is in part directly attributable to the advances in gene technology. Preserving and maintaining the integrity of the technology is of prime concern to the industry and thus to CRDC.



Dr Sharon Downes, pictured with CRDC's Bruce Finney, received a 2006 Science and Innovation Award for Young People in Agriculture, Fisheries and Forestry. Sharon is conducting CRDC-funded research relating to *Helicoverpa* in Bollgard II® cotton fields and the implications for *Bt* resistance management

Bt cotton has underpinned the management of *Helicoverpa* but it is only one aspect of good pest management. The continued presence of secondary pests such as green mirids, silver leaf whitefly and green vegetable bug emphasises the importance of an integrated approach to pest management, of which the judicious use of conventional insecticides is a fundamental component. To ensure the continued effectiveness of these compounds, CRDC supports a number of resistance monitoring projects that quantify the level of resistance in certain insect species. The success of the resistance management strategy and implementation of science-based integrated pest management strategies is demonstrated by a decline in the resistance levels to a number of important insecticides in both the 2005–06 and 2006–07 seasons.

MEASURES OF SUCCESS

Strategy 4

- A highly effective resistance management strategy means the resistance status and frequency of resistance of *Helicoverpa armigera* or *Helicoverpa punctigera* have shown no signs of change since the commercial introduction of Bollgard II® varieties, thus maintaining the efficacy of the technology
- The herbicide resistance strategy within the Australian cotton industry has been totally effective since the introduction of Roundup Ready® cotton varieties

Strategy 5

- CRDC-funded research provided comprehensive field monitoring of insecticides and miticides with the following results:

Helicoverpa armigera

- Insecticide resistance to a number of key compounds has remained unchanged or has declined
- A new Insecticide Resistance Management Strategy (IRMS) has been introduced that is less restrictive than previous strategies, reflecting the improvements in resistance levels of key pests to some of the commonly used insecticides.
- Background resistance to the Cry 2ab toxin is around twelve in 1000 individuals with no evidence of cross-resistance to Cry 1Ac detected

Aphids

- Resistance to some key insecticides has declined and in some instances was not detected at all

Mites

- Results for mites are similar to those of aphids

Silverleaf whitefly

- Silverleaf whitefly continued to spread throughout the cotton industry during 2006–07. This makes vigilance for resistance very important; CRDC has a resistance monitoring program with Queensland Department of Primary Industries and Fisheries.

PROGRAM FOUR Farming Systems

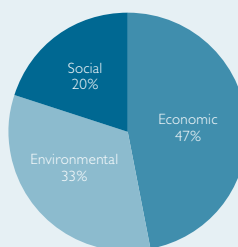
THE PROGRAM AT A GLANCE

Objective

Integrated farm management practices that enhance the sustainability and profitability of cotton farming systems

Number of projects 2006–07:	26
Compared with 2005–06:	27
Expenditure in 2006–07:	\$2,097,896
Compared with planned expenditure:	\$2,568,064
Compared with 2005–06:	\$2,357,679

Triple Bottom Line investment



Outcome

A more sustainable and profitable cotton farming system

Strategies – CRDC Strategic Plan 2003–2008	Measures of Success
1 Improve water use efficiency on farms using existing and new infrastructure, new tools and technologies	Increased yield per hectare and per megalitre of water and; Improved water use efficiency on farms
2 Understand salinity, sodicity and deep drainage on farms and develop appropriate farm management strategies to minimise these potential negative processes	Adoption of integrated management options for salinity and sodicity
3 Strengthen our understanding of soil health and improve crop nutrition management	Benchmark of soil health characteristics and optimise crop nutrition management
4 Increase profitability with better whole farm management strategies and innovative precision agricultural systems	Improved economic returns to farmers and; Data on changed farming practices including the economic, environmental or social benefits
5 Continue fundamental research on cotton agronomy and plant physiology and explore the interactions of different components for both conventional and transgenic varieties	Publication of cotton research related to crop physiology and transfer of agronomic knowledge into other research and extension project outcomes

Background

The ever-increasing costs of land, water, machinery and labour, coupled with prevailing drought and declining global prices, place growing financial pressure on cotton growers, which CRDC-funded R&D must continue to address. The introduction of new GM varieties and integrated management systems such as those for pests, soils and weeds has seen the costs of chemical inputs decline significantly in recent years.

STRATEGY I

Improve water use efficiency on farms using new and existing infrastructure, new tools and technologies

Queensland cotton growers have improved their water use efficiency by 11 per cent since 1999, equivalent to water savings of 67,885 megalitres a year (Source: *Rural Water Use Efficiency Final Report, Australian Cotton CRC, 2003*). Of the world's major cotton producing countries, Australia uses its water most efficiently (Source: *Australian Cotton CRC/CSIRO, 2003*).

A major review of water use benchmarking information and research conducted by the Cotton Catchment Communities CRC has demonstrated the difficulty of using any single index to measure WUE across a whole industry. From this, CRDC concludes that its 2004 Triple Bottom Line target of a 20 per cent reduction in WUE by 2008 is not only extremely difficult to measure but also may not be meaningful because of regional differences in climate, soils and irrigation systems.

Instead, CRDC is placing more importance on being able to monitor and measure practice change that demonstrates the industry's capacity to improve WUE. This may best be done by using grower compliance with the Best Management Practices (BMP) Land and Water Management module to monitor practice change and by developing a range of detailed case studies that demonstrate the WUE improvements these practice changes deliver on individual farms. A number of case studies are being developed at present, through a collaborative effort involving CRDC staff, members of the Water Extension team and a project initiated by the National Program for Sustainable Irrigation (of which CRDC is a partner). The cotton industry's commitment to double WUE by 2015 remains intact although the challenge to measure this aspirational goal effectively is recognised.



Postdoctoral researcher Simon White is undertaking research to optimise irrigation scheduling to achieve water use efficiency

The activities of the National Water Extension Team are important for achieving improved WUE in the cotton industry. The team is part of the larger Cotton Extension Team and works on a range of funded project undertaken on behalf of industry by the NSW and Queensland Primary Industries departments and CSIRO. Growers, consultants and agribusiness suppliers are encouraged to contact the water team for further information.

CRDC increased its investment in an irrigation program delivered through the Cotton CRC to target whole farm water use efficiency and profitability. This project involves two Catchment Management Authorities, Namoi and Border Rivers-Gwydir, in the activities of the Water Extension Team in NSW. The team is working with growers, cotton consultants and irrigation specialists to improve industry capacity to measure WUE on-farm using the most up-to-date tools available, including Irrimate® and Water Track®. CRDC's past investments helped to develop Irrimate, a furrow irrigation optimisation system that provides growers with the ability to measure what is happening to their water at a field level so they can assess the performance of irrigations throughout the season.

During the 2006–07 season the National Water Extension Team monitored 37 irrigation events across five farms in the Moree district. The monitoring revealed a wide range in WUE between the farms at a field level, with application efficiency ranging between 44 and 97 per cent. The monitoring demonstrated that many growers could still improve their WUE by simple cost effective means, such as refining irrigation techniques and timing.

MEASURES OF SUCCESS

- CRDC is aiming to develop more viable methods of measuring improvement in the cotton industry's WUE
- A major CRDC project is enhancing the water use efficiency extension effort by targeting whole farm water use efficiency and profitability, with more direct linkages to BMP
- CRDC projects are exploring WUE through better irrigation timing and water placement
- Continued uptake of information in resources such as and WATERpak and their inclusion in the searchable 'COTTONpak' CD, combined with an increased uptake of commercial water use efficiency services, indicates industry commitment to improving on-farm water use efficiency

STRATEGY 2

Understand salinity, sodicity and deep drainage on farms and develop appropriate farm management strategies

CRDC invested \$1.2 million over the nine years prior to 2003–04 on mapping salinity risks in cotton growing areas. The underlying aim of the mapping project was to use similar methods to generate independent maps of these causal factors, store the information in Geographic Information Systems (GIS) format and generate salinity risk maps in various irrigated cotton growing areas. When the independent causal factors are stored in GIS, their interaction can be related to where salinisation is evident and assist to determine whether these conditions may be encountered elsewhere.

A PhD project has collated and stored this information in various GIS for a range of irrigated cotton growing areas, with funding from the Australian Government's National Competitive Component of the Natural Heritage Trust Program funded this work. One CRDC funded researcher won a National Water Research award for this work.

CRDC has invested in two key approaches to understand the threats of salinity and the impact of deep drainage on production efficiency. Deep drainage becomes critical in managing the quality of water and soil within the plant root zone for all irrigated agriculture systems. Deep drainage must be minimised in order to achieve water use efficiency but a certain level is required to remove excessive salts beyond the plant root zone. This must be

balanced with the risk of saline salts moving off the field into the broader environment and an increase of soil sodicity.

At a field level, research is targeting the management of new irrigation techniques. It is expected that the industry will continue to make a steady shift to alternative irrigation systems such as lateral move and centre pivot, as these systems may offer advantages in improving WUE and managing deep drainage. However, while research into optimising alternative delivery systems continues, the key emphasis of CRDC research is to optimise the effectiveness of water delivery in furrow irrigation. This work extends to improving the management of whole-farm efficiency, including not only the furrow irrigation itself but also on-farm water storages and channel delivery systems, which have been implicated as major contributors to deep drainage through seepage.

Deep drainage must be measured accurately if it is to be managed and this is dependent on the installation of weighing lysimeters. These are very expensive, and therefore unlikely to be installed on cotton farms. The affordable compromise reached has been to install one large lysimeter at the Australian Cotton Research Institute (ACRI), near Narrabri, which is then used to calibrate results obtained from 27 smaller barrel lysimeters (a much cheaper alternative) which are deployed throughout cotton regions in Queensland and NSW. This provides more reliable information that will assist the development of management techniques for deep drainage under different soil conditions.

CRDC research investments are also focused on understanding the impacts of on-farm deep drainage on catchment water quality at a catchment scale. Further information on this aspect can be found in Program Two: Natural Resource Management.

Sodic soils contain other sodium compounds that, unlike salt, are not transportable off-farm. Sodicity is seen as a more significant problem for the cotton industry than salinity, as cotton is particularly sensitive to sodic soils. CRDC research projects in Programs Two and Four, relating to crop rotation, irrigation, deep drainage and soil tillage, all have implications for sodicity. Research continued to focus on long-term farming system sites, investigating and comparing a range of crop rotation, irrigation and soil tillage practices for their impact on sodicity, long-term environmental sustainability and profitability. Research indicates that sodicity may be up to five

times higher in seasons with low rainfall, which has the potential to reduce irrigation application efficiency by up to 50 per cent.

Another major impact of sodicity is on the ability of plants to extract nutrients from the soil. CRDC is currently investing in several research projects investigating how to enable the plants to extract nutrients even when sodicity is present. NutriLOGIC, a decision support tool developed with CRDC funding, now also includes interpretation of soil analyses for salinity and sodicity.

A recent PhD study has found that sodicity limits the growth of the cotton plant in soils that have low to moderate sodium levels, mainly due to the physical effect of sodicity on soil properties such as hard-setting soils and poor aeration. In soils with high sodium content the problem tends to be a chemical one, in that plants have to deal with sodium toxicity and micronutrient deficiencies; hence, yields can also be reduced.

MEASURES OF SUCCESS

- Research on deep drainage will help growers better understand its relationship to furrow irrigation
- CRDC research is set to optimise the efficiency and effectiveness of whole-farm water delivery to minimise deep drainage
- Extensive information gathered on salinity risk will soon be available on GIS and able to predict other areas where problems might occur
- CRDC research is investigating a range of crop rotations, irrigation, and soil tillage practices for their impact on sodicity, long-term environmental sustainability and profitability

STRATEGY 3

Strengthen our understanding of soil health and improve crop nutrition management

Healthy soils are important to cotton production systems. They contribute to increased yields by facilitating the exchange of nutrients essential for plant growth, reducing the likely impacts of disease, improving the soil's structure and enhancing water infiltration. The CRDC-supported National Cotton Extension Team has developed a priority plan for the coordination and extension of crop nutrition research within the cotton industry.

Anhydrous ammonia and urea-based fertilisers are used widely in the cotton industry as a source of nitrogen fertilisers. Not only are these costly, they are also known to contribute to greenhouse gases. CRDC is investing in research to optimise the use of the fertilisers and investigate the use of alternative, agronomically based sources of nitrogen, such as legume rotation crops. As with any farming system, there are advantages and disadvantages attached to each agronomic decision and this research will help growers to balance these and arrive at decisions that are best for their particular farms.



CRDC-funded research seeks to optimise the use of fertilisers such as anhydrous ammonia and to investigate other sources of nitrogen such as legume rotation crops

Through the Cotton Catchment Communities CRC, and in conjunction with a number of Catchment Management Authorities, CRDC is participating in Healthy Soils for Sustainable Farms, coordinated by Land and Water Australia. The project to which CRDC is contributing is developing practical tools and extension activities, based on existing research and extension information, to accelerate the adoption of best practice for soil health by irrigated cotton and grain growers. Project activities will link to regional NRM catchment management targets and the BMP Land and Water Management module. The 2005 Soil Biology Growers Survey and Research Review, undertaken by CRDC, guided much of the work within this project.

MEASURES OF SUCCESS

- The National Cotton Extension Team is utilising CRDC-funded soil health research within a priority plan for extension
- A greenhouse gas calculator available via the Cotton Catchment Communities CRC website has been promoted by the extension team and revised in accordance with feedback from growers and consultants

STRATEGY 4

Increase profitability with better whole farm management strategies and innovative precision agricultural systems

Each year, CRDC and the Cotton Catchment Communities CRC organise a Farming Systems Forum to identify research gaps and extension needs relating to an issue of particular current importance. Growers, consultants, researchers and other industry personnel attend the forums.

The latest, on On-Farm Energy Use, was held in Narrabri in September 2006 and attracted a number of people from outside the cotton industry, including grain growers. Papers presented covered diverse energy-related areas such as greenhouse gas emissions, fuel use and biodiesel production. Participants identified a range of possible areas for future research and extension, which will inform planning decisions by both CRDC and the CRC.



The Energy Use Farming Systems Forum proved valuable to a wide range of participants from the cotton and grains industries

CRDC once again supported production of the joint Cotton Comparative Analysis with Boyce Chartered Accountants and the Cotton Catchment Communities CRC, to help cotton growers to benchmark their own operations financially against those of top growers and better understand the drivers of profitability. The latest publication was launched at the Australian Cotton Conference in August 2006. While the report focuses on the 2005 crop, it also presents trends that have been measured against more than 10 years of data and identified important trends from 1996 to 2005. The net price per bale of cotton decreased by eight per

cent over that period, while the yield per hectare increased by 28 per cent. Profitability trends on average performing farms are declining. The top 20 percent of farms are distinguished from the average by producing higher yields at lower cost.

MEASURES OF SUCCESS

- A CRDC and Cotton Catchment Communities CRC On-Farm Energy Use Farming Systems Forum provided comprehensive information on this highly relevant area and identified both research and extension needs
- The new *Cotton Comparative Analysis* demonstrates that despite the cost price squeeze, increased yields continue to be vital to profitability and highlight the contribution delivered through research and the economic gains from best practice management
- As a direct result of research into IPM and the introduction of GM varieties, the cost of chemicals has declined in comparison to other farm inputs

STRATEGY 5

Continue fundamental research on cotton agronomy and plant physiology and explore the interactions of different components for both conventional and transgenic varieties

Cotton row spacing can have a significant impact on yields, particularly in the more southerly cotton growing areas with a short growing season. In these circumstances, narrow or ultra-narrow row configurations mean the plants must compete for light, which makes them smaller and forces them into their reproductive phase earlier. Paradoxically, this often results in higher yields and improved fibre quality. A research project commenced in 2006–07,



Postdoctoral researcher Rose Roche is researching the impact of plant configuration such as narrow row planting on cotton yields

examining different row configurations and row spacings in the farming systems of Hillston and Hay in southern New South Wales. The project seeks to determine optimum planting configurations for yield and quality in this area.

Bt cotton, with the ability to control the insect pest *Helicoverpa* spp., has led to a significant reduction in crop damage which, in turn, has influenced the structure and growth habit of *Bt* cotton plants. CRDC investments have investigated the significance of the changing growth habits in relation to nutrient use and water use efficiency. As well as having a potential impact on nutrient and water use efficiency, the changing growth habit of the *Bt* cotton plant may also impact on the quality of the cotton fibre produced. *Bt* cotton crops mature earlier than conventionally bred varieties and in some cases this has led to an improvement in fibre quality by reducing the degree of immature fibres and short fibre content.

The CRDC-funded Field to Fabric project is assessing the agronomic impacts on fibre quality across new, elite cotton varieties. This work should lead to a better understanding of whether there are any significant fibre quality differences between transgenic and conventional varieties. Key outcomes of this research may indicate necessary changes in both water and nutrient management of *Bt* cotton, particularly during the first half of the growing season, to optimise yield and fibre quality.

MEASURES OF SUCCESS

- Crop physiology and agronomic research outcomes communicated to industry through CRDC, as well as agricultural science journal articles and trade publication articles by researchers and CRDC staff
- The National Cotton Extension Team incorporates the latest agronomic research findings in its work in all cotton areas and informs growers and consultants in their region.



Centre pivot irrigation



Furrow irrigation



Lateral move irrigation

Furrow irrigation is the principal method used in the Australian cotton industry and the major focus of CRDC irrigation research. The overhead irrigation systems of lateral move and centre pivot are also gaining greater acceptance.

PROGRAM FIVE

Plant Breeding and Biotechnology

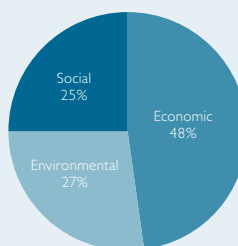
THE PROGRAM AT A GLANCE

Objective

World-leading cotton varieties displaying continuous improvement in cotton yield, quality and agronomic performance through plant breeding and biotechnology innovations

Number of projects 2006–07:	17
Compared with 2005–06:	19
Expenditure in 2006–07:	\$1,297,469
Compared with planned expenditure:	\$2,363,474
Compared with 2005–06:	\$1,945,199

Triple Bottom Line investment



Outcome

Continually improving cotton varieties

Strategies – CRDC Strategic Plan 2003–2008	Measures of Success
1 Develop regionally adapted cotton varieties exhibiting improved yield, quality, insect and disease resistance and herbicide tolerance	Evidence that new cotton varieties are increasing yields and potential returns to the industry Evidence that new varieties can produce higher yields with lower inputs of chemicals and improved water use efficiency
2 Targeted, innovative biotechnology focused on solving production and quality constraints confronting the Australian cotton industry	Evidence that CRDC's biotechnology investments are delivering industry or community benefits
3 Reduction in time required to introduce improved or novel genes into elite cotton varieties through the development of frontier technologies, without compromising scientific rigour	Evidence of the reduced time to introduce genes into cotton varieties
4 Continuous monitoring of the signals from cotton textile and oilseed marketplace to ensure Australian varieties maintain a place at the high quality end of the market	Market reports on the demand for Australian cotton lint and seed

Background

To date, CRDC has invested over \$45 million in plant breeding and biotechnology-related research. The outcomes from these investments have been one of the major success stories in agricultural research, recognised by a number of prestigious government and industry awards for the researchers involved. Growers have benefited from world-leading yield, disease, agronomic and quality improvements, as well as access over the last ten years to new biotechnology. In addition to addressing a range of Australian Government's National Research Priorities and Rural R&D Priorities, the investments have significant social spillover, in a diversity of ways such as improved quality in local river systems (from greatly reduced pesticide use), safer workplaces and sustainable careers within the industry.

Support for the CSIRO core plant breeding program, and for associated research in biotechnology, has been a major part of these investments. Consequently, 2006–07 represented a watermark for this program, with advice from CSIRO in January 2007 that it no longer required the funding support that it had requested for 2006–07 for the core breeding program, and that had been allocated in CRDC's Annual Operating Plan for that year.

STRATEGY I

Develop regionally adapted cotton varieties exhibiting improved yield, quality, insect and disease resistance and herbicide tolerance

Future outcomes for this strategy will be affected by CSIRO's decision not to take up CRDC funding for its core breeding program in 2006–07. Nevertheless, the germplasm developed through past investments will continue to form the basis for new varieties developed by the CSIRO breeding team. CRDC investments have continued in the critical area of biotechnology. Of particular importance for the industry is the continual integration of transgenic traits into new varieties.

In 2007, six new varieties were commercially released, with five incorporating key transgenic traits. These included one conventionally bred variety, two Bollgard II®, one with combined Bollgard II® and Roundup Ready Flex® technologies and two Liberty Link® varieties. Their release will continue to deliver great benefits of environmental and economic sustainability, through varieties with improved fibre

quality and requiring far less use of insecticides to control cotton's principal pest, *Helicoverpa* spp.

In 2006–07, 92 per cent of the cotton varieties planted across all regions contained both the Bollgard II® and Roundup Ready® genes, with the latter tolerant to the herbicide glyphosate. Averaged over their first three seasons, Bollgard II® varieties required only 18 per cent of the insecticide required for conventional cotton to manage pests.

Following a limited release in 2005–06, the full release of varieties containing Roundup Ready FLEX® for the 2006–07 season provided growers with greater flexibility in weed control spray options using glyphosate.

Over the last three seasons the Bollgard II® variety Sicot 71BR has dominated crop plantings. It is a well adapted variety offering growers significant yield improvements over previous varieties. At the same time, it delivers fibre quality similar to previous varieties.

The 2005–06 release of the variety Sicala 350B, developed with CRDC support, aimed to provide growers with the opportunity to produce a quality of cotton that attracts a premium price on the international market. Indications so far are it delivered a 10 to 15 per cent quality premium over conventional varieties in the 2006–07 season.

Unfortunately, there is a negative correlation between yield and fibre quality when breeding for quality. There will need to be evidence of significant premiums before widespread adoption of varieties such as Sicala 350B will occur. The CSIRO breeding team is continuing to target fibre quality in conventional breeding programs and in 2007 release a new variety Sicot 75 (2007) which is a broadly adapted variety with similar yield potential to Sicot 71BR but with much improved staple length. The new variety Sicot 70BRF is being released for the 2007–08 season and will offer growers improved yield with improved fibre fineness. Fibre length and fineness are the key fibre traits sought by spinners for the production of quality yarns.

CRDC continues to invest in understanding how growers can best capture the benefits of such varieties through the value chain, particularly as the quality premium has, to date, been offset by some reduction in yield. More discussion of this issue can be found in Program Six.

MEASURES OF SUCCESS

- 85 per cent of 2006–07 plantings were CSIRO-developed CRDC-funded varieties, comprising both GM and conventionally bred varieties
- Averaged over three seasons, Bollgard II® have required less than 18 per cent of the insecticide required for conventional crops
- Roundup Ready® varieties have assisted with a 32 per cent reduction in residual herbicide use
- Growers received a premium of up to 15 per cent higher than traditional varieties with Sicala 350B, which delivered higher quality cotton
- The availability and adoption of varieties with higher tolerance for Fusarium wilt has increased

STRATEGY 2

Targeted, innovative biotechnology focused on solving production and quality constraints confronting the Australian cotton industry

CRDC continues to invest in biotechnology that targets yield and fibre quality, disease tolerance and agronomic performance (issues such as tolerance to waterlogging and disease, and pest resistance).

The key outcome has been the continued integration of technologies such as Bollgard II® and Roundup Ready FLEX® into elite germplasm. This allows the industry to take advantage of improvements in conventional breeding while still having access to the latest biotechnology for pest management.

Biotechnology for the management of *Helicoverpa* spp. continues to play a crucial role. Pesticide use has reduced by 85 per cent since the introduction of varieties containing genes resistant to *Helicoverpa*, which has delivered significant environmental benefits and played a crucial role in reducing costs for growers.

Roundup Ready® technology has provided growers with resistance to the commonly-used herbicide, glyphosate, and allows growers to reduce their use of residual herbicides, which pose risks to land, water and biodiversity. The past two seasons have seen the use of Roundup Ready FLEX®, which extends the period during which glyphosate can be applied compared to the previous Roundup Ready® technology. CRDC is mindful of the need to understand the risks of herbicide resistance developing through the continued use of glyphosate within the farming system. Current

monitoring programs have not yet revealed any such development of resistance.

The CSIRO breeding team has made great strides in developing Fusarium resistance through conventional breeding techniques, as can be seen in Program Three; however, the development of genetic markers for Fusarium wilt resistance has been a key priority for CRDC. Genetic markers have the potential to further improve the selection of varieties resistant to Fusarium and reduce the period during which such varieties can be developed for commercial release. CSIRO efforts to develop genetic markers for Fusarium resistance continued in 2006–07.

CRDC-funded research is also assessing the use of genes from other plants that may provide increased resistance to Fusarium. CRDC-supported research at the Australian National University has seen the successful transfer of a gene that provides Fusarium resistance in tomatoes into cotton. Glasshouse trials will be conducted in 2008 to assess the impact of this gene in diseases resistance in cotton

Another key area of research is identifying the genes that influence fibre quality. To date, the research has identified a number of fibre-specific genes (rather than the markers) that influence quality. In 2006, CRDC conducted a review of industry investments in fibre quality research. As a result of this review, future investment will attempt to utilise current knowledge to develop the genetic markers for quality. Once again, this is no easy task and is likely to require a long-term commitment to achieve success.

Work has progressed in defining the activity and importance of a number of promoter genes for fibre development. One of these genes (GhMyb25) may play a role in determining seed number, which could have implications in developing high yielding varieties. The gene has also been shown to affect fibre initiation. If fibre initiation can be delayed and the number of fibres reduced, fibre quality may be significantly improved. The challenge will be to achieve this without affecting yield.

The double haploid system of breeding depends on the technique of tissue culture to produce adult plants from the male sex cells of early generation plants derived from crosses between selected parents. The benefit of the system, if it can be achieved, is that it allows the breeder to produce plants that breed true to type in one generation. This can take six to eight generations using normal plant breeding techniques. Worldwide, the development of double haploids in cotton has proved challenging,

with no commercial outcomes achieved. CRDC's investment in this area has not yet met with success and, due to significant drought-related constraints on the 2007–08 R&D budget, a decision has been made to put this area of research on hold. CRDC will continue to monitor developments in this area in other countries.

MEASURES OF SUCCESS

- CRDC investments in CSIRO's cotton biotechnology program provide the breeding program with early stage quality assurance for new transgenic traits. This is an important role and it is serving Australian growers well because it means new traits generally achieve commercial status within six to twelve months of their commercial release in the US. In 2006-07:
 - Roundup Ready FLEX® was fully released, following limited release in 2005–06
 - Liberty Link® cotton was granted a limited commercial release and will provide control of weeds that are hard to kill

What is Liberty Link® ?

Liberty Link® Cotton represents Bayer CropScience's first genetically modified (GM) crop to be made available in Australia. Liberty Link Cotton has been genetically modified to be tolerant to the active ingredient glufosinate-ammonium contained in the herbicide Liberty®. This innovative technology, offers growers a new mode of action for the control of weeds in cotton. Liberty Herbicide contains a member of the glycine group of herbicides, Group N as apposed to the Group M herbicide for which the herbicide Roundup® exists. Therefore, Liberty Link® provides an important management tool for a number of key cotton weeds.

The key benefits of Liberty Herbicide include control of weeds that are hard to kill, including volunteer (self-sown) cotton, peach vine, sesbania pea and bladder ketmia. The technology allows Liberty Herbicide to be applied up to ten weeks prior to harvest.

STRATEGY 3

Reduction in time required to introduce improved or novel genes into elite cotton varieties through the development of frontier technologies, without compromising scientific rigour

IN 2005–06, CRDC, CSIRO Plant Industry and Cotton Seed Distributors Ltd launched CottTech, a new and innovative research approach aimed at generating commercial outcomes for the cotton industry, building upon the existing capacity of the CSIRO cotton breeding team. Researchers working within the CottTech program are undertaking a suite of cotton biotechnology projects aimed at removing constraints on production and ultimately delivering beneficial traits faster through improved breeding techniques.

The capacity to transfer new transgenic traits directly into elite conventional cotton varieties efficiently remains a problem worldwide. At present it is only possible to use older, unimproved varieties into which it easier to insert the transgenic material. Plant breeders then must undertake considerable backcrossing to produce elite varieties containing the transgenic traits. CRDC continues to invest in research exploring ways of speeding up this process.

To ensure new transgenic traits have been incorporated into conventional varieties screening activities involve predominantly ELISA assays and some biochemical assays and bioassays, and more recently large numbers of DNA or PCR based assays to test for the trait. A new procedure that allows all the material to be sampled over a short time, dried and then stored at room temperature until it can be processed into DNA at a convenient time has now been tested. The process worked well and will be used in subsequent years. It will improve the efficiency of incorporating new transgenic traits in to conventional varieties.

MEASURES OF SUCCESS

- CRDC continues to support research to reduce the time needed to transfer genes into elite varieties a worldwide problem hurdle for researchers
- More efficient methodology has been developed to screen breeding material for the presence of desired transgenic traits

STRATEGY 4

Continuous monitoring of the signals from cotton textile and oilseed marketplace to ensure Australian varieties maintain a place at the high quality end of the market

The benchmark for Australian cotton on the world market is acala type cotton from the San Joaquin Valley in California: SJV cotton. Despite the severe impact of the drought on production in the 2006–07 season, Australian cotton was quoted as an equal of SJV for significant periods of the year. Australian cotton continued among the top prices listed for the highest category of upland cotton on the Liverpool Cotton Outlook 'A' index.

The reporting year saw the finalisation of the EMS Pathways project, which extended the cotton industry's Best Management Practices (BMP) program through the entire production chain, from the growing of the crop to the final processing. BMP guidelines have been developed for the ginning sector, in consultation with the Australian Cotton Ginners Association. These aim to preserve the quality of cotton once it is delivered to the gin, focusing on issues such as contamination and module and bale moisture, which can cause problems with overseas markets.

The BMP guidelines have enabled ginning practices to be benchmarked against best practice. In 2006–07, CRDC invested in the first audit of ginning operations measured against the guidelines. This found that the guidelines had been valuable to the ginning companies in improving and refining their practices.

CRDC continues to support the Australian Cotton Shippers Association (ACSA) to monitor quality requirements of spinning mills to and to ensure Australian cotton meets international market demands. This includes maintaining levels of support into the assessment of aspects such as contamination levels: an attribute that gives Australian cotton a strong advantage in comparison to our trading competitors. ACSA has received feedback from key international clients that they are concerned about the increase in fibre micronaire of Australian cotton. For details as to how this concern is addressed, please see Program Six.

CRDC continued to support the dissemination and review of results of a 2004 International Mill Survey on the attitudes of overseas spinners to Australian cotton quality. Investments addressing this strategy can also be found in Program Six: Value Chain

MEASURES OF SUCCESS

- Australian cotton remained among the top prices listed for the highest category of upland cotton on the Liverpool Cotton Outlook 'A' index during 2005–06. It continued to perform well against the industry SJV (San Joaquin Valley) benchmark
- The EMS Pathways project pursued the extension of BMP through the entire production chain, now enhanced by the adoption of ginning BMP

PROGRAM SIX

Value Chain

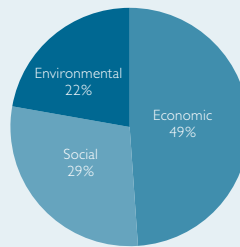
THE PROGRAM AT A GLANCE

Objective

To produce high quality consumer-preferred cotton and develop new international and domestic market opportunities

Number of projects 2006–07:	17
Compared with 2005–06:	7
Expenditure in 2006–07:	\$834,833
Compared with planned expenditure:	\$788,366
Compared with 2005–06:	\$698,123

Triple Bottom Line investment



Outcome

High quality consumer-preferred Australian cotton in the world marketplace

Strategies – CRDC Strategic Plan 2003–2008	Measures of Success
1 A breeding program that releases varieties with high quality fibre characteristics, which satisfy consumer demand trends. To investigate the use of biotechnology to enhance other traits, for example, nutritionally improved cottonseed oil	Release of varieties with appropriate fibre and seed characteristics
2 To promote agronomic and management practices, including the Cotton BMP program, which preserve and protect optimal fibre quality characteristics	Evidence of improved practices that preserve fibre quality. Extension of the Cotton BMP program to post farm gate issues
3 Ginning improvements resulting from research to reduce nep generation and to preserve desirable fibre qualities	Improved ginning practice measured by ginning data
4 The development of more accurate and repeatable technology of fibre measurement for neps, fineness, maturity and other fibre characteristics and; Support changes to the traditional classing system, which better identifies and rewards superior fibre characteristics	Proportion of the crop objectively measured by HVI increased. Release of new fibre measurement technology
5 To support efforts to develop new markets and high premiums for Australian raw cotton as well as value adding cotton in Australia	Number of unsold stocks accumulated and increased relative premium of Australian cotton compared to competitors. Demonstration of value added developments in Australia

Background

Australian cotton continues to compete at the premium end of the world market. It has achieved this with Australian-bred varieties that produce cotton fibre with the strength, length, fineness and maturity sought by spinners, combined with excellent agronomic practices producing consistent high quality and efficient ginning and shipping systems that deliver cotton on time. These success factors have been underpinned by CRDC-funded research.

STRATEGY 1

A breeding program that releases varieties with high quality fibre characteristics, which satisfy consumer demand trends. To investigate the use of biotechnology to enhance other traits, for example, nutritionally improved cottonseed oil

Cottonseed is Australia's second largest oilseed crop with up to 250,000 tonnes crushed each year. It is often considered a by-product of cotton production, representing less than 25 per cent of gross income per hectare. Key markets for Australian cottonseed are the domestic and international feedlot and dairy industries (70 to 80 per cent) and vegetable oil market (20 to 30 per cent). The stockfeed market is valued at between \$250 million and \$280 million per year, while the cottonseed oil market is worth \$70 million to \$100million.

The worldwide vegetable oil seed market is dominated by soybean, canola and palm oil. In Australia canola has taken much of the market for vegetable oil used in cooking and margarine products. Health concerns associated with the increased levels of saturated fat and trans fatty acids within diets has driving consumers in developed countries to demand higher quality, healthier oils. In response to this consumer demand, the food service sector (the primary market for cottonseed oil) is making a rapid shift to healthier high oleic oils that are low in saturates and contain zero or minimal trans fatty acids.

Current cottonseed oil is high in saturates (27 per cent), low in oleic (15 per cent) and often contains significant amounts of trans fatty acids following processing. Using gene-silencing biotechnology, joint CSIRO/CRDC-funded research has modified cottonseed oil with the potential to it to compete in the high quality food service sector. This represents

a 13-year investment, with the key aim of producing highly stable oil requiring no hydrogenation or processing.

The resulting genetically modified seed contains oil that is very high in oleic acid and low in saturates. This new low palmitic/high oleic oil is in the process of patent preparation.



Dr Qing Liu with the new healthier cottonseed oil

With regard to fibre quality, the Australian Cotton Shippers Association (ACSA) has received feedback from key international clients that they are concerned about the increase in fibre micronaire of Australian cotton. Many factors that influence this include the climate conditions under which the crop is grown.

CRDC has invested in a better understanding of all key aspects of production on fibre quality. This project is called Field to Fabric. In response to ACSA feedback, the project was modified in 2007 to ensure that issues relating to fibre fineness were examined. The development of new varieties is also a critical to the management of fibre fineness. The new variety Sicot 70BRF is being released for the 2007–08 season and will offer growers improved yield with improved fibre fineness.

Further research and development relating to fibre quality is reported in Program Five: Plant Breeding and Biotechnology

MEASURES OF SUCCESS

- CRDC-funded CSIRO scientists continue to receive feedback from spinners on Australian cotton fibre quality
- Joint CSIRO/CRDC-funded research has modified cottonseed oil with the potential to compete in the high quality food service sector

STRATEGY 2

To promote agronomic and management practices, including the Cotton BMP program, which preserve and protect optimal fibre quality characteristics

The reporting year saw the finalisation of the EMS Pathways project. This project has extended the cotton industry's BMP program through the entire production chain, from the growing of the crop through to the final processing. Post-farmgate BMP guidelines have been developed and this is further reported in Program Five.

A continuing component of the Field to Fabric cotton quality initiative is assessing the influence of on-farm agronomic management practices on fibre quality. This work includes assessing the impact of different management practices at the farm level on fibre quality, 'spinnability' and resulting yarn quality.

The Cotton Field to Fabric Training Course: Managing for Quality through the Production Chain was held at CSIRO Textile and Fibre Technology in Geelong on three occasions in 2006–07 (reported further in Program One). This course, which is aligned to national training competencies, covers global perspectives of the market and distribution, yarn manufacture, fabric formation, marketing, dyeing and finishing, fibre properties, quality assurance, agronomy impacts, picking, ginning and classing. Much of the information contained in the course is based on the outputs of CRDC-sponsored research, development and extension work. Strong demand for the course reflects an industry-wide acceptance of the importance of maximising fibre quality right through the production chain.

MEASURES OF SUCCESS

- EMS Fibre Pathways project has defined how fibre quality can be maintained through the processing chain and led to development of post farmgate BMPs
- The Cotton Field to Fabric Training Course: Managing for Quality through the Production Chain held three times at CSIRO Textile and Fibre Technology in Geelong were oversubscribed, confirming strong demand for knowledge about processing best practice.



CRDC Directors and senior staff visited CSIRO Textile and Fibre Technology in Geelong, where important fibre quality research is taking place

STRATEGY 3

Ginning improvements resulting from research to reduce nep generation and to preserve desirable fibre qualities

Ginning has a significant impact on fibre and subsequent yarn quality. It can reduce fibre length and increase nep levels (short, tangled, immature fibres) significantly. CRDC's investment in ginning research is targeting development of gin modifications and/or practice change, particularly moisture management and improved quality parameters throughout the ginning process, to ensure fibre quality is maintained. As reported in Program Five, this will enhance and extend the Best Management Practices that are newly developed for ginners.

MEASURES OF SUCCESS

- A new project is assessing ginning practices such as moisture management and improved quality parameters during ginning to maintain fibre quality

STRATEGY 4

The development of more accurate and repeatable technology of fibre measurement for neps, fineness, maturity and other fibre characteristics; and support changes to the traditional classing system, which better identifies and rewards superior fibre characteristics

Cotton fibre maturity, combined with fineness (low micronaire) is extremely important to spinners and fabric manufacturers, as it determines how well fibres will process and dye. Immature fibres (those with little or no fibre wall thickening) are associated with the formation of small entanglements called neps. These cause irregularities in processed fibre assemblies, including finished yarns, non-uniform dyeing of fabrics and decreased processing efficiency.

While knowledge of cotton fibre maturity has always been important with regard to avoiding these problems, there is an increasing need for faster and more accurate measurements. Micronaire is the most widely used indirect method for measuring fibre maturity even though it actually measures a composite of fibre fineness and fibre maturity. This means that fine, mature cotton, which is premium cotton, might give the same micronaire reading as coarse, immature cotton, which receives a much lower price.

With funding from CRDC, CSIRO Textile and Fibre Technology in Geelong developed an instrument, SiroMat, based around the automation of the polarised light microscopy test for fibre maturity. The advantage of SiroMat is that it is able to measure the fibre maturity distribution in a sample, which is important from the perspective of predicting textile problems such as nep formation and dye uptake variation. The speed of the SiroMat test means that it has potential for use as a stand alone, medium volume instrument in mill and merchant laboratories; however, its greatest value may be as an effective tool to aid cotton breeders to select improved varieties.

Following work in 2004–05 to improve calibration and build duplicate instruments for inter-laboratory trials, 2005–06 and 2006–07 have seen a concentration on preparing SiroMat for commercialisation.

Cottonscan, also developed by the CSIRO researchers with CRDC support, is an innovative and fast instrument giving average maturity and fineness values. Extensive trials with the prototype

instrument confirmed the validity of the approach and potential of the instrument.

Work in 2006–07 indicates that the Cottonscan instrument can indeed be used to reliably determine average fibre linear density (fineness). Cottonscan measurements have been shown to offer a significant improvement over traditional HVI measurements in differentiating fibre quality for spinners. Spinning trial results confirmed that unlike the micronaire value, average fibre fineness information obtained from Cottonscan correlates well with measured yarn properties such as yarn tenacity. This result may result in Australian cotton being differentiated in the market place through objective description of fibre qualities.

CRDC are investigating how such information may be best used to the advantage of the Australian cotton grower.

MEASURES OF SUCCESS

- SiroMat and Cottonscan offer more precise and useful measurement of cotton maturity and fineness. Business cases are preparing them for commercialisation

STRATEGY 5

To support efforts to develop new markets and high premiums for Australian raw cotton as well as value adding cotton in Australia

The major EMS Fibre Pathways project, which finished in 2006–07, has extended the cotton industry's BMP Program to the entire production chain to create a complete environmental and quality assurance supply chain program. The purpose of the project was to create a point of market differentiation that can provide a market incentive for higher levels of adoption of the BMP Program.

ACGRA representatives and other cotton growers attended the CRDC EMS Pathways final report forum in Moree in May 2007 along with representatives of the industry's 'post farm gate' sector: ginners, classers, merchants and cotton picking contractors.. ACGRA has supported the project by providing industry funding of \$47,900 over 3 years.

A key finding from this project was that development and implementation of a whole of chain environmental management system is unlikely to lead to sufficient market incentives or

benefits on its own to significantly influence the on-farm adoption of BMP, due to the complexity of the supply chain, both on-shore (from grower to port) and off-shore (from spinner to retailer). This complexity makes it difficult for the individual supply chain participants to identify (and therefore value) the specific benefits to be gained by investing in and implementing a whole of chain approach

The project identified the difficulty in making the connection between the retail interest in sustainable cotton and the farmers, as there are generally no direct connections between the retailer and the cotton producer. Such an approach is identified as too logistically difficult to implement on a large scale.

The report also identified the likelihood of additional costs being incurred to maintain product integrity via the chain of custody requirements, combined with the (generalised) unwillingness of retailers and consumers to pay a higher price for sustainability attributes for their clothing, and the associated chain of custody costs.

A key recommendation from the project encouraged the industry to investigate the opportunity to develop a brand based on fibre quality and whether this could then be linked to adoption environmental BMPs. It also highlighted the need to develop an agreed set of indicators for the environmental

performance on cotton farms and to better identify practices that are relevant to improving or sustaining those indicators and the specific benefits that accrue to the farm and/or the environment from the adoption of those practices. CRDC is working with industry to explore the opportunities highlighted within the project.

Despite these difficulties, IZUMIYA (with 86 department stores in Japan and a turnover of \$3.6 billion) continues to successfully market garments made exclusively from Australian BMP cotton under their environmentally branded in-house “Good-i” label.

MEASURES OF SUCCESS

- Extension of BMP to post-farm gate sectors potentially opens up opportunities for enhancing the differentiation of high quality Australian cotton in a competitive market place
- Japanese retailer ISUMIYA continues to successfully market garments made exclusively from Australian BMP cotton under their environmentally branded in-house “Good-i” label and developed a new range in 2006–07.
- A business case has been prepared identifying the market opportunities for the introduction of a healthier cottonseed oil.

“The BMP system aligns well with IZUMIYA’s marketing policy and thus we are excited about moving forward with Australian cotton”

*Kunihiko Wada
IZUMIYA Executive,
13th Australian
Cotton Conference,
August 2006*





REPORT OF OPERATIONS

Corporate Governance

CRDC'S BACKGROUND

The Cotton Research and Development Corporation was established in 1990 under the *Primary Industries and Energy Research and Development (PIERD) Act 1989*. The Act provides the Corporation with a charter to invest in and manage a portfolio of research, development and extension projects and programs to secure economic, environmental and social benefits for the Australian cotton industry and the community, to achieve sustainable use and management of natural resources and to make more effective use of the resources and skills of the scientific and general communities. All of this is to be conducted in a framework of improved accountability for research and development spending in relation to the cotton industry.

Location of Office

CRDC is located in Narrabri in north west NSW – one of Australia's major cotton-growing areas, centrally located in the broader cotton industry. This enables the Corporation to develop and maintain important relationships with cotton growers, researchers, processors and members of regional cotton communities on a day-to-day basis. The Narrabri district is also the home of a key industry research facility, the Australian Cotton Research Institute. The Institute is a collaborative research site and headquarters of the Cotton Catchment Communities CRC, of which CRDC is a core partner.

The Board

Composition

The Corporation has a nine-member Board, with six members nominated by an independent Selection Committee established by legislation. The Minister nominates and appoints the Chair. The Board selects the Executive Director who becomes its ninth member. Appointment to the Board is subject to

Ministerial approval and directors other than the Executive Director are appointed for terms not exceeding three years. The Corporation's Board included a Government Director; however, the amendment of the Primary Industries and Energy Research and Development (PIERD) Act in 2007 abolished this position from the Board. Following the removal of this position, CRDC is operating with a board of eight members. When the next selection round takes place in October 2008, the Selection Committee will recommend the appointment of an additional director, bringing the number of directors back to nine.

Appointments

Ms Bridget Jackson resigned as Chair of CRDC, effective on 31 December 2006. On Ms Jackson's retirement, the Deputy Chair, Mr Dick Browne, became Acting Chair pending the appointment of a permanent Chair by the Australian Government. Mr Ian Robinson was appointed Government Director in March 2007, following the resignation of Mr Simon Smalley; however, the PIERD Amendment Act 2007 abolished the position of Government Director on 28 May 2007.

Expertise

Directors are selected from across the industry, business and research communities and together they bring expertise in cotton production, processing, marketing, science, research and development, intellectual property, business management, technology transfer, conservation and management of natural resources, economics and environmental and ecological matters. The PIERD Amendment Act 2007 will require the CRDC Selection Committee to specify how its Board nominations will ensure that CRDC collectively possesses experience in board affairs, in addition to the existing requirement for an appropriate balance of expertise.

Induction and Training

Following appointment to the Board, each Director is provided with an induction package designed to provide them with an appropriate level of information about the Corporation, its history and operations, and the rights, responsibilities and obligations of Directors.

Copies of the relevant legislation are also included in the package. The induction process for Directors includes an initial visit to CRDC offices in Narrabri to meet with management and staff for a comprehensive overview of corporate activities and practices and tour key industry research facilities. Where necessary and appropriate, the Corporation sources training for Directors, either individually or as a group. The Board generally establishes the need for such training.

Directors' Responsibilities

The roles and responsibilities of Directors are set out in the CRDC Board Charter adopted in June 2005. An external review of Board operations, conducted in 2006–07, has resulted in a revised Board Charter, which will be implemented in 2007–08. Directors are responsible for ensuring that the affairs of the Corporation are properly managed and for setting strategic directions. The Board assigns specific research programs to each Director, based on their expertise. Under this structure Directors reviews management's advice on project applications and review for their allocated programs and make subsequent recommendations to the full Board.

The Board's functions include:

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

Responsibility for the day-to-day management of the Corporation lies with the Executive Director and senior management team. The close links between the Board and management have assisted the development of a sense of mutual confidence,

trust, teamwork and common purpose. Senior management participates in Board meetings, with other staff invited to contribute whenever appropriate.

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

Board of Directors 2006–07

Chair (until 31 December 2006):

Bridget Jackson

BScAg, MBus



Bridget Jackson is a Director of Cameron Agriculture Pty Ltd. She was Chair of the CRDC Board from October 1999 until her retirement from the position on 31st December 2006. She had previously been Chair of the Remuneration Committee and was a member of the Audit Committee.

Ms Jackson is an agricultural consultant with extensive experience in irrigated agriculture and the management of private farmer-group projects. She represented CRDC as a Director of the Australian Cotton Industry Council, was a Board member of the former Australian Cotton CRC and the CRDC member representative for the Cotton Catchment Communities CRC.

Acting Chair (from 1 January 2007):

Richard Browne



Dick Browne was reappointed to the Board in October 2005 and is its Vice-Chair. He became Acting Chair on 1 January 2007, following the resignation of Bridget Jackson and remains in that position pending the appointment of a new Chair by the Australian Government. Mr Browne has responsibility for the Farming Systems and Natural Resource Management programs. He became Chair of the Remuneration Committee and a member of the Audit Committee following the resignation of Bridget Jackson, and is a member of the Intellectual Property Committee.

Mr Browne worked in the cotton industry for 38 years, most of that at a senior management level in Corporate agriculture involving production and processing of cotton. His main interest has been promoting research and development for the benefit of the industry.

Mr Browne was Chair of the CRC for Sustainable Cotton Production for the life of the organisation, a past Chair of the Australian Cotton Growers' Research Association for three terms and was a Director of the Australian Cotton CRC. He was previously a member for the Cotton Research Council, the forerunner of the CRDC. In 2003 he became Chair of Condamine Alliance, a regional Natural Resource Management body in Queensland.

Government Director (July 2006–March 2007):

Simon Smalley

BSc (Hons)



Simon Smalley is the Assistant Secretary, Water Services, Australian Government Department of the Environment and Water Resources. He was appointed Government Director on the CRDC Board in November 2004 and resigned in March 2007. Prior to his resignation, Mr Smalley was a member of the Audit Committee.

Mr Smalley's current focus is on implementing the National Plan for Water Security and water policy reform (the National Water Initiative) to ensure sustainable use and management of Australia's water resources.

Government Director (April 2007–May 2007):

Ian Robinson

MEc, MPA



Ian Robinson is the General Manager of the Horticulture and Wine branch in the Australian Government Department of Agriculture, Fisheries and Forestry. He was appointed Government Member on the Corporation's Board in March 2006 following the resignation of Simon Smalley. On 28 May 2007, following Mr Robinson's attendance at two Board meetings, the Primary Industries and Energy Research and Development Amendment Act 2007 abolished the position of Government Director.

Executive Director:**Bruce Finney***BSc Ag*

Bruce Finney joined the Board in August 2004 by virtue of his appointment as Executive Director of CRDC. He has responsibility for the Crop Protection and Value Chain programs and attends the Audit, Intellectual Property and Remuneration Committees as an observer.

Mr Finney has extensive experience in the agricultural sector. Prior to his appointment to CRDC he worked for Twynam Agricultural Group for 17 years in various roles, including Company Agronomist, Regional Manager of the Central Region and Natural Resource Management Coordinator. He is a past chair of the Australian Cotton Growers Research Association, a graduate of the Australian Rural Leadership Program and of the Company Directors Course of the Australian Institute of Company Directors.

Non-executive Directors:**Leith Bouly***BRuSc, DipBusStud*

Leith Bouly is a primary producer from Dirranbandi in Queensland and was appointed to the Board in October 2005. She has responsibility for the Integrated NRM and Farming Systems programs and is a member of the Audit Committee.

Ms Bouly is an Adjunct Professor with the Centre for Ecological Economics and Water Policy at the University of New England and the School of Natural and Rural Systems at the University of Queensland.

She is also Chair of the Centre for Rural and Regional Innovation, Queensland, FarmBis Queensland and the Lower Balonne Water Resources Ministerial Advisory Council, a Board member of Murrumbidgee Irrigation Ltd and a member of the Wentworth Group of Concerned Scientists and the Australian Statistics Advisory Council. Ms Bouly is a graduate of the Australian Rural Leadership Program.

David Conners

David Conners was appointed to the Board in October 2005. He has responsibility for the Value Chain program and is Chair of the Intellectual Property Committee and a member of the Remuneration Committee. He became a member of the Audit Committee following the resignation of Simon Smalley.

Mr Conners was Managing Director of Australian Wool Services/The Woolmark Company from 2000 to 2004 and a Director of the subsidiary, Andar Holdings Pty Ltd. Prior to the formation of AWS, he was Managing Director of its predecessor, Australian Wool Research and Promotion Organisation, from 1999, having previously served as the International Marketing and Operations Director, based in Europe. In 2004 Mr Conners chaired a review of the CSIRO Textile & Fibre Division.

Mr Conners spent 20 years in the book retailing and publishing industries including four years as CEO of Angus & Robertson Bookworld and five years as Marketing Director of Heinemann/Hamlyn Publishing in Australia.

Glenn Fleischfresser (Fresser)



Glenn Fresser has owned and operated a successful cotton and grain production business on the Darling Downs since 1981. He was appointed to the CRDC Board in October 2005 and has responsibility for the Farming Systems program. He is a member of the Intellectual Property Committee.

Mr Fresser has extensive experience in the cotton industry. His farming approach is underpinned by a respect for the natural environment, and an interest in adopting new technology and farming systems approaches.

Mr Fresser is past Chairman of the Australian Cotton Growers Research Association (ACGRA) and has held other industry positions including member of the Australian Cotton Conference Committee and Cotton Biotechnology Review Panel. He is the past Chair of the ACGRA Transgenic Insect Management Strategy Committee, Australian Cotton Industry Council and its Pesticide and Biotechnology sub-committee, Queensland Department of Primary Industries and Fisheries' Darling Downs cotton extension agronomy and research team and the Darling Downs Cotton Growers Inc. Management Committee.

Mr Fresser has a strong understanding of the needs and issues of farmers and a genuine interest in ensuring the cotton industry continues to be sustainable, profitable and progressive.

TJ Higgins

BScAg, MAgSc, PhD



Dr Higgins is the Deputy Chief of Plant Industry at CSIRO. He was reappointed to the CRDC Board in October 2005 and has responsibility for the Crop Protection and Plant Breeding and Biotechnology programs.

Dr Higgins is a distinguished research scientist and has been involved in plant research for 30 years, specialising in gene technology for a range of Australian agricultural ecosystems. He has been involved in research on gene technology and genetically modified legumes (grain and pasture) and is experienced in administration of research and development.

Lisa Wilson

BAGSci (Hons)



Ms Wilson was appointed to the CRDC Board in October 2005 and has responsibility for the People and Knowledge and Plant Breeding and Biotechnology programs and is Chair of the Audit Committee.

Ms Wilson is an experienced Director and General Manager with more than 19 years experience as an agribusiness professional. She is Deputy Chair of the Australian Rural Leadership Foundation, a Member of the Victorian Advisory Group for LandCare Australia Limited, a Member of the Albert Park Advisory Group for Parks Victoria and was a founding Director of the Foundation for Australian Agricultural Women. She is a Graduate of the Australian Institute of Company Directors and the Australian Rural Leadership Program.

Board meetings

The Board held ten meetings during 2006-07:

7 August, 2006	Broadbeach, Queensland
4 September, 2006	Canberra, ACT
15 and 16 November, 2006	Toowoomba, Queensland
15 December, 2006	Sydney, New South Wales
30 January, 2007	By teleconference
21 and 22 February, 2007	Sydney, New South Wales
28 and 29 March, 2007	Narrabri, New South Wales
17 April, 2007	By teleconference
8 June, 2007	Canberra, ACT
25 June 2007	By teleconference

Board Committees

During 2006–07 the Board operated three committees: the Audit, Intellectual Property and Remuneration Committees. The number of committee meetings is not a reflection of the workload. Much of the work of the Committees is conducted via email and telephone, rather than through formal meetings. The Corporation finds this arrangement to be effective and productive.

Audit Committee

Established under section 89 of the *Primary Industries and Energy Research and Development Act 1989* and section 32 of the *Commonwealth Authorities and Companies Act 1997*, the Audit Committee's primary role is to ensure the Corporation's financial reporting is a true and fair reflection of its financial transactions. The Committee also provides a forum for communication between the Directors, the senior managers of the Corporation and the internal and external auditors of the Corporation. It carries responsibility for identifying areas of significant business risk and stipulating the means of managing any such risk. The Board's Audit Committee completed a review of the Corporation's risk management framework and risk register in the first half of 2007; further details can be found below under 'Risk Management'.

Lisa Wilson continued as Chair of this committee, and Leith Bouly as a member. Bridget Jackson and Simon Smalley were members of the committee until their resignations from the Board in, respectively, December 2006 and March 2007. Dick Browne took the place of Bridget Jackson and David Conners took the place of Simon Smalley. The Executive Director, Bruce Finney, and General Manager – Business and Finance, Robin Logan, attend the meetings as observers.

Directors' Attendance at Board Meetings

	August 2006	September 2006	November 2006	December 2006	January 2007	February 2007	March 2007	April 2007	8 June 2007	25 June 2007
Bridget Jackson	YES	YES	YES	YES	Resigned from Board					
Dick Browne	YES	YES	YES	YES	YES	YES	YES	YES	YES	
Bruce Finney	YES	YES	YES	YES	YES	YES	YES	YES	YES	
David Conners	YES	YES	YES	NO	YES	YES	YES	YES	YES	
Glenn Fresser	YES	YES	YES	YES	YES	YES	YES	YES	YES	
Ian Robinson	n/a	n/a	n/a	n/a	n/a	n/a	YES	YES	Position terminated	
Leith Bouly	YES	YES	YES	NO	YES	YES	YES	NO	YES	
Lisa Wilson	YES	YES	YES	YES	YES	YES	YES	YES	YES	
Simon Smalley	NO	YES	YES	YES	NO	Term Completed				
TJ Higgins	NO	YES	YES	YES	YES	YES	YES	NO	YES	NO

The Audit Committee met three times during 2006–07:

	July 2006	January 2007	June 2007
Lisa Wilson	Yes	Yes	Yes
Dick Browne	Not applicable	Yes	Yes
Leith Bouilly	Yes	Yes	Yes
David Conners	Not applicable		Yes
Bridget Jackson	Yes	Resigned from Board	
Simon Smalley	Yes	Resigned from Board	

Intellectual Property Committee

The role of the Intellectual Property (IP) Committee is to assist the Corporation's Board in fulfilling its responsibilities and monitor the adequacy and effectiveness of the Corporation's policies and procedures that relate to the management of intellectual property (IP). The Committee's specific responsibilities are to review the operation of the CRDC's IP Policy and IP Operating Principles and to consider IP matters directed to it for consideration by the Board.

The Chair of the Committee was David Conners and other members were Dick Browne and Glenn Fresser. Executive Director, Bruce Finney, attends as an observer.

The Intellectual Property Committee met twice during 2006–07:

	November 2006	March 2007
David Conners	Yes	Yes
Dick Browne	Yes	Yes
Glenn Fresser	Yes	Yes

Remuneration Committee

The Remuneration Committee advises the Board on the Executive Director's remuneration and senior staff remuneration adjustments. During the reporting year, the Committee consisted of the Chair, Bridget Jackson (until her resignation on 31 December), David Conners and Dick Browne. Dick Browne became Chair of the committee following Ms Jackson's resignation. Executive Director, Bruce Finney, attends as an observer.

The committee met 4 times during 2006–07:

	Dec 2006	February 2007	March 2007	June 2007
Dick Browne	Yes	Yes	Yes	Yes
Bridget Jackson	Yes	Resigned from Board		
David Conners	Yes	Yes	Yes	Yes

Conflicts of Interest

In accordance with Section 131 of the *Primary Industries and Energy Research and Development Act 1989*, Directors are appointed on the basis of their expertise and do not represent any particular organisation or interest group.

The Board follows section 54 of the *Primary Industries and Energy Research and Development (PIERD) Act 1989* and section 21 of the *Commonwealth Authorities and Companies (CAC) Act 1997* regarding Directors' disclosures of interests. A Director who considers that he/she may have a direct or indirect pecuniary or non-pecuniary interest in a matter to be discussed by the Board must disclose the existence and nature of the interest before the discussion. Depending on the nature and significance of the interest Directors may be required to absent themselves from the Board's deliberations. The Board has a standing notice of Director's interests; it is an agenda item at each Board meeting and is updated as necessary.

The *PIERD Amendment Act 2007* repealed section 84 of the *PIERD Act 1989* in June 2007 so as to eliminate a possible inconsistency of interpretation with the CAC Act regarding disclosure of interest by the Executive Director; whose obligations are identical to those of other Directors.

The Board is very aware of its responsibilities regarding conflict of interest and duty of care, and has adopted a very cautious approach, which was further enhanced with the adoption of a Board Charter that clearly outlines the roles and responsibilities of Directors in terms of potential conflicts of interest. This approach has been successful and no difficulties have been encountered.

Indemnities

The Board has taken the necessary steps to ensure adequate insurance cover is in place for Directors and officers of the Corporation. The Corporation's insurance cover is provided through Comcover; however, the insurance contract prohibits CRDC from disclosing the nature or limit of the liabilities covered, or the amounts of premiums paid.

Legislation

The Cotton Research and Development Corporation began operations in 1990 under the *Primary Industries and Energy Research and Development (PIERD) Act 1989*, which sets out the following objectives:

- a. Increasing the economic, environmental and social benefits to members of primary industries and the community in general by improving the production, processing, storage, transport and marketing of the products of primary industries
- b. Achieving the sustainable use and management of natural resources
- c. Making more effective use of the resources and skills of the community in general and the scientific community in particular
- d. Improving accountability for expenditure on research and development activities in relation to primary industries.

As can be seen in the diagram on page 30, the requirements of the PIERD Act are central to the Corporation's R&D planning and these objectives are addressed in the six R&D programs devised under the current five-year Strategic Plan. The number and nature of these programs varies from those under the Strategic Plan 1998–2003, which reflected the Australian cotton industry's evolving challenges and opportunities in relation to achieving these objectives. The Corporation began formulation of the Strategic Plan for 2008–2013 in the 2006–07 year; the new plan will closely reflect changed circumstances in relation to addressing the PIERD Act objectives, as well as government and industry research priorities.

The Primary Industries and Energy Research and Development Amendment Act 2007 amended the PIERD Act in several respects intended to deliver an enhancement in the governance of Rural R&D Corporations. The amendments were in response to the findings of the *Review of the Corporate Governance of Statutory Authorities and Office Holders* (the Uhrig Review), following an internal review by the Australian Government Department of Primary Industries and Energy of the PIERD Act's operational and reporting requirements.

The principal provisions of the PIERD Amendment Act 2007 are:

- To abolish the position of Government director on each Rural R&D Corporation's Board

- To require the Corporations to consult with the Minister in preparing or varying a research and development plan
- To ensure unambiguously that all directors, including the Executive Director, are subject to the notification regime for material personal interest in the *Commonwealth Authorities and Companies (CAC) Act 1997*
- To provide further direction to R&D Corporation Selection Committees and improve the selection criteria for board members.

The setting and collection of levies on the cotton industry is enabled by the *Cotton Levy Act 1982* and the *Primary Industries Levies and Collections Act 1991*. Accountability and reporting requirements are set out in the *Commonwealth Authorities and Companies (CAC) Act 1997*.

Functions

CRDC's legislative functions are:

- Investigating and evaluating the cotton industry's requirements for research and development, and the preparation, review and revision of an R&D plan on that basis;

This is achieved by continuing interaction with CRDC's legislated industry body, the Australian Cotton Growers Research Association (ACGRA), as well as the industry peak body, the Australian Cotton Industry Council, and its sub-committees. ACGRA reviews each year's planned R&D activities on behalf of the industry before the Annual Operating Plan is formulated and submitted to the Australian Government for approval. In addition, ACGRA participates with CRDC in an annual review to ensure the CRDC Strategic Plan remains current and relevant. The cotton industry, including ACGRA, ACIC and cotton researchers are closely involved in development of the CRDC Strategic Plan 2008–2013.

- Preparing an Annual Operational Plan for each financial year;

An Annual Operating Plan is submitted to the Australian Government in April each year and implementation proceeds once Government approval is received.

- Coordinating and funding R&D activities consistent with current planning documents;

Research, development and extension projects are approved or commissioned in line with the Annual

Operating Plan each year. The Annual Operating Plan is, itself, devised to address the objectives and strategies outlined in the current five-year Strategic Plan.

- Monitoring, evaluating and reporting to Parliament, the Minister for Agriculture, Fisheries and Forestry, and to industry on R&D activities coordinated or funded by the Corporation;

The Corporation reports formally to the Australian Government through its Annual Report, which is tabled in Parliament in October; in addition, the Corporation informs the Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry of any matters of interest or concern in the current operating environment. This occurs both in written and, where possible, face-to-face communication. CRDC is also in constant communication with the Department of Agriculture, Fisheries and Forestry on a range of issues. Communication with the industry occurs continually on both a formal and informal basis, as outlined above.

- Facilitating the dissemination, adoption and commercialisation of research and development results in relation to the cotton industry.

The Australian cotton industry has benefited greatly from having an industry-wide extension network, the Australian Cotton Extension Team. CRDC remains the major funder of this network, which is coordinated by the Cotton Catchment Communities CRC. In addition, CRDC staff members play a pivotal role in the activities of the network, including ensuring fast and effective dissemination of CRDC-funded research outcomes. More broadly, CRDC hosts forums, participates in roadshows, produces publications, sponsors the biennial research-based Australian Cotton Conference and has a communication strategy to extend and enhance the adoption of R&D. CRDC also partners in the successful commercialisation of R&D where possible.

Powers

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

- Entering into agreements for the carrying out of R&D activities;
- Applying for patents, either solely or jointly;
- Charging for work done, services rendered, and goods and information supplied;

- Acquiring, holding and disposing of real or personal property; and,
- Anything incidental to any of its powers.

Ministers

The Corporation is accountable to the Australian Parliament and the Minister for Agriculture, Fisheries and Forestry. The Hon Peter McGauran MP was Minister for Agriculture, Fisheries and Forestry during the reporting year, having been appointed in July 2005. The Hon Sussan Ley MP was Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry for the reporting year, having been appointed on 24 January 2006.

The Minister's powers and responsibilities, as outlined under various sections of the PIERD Act, include:

- Appointing the Corporation's Chair and Directors;
- The option to terminate the appointment of the Chair or any Director under certain conditions;
- Approving the Corporation's Research and Development (Five Year) Plan and any variations;
- Approving the Corporation's Annual Operating Plans and any variations;
- Appointing a person as Presiding Member of the Corporation's Selection Committee, and other members of that Committee; and
- Transferring to the Corporation any assets held by the Commonwealth that the Minister considers appropriate and which would assist the performance and function of the Corporation.

Ministerial Directions

As at 30 June 2007, CRDC is either compliant or undergoing compliance processes for all legislative and policy requirements of the Australian Government that it has been able to ascertain. Ongoing directions from previous year that are applicable to the Corporation are the Commonwealth Fraud Control Guidelines 2002 and the Australian Government Property Ownership Policy 2005.

In January 2007, the Minister for Agriculture, Fisheries and Forestry, the Hon. Peter McGauran MP, notified the Corporation that the Protective Security Manual 2005 (the PSM) is to apply to CRDC as a general policy of the Government from 1 March 2007. In accordance with subsection 28(2) and 28(3) of the

CAC Act, the Corporation must ensure that the policy is carried out. Following this notification, the CRDC Board approved a Protective Security Policy for the Corporation and an implementation plan, which commenced in June 2007. In compliance with the Government's policy, the Executive Director has waived certain requirements and notified the Auditor General of these waivers

On 1 March 2007, Ms Sussan Ley MP, Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, provided CRDC with her initial Statement of Expectations, as required by the Australian Government following the *Review of the Corporate Governance of Statutory Authorities and Office Holders* (Uhrig Review).

CRDC also received notification of new Australian Government Rural Research and Development Priorities in May 2007.

Research Accountabilities

The Corporation is accountable to the Australian people through the Australian Government and to the cotton industry through its industry representative body, the Australian Cotton Growers' Research Association. In August 1998 the Corporation became subject to the *Commonwealth Authorities and Companies (CAC) Act 1997* which provided new levels of accountability, as well as a new planning and reporting framework. The *Annual Operating Plan 2006–07*, and thus this reporting year, marked the fourth year of operation under the framework requirements of the *Strategic Plan 2003–2008*.

CRDC's stakeholders set broad objectives, which the Corporation addresses through its Strategic (Five Year) Plan and Annual Operating Plan. CRDC has used these objectives as a basis for the development of its outcomes and the identification of key outputs.

Risk Management

The Corporation has a Risk Management Plan as part of its approach to identifying and managing areas of significant business risk. The Board's Audit Committee completed a review of the Corporation's risk management framework and risk register in the first half of 2007, with a number of changes made and priorities identified. Some of the new policies have already been formalised, including Terms of Employment, Equal Employment Opportunity and Harassment, Appropriate Internet and Email

Access and Government Protective Security: that is, the security aspects of security assets, people and information, which will now all receive a security classification. The coming year will see further policy development and implementation in areas such as overall protective security for the Corporation, including the management plan for business continuity in the face of a possible crisis.

The risk management process also involves consulting widely and participating in appropriate industry, Rural Research and Development Corporation and Government forums to keep fully informed about the environment in which the Corporation operates. Situations involving even minor business risk are fully discussed at a Board level with policy developed through consensus. Management and staff have responsibility for implementing policy as directed by the Board.

The Board has instituted a policy of holding a focused and facilitated strategic review session in conjunction with Board meetings wherever possible. These focus on a specific issue or area of research. Depending on the topic, a variety of speakers and industry participants may also be invited to attend, to enable broad discussion and to expose risks and opportunities for the Corporation and the industry.

Directors and employees conducted or commissioned a number of reviews during the year:

	Review	Outcome
Corporate Reviews	Risk management framework and risk register	Risk management improved through a number of enhancements and further priorities identified.
	Occupational Health and Safety audit	Assisted with program of continuous improvement and highlighted the Corporation's proactive safety culture and positive improvement in organisational processes and documentation regarding OH&S since the previous audit in 2004.
	Annual IT audit	This externally-conducted audit made a number of recommendations to achieve the Corporation's objectives of continuous improvement and risk management and this will be implemented during 2007–08.
R&D Strategic Reviews	CRDC-funded cotton disease research	Ten recommendations identified priorities, gaps, overlaps and other issues important to future research and are guiding consultations with researchers and others involved in this area

Board Charter

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

Industry Stakeholder Reporting

CRDC's reporting processes include the presentation of a formal report to its industry stakeholder, the Australian Cotton Growers' Research Association. Part of this presentation includes an opportunity for questioning and debating Board decisions. At least one CRDC staff member attends each ACGRA meeting.

Corporate Planning

In accordance with the *Primary Industries and Energy Research and Development (PIERD) Act 1989* and the *Commonwealth Authorities and Companies (CAC) Act 1997*, the Corporation prepares a Strategic (Five Year) Plan as well as an Annual Operating Plan for each financial year. The Corporation submitted the *Annual Operating Plan 2007–08* to the Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, the Hon Sussan Ley MP, on 1 May 2007. Written advice of approval was received from Ms Ley on 21 June 2007.

Planning for the CRDC Strategic Plan 2008–2013 began in early 2007; further details can be found in the introductory section of the report.

Fraud Control

The Corporation fosters an environment that minimises the likelihood and impact of fraud. Active fraud control is a major responsibility of all staff and clear standards and procedures have been established. All personnel engaged in the prevention, detection and investigation of fraud receive appropriate fraud control training, consistent with the Federal Government's *Fraud Control Policy*. The Audit Committee endorses, monitors and reviews the Corporation's Fraud Control Plan, which is read in conjunction with the Risk Management Plan and the Code of Conduct for Directors and staff.

The Corporation's Audit Committee, Executive Director and General Manager – Business and Finance, who is the nominated fraud control officer, collectively carry out the functions of a fraud investigation unit as described in the Commonwealth Fraud Investigation Model. The support of the Australian Federal Police would be sought if the

Corporation felt there was a prima facie case of fraud and further investigation was required.

Service Charter

The Corporation does not provide services direct to the public and does not have a service charter; however, the Corporation has a Statement of Principles for the Board, management and staff, which can be found in the introductory section of this publication. It embodies the set of values underlying our decisions, actions and relationships.

Staff

Staff members are employed under Section 87 of the *PIERD Act 1989*, which provides that the terms and conditions of employment are to be determined by the Corporation. Including the Executive Director, there were 11 full-time employees and one part-time employee as at 30 June 2007.

Staff Changes during 2006–07

Communications Manager, Rohan Boehm, commenced at CRDC on 9 October 2006, filling a position that had been vacant since March 2006.

Appointments after the reporting year

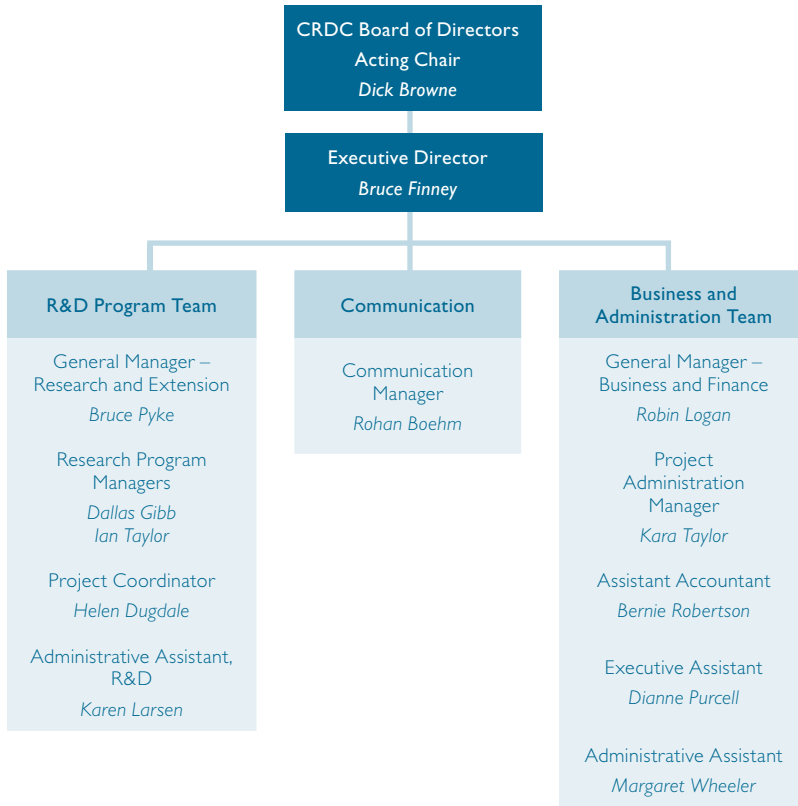
No appointments have been made after the reporting year. General Manager – Business and Finance, Robin Logan, left CRDC on 13 September.

Training and Development

During the reporting year, the Corporation spent \$27,750 on training and recruitment. Areas of direct training activities were:

- Molecular Transformation
- University Fees
- Communications & Negotiations
- Australian Government Central Budget Management System
- Occupational Health and Safety
- Australian Institute of Company Directors – Governance Program
- Australian Institute of Company Directors – Strategic Board
- Risk Management
- Payroll & FBT
- Defensive driving
- Business continuity

Organisational structure



In addition, activities such as the attendance of staff members at workshops and meetings and internal staff training on Occupational Health and Safety occurred at no additional cost to the Corporation.

Throughout the year, Corporation Directors and staff participate in a wide range of activities relating to the operations of the Corporation, which provide valuable experience, as well as skills and knowledge upgrades for the personnel involved.

Contractors and Consultants

The Corporation employs consultants and contractors on a needs basis, and after background checks to ensure proposed appointees have necessary skills and experience. During the reporting year the Corporation spent \$95,076 to remunerate consultants and contractors. It is Corporation policy not to disclose amounts paid to individual consultants due to privacy and confidentiality arrangements.

AKC Consulting	Regulatory support
Attorney General	Vetting services
Bytes & Bites	Information Technology support
Eileen Scott	Program review
Gus Shaw	Soil biological study
In Corporated	Strategic planning
Jodi McLean	Cotton variety trials
Nexia Court	IT audit
	Fringe Benefits Tax consultation
PKF Accounting	Long service leave calculation
Safety in Focus	OH&S audit
Sefton & Associates	Communication strategy
Vic Edge	Review of projects
Weemalah Writeability	Annual report and publication content

Equal Employment Opportunity

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

In March 2007, the Board of Directors adopted an Equal Opportunity and Harassment Policy, which defines prohibited discrimination and harassment and sets out a complaints procedure to be followed if there is a complaint of a breach of this policy, including details of what action can be taken once the complaint has been made. The policy applies to all employees, whether full-time, part-time, casual or temporary, to directors and to contractors and customers (clients).

Occupational Health and Safety

CRDC is committed to creating a safe workplace and has a strong culture of achieving best practice and continuous improvement in Occupational Health and Safety (OH&S). This is achieved through regular staff and OH&S meetings where safety issues are formally discussed, workplace inspections held and staff consulted in resolving safety issues and physical conditions of the workplace. CRDC provides the necessary resources to ensure that OH&S functions effectively.

CRDC commissions external OH&S audits to assist with its focus on continuous improvement. An audit during 2007 highlighted the Corporation's proactive safety culture and positive improvement in organisational processes and documentation regarding OH&S since the previous audit in 2004. During 2006–07 the implementation of OH&S management software was advanced, OH&S policy reviewed and a small number of physical hazards addressed. In addition to general OH&S inductions, training was completed in defensive driving and managing driver fatigue, and emergency evacuation procedures.

In 2007–08 CRDC will address the recommendations from the latest external OH&S audit, including further development of the OH&S management system. Training planned for 2007–08 includes ergonomics and manual handling, fire extinguisher training and general OH&S inductions for new staff and contractors.

CRDC had no OH&S incidents to report in 2006–07, as defined in Section 68 of the Occupational Health and Safety (Commonwealth Employment Act 1991). Should any such incident occur, it would be managed in accordance with the Act.

Freedom of Information

General enquiries regarding access to documents or other matters relating to Freedom of Information should be made in the first instance to the General Manager – Business and Finance. The Corporation did not receive any requests under the *Freedom of Information Act 1982* during the reporting year.

Funding information on individual projects funded by the Corporation is available on request, unless information has been classified as commercial-in-confidence. Information about CRDC projects is also available through the Australian Agricultural and Natural Resources Online (AANRO) Database, which can be accessed through the Internet and through most Australian research and public libraries.

Categories of Documents Held

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

C: Documents customarily made available

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

Ecologically Sustainable Development and Environmental Performance

The principles of ecologically sustainable development under the *Environment Protection and Biodiversity Conservation Act 1999* apply to the Corporation. These include integrating long-term and short-term economic, environmental, social and equitable considerations into decision making processes; not using lack of full scientific certainty as a reason to postpone measures to prevent environmental degradation if there is the threat of serious or irreversible environmental damage; maintaining or enhancing the health, diversity and productivity of the environment for future generations; ensuring the conservation of biological diversity and ecological integrity is a fundamental consideration in decision-making; and promoting valuation, pricing and incentive mechanisms.

The Corporation has integrated these principles into its planning framework. The three Output groups – Sustainable Production Systems and Catchments, Profitability and International Competitiveness, and Empowered People and Communities – were a reflection of the need to factor ‘triple-bottom-line’ environmental, economic and social considerations into all decisions. Almost half the Corporation’s budget is directed towards issues improving the industry’s sustainability, encompassing natural resource management and biodiversity. CRDC continued to fund a specific research program (Best Management Practices and the Environment) designed to minimise environmental impacts.

Commonwealth Disability Strategy

Corporation working conditions and procedures for employees and stakeholders are compliant with the Commonwealth Disability Strategy insofar as the small size of the Corporation and physical nature of the CRDC building allows. While the CRDC building had two floors with access between them by stairs only, CRDC has ensured that any person with a disability could be properly accommodated and carry out all functions, either as a staff member or a visitor. This has been achieved by enhanced disability access for staff and visitors through the installation of a wheelchair accessible ramp with adjacent disabled parking and disability signage. A meeting room has been set aside on the ground floor for joint activities and safety measures such as marking of steps have been carried out. Should a future staff member need more specialised disability assistance, CRDC will assess and meet these needs to the extent that it is possible.

In March 2007, the Board of Directors adopted an Equal Opportunity and Harassment Policy, which defines prohibited discrimination and harassment and sets out a complaints procedure. Further details can be found above, under Equal Employment Opportunity.

Significant Events

Under section 15 of the *Commonwealth Authorities and Companies (CAC) Act 1997*, the Corporation is required to notify the Minister of ‘significant events’. CRDC had no significant events within the meaning of the Act during the reporting year.

Significant Changes in the State of Affairs

In January 2007, CRDC notified the Hon. Sussan Ley MP, Parliamentary Secretary to the Minister for

Agriculture, Fisheries and Forestry, that the decision by CSIRO not to take up funding that had been allocated for the core cotton breeding program in 2006–07 meant a significant variation from planned expenditure. This is reported further in the report by the Chair and Executive Director in the Executive Summary.

Payments to Advertising Agencies

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

Payment to Representative Bodies

The Corporation’s industry representative body is the Australian Cotton Growers Research Association (ACGRA). In this role ACGRA undertakes several specific activities on an annual basis:

- Participation in ongoing development of the CRDC five year Strategic Plan 2008–2013. This ensures CRDC’s strategic planning continues to meet evolving industry R&D needs.
- A meeting to receive and discuss the CRDC annual report for the preceding year. This enables ACGRA to ensure CRDC’s activities for that year have met its strategic objectives (listed earlier in this report) and to question senior staff on any matters of interest or concern.
- Participation in the annual CRDC and Cotton Catchment Communities CRC Farming Systems forums.

While CRDC does not pay a fee for service to the ACGRA for these activities, under s.15 of the PIERD Act relating to consultation with its industry stakeholder, it contributes to the expenses they incur in carrying them out.



In 2006–07 CRDC contributed a total of \$29,432 to ACGRA, for the following ACGRA activities:

- Review CRDC Research applications and reports
- Steering Committee expenses
- Participation in an R&D forum
- Attend CRDC Strategic Planning meetings.

In addition, the Corporation contributed \$50,000 towards the ACGRA 13th Australian Cotton Conference and a travel grant of \$3,000 for ACGRA Chairman, Mr Hamish Millar, to attend the 2nd International Federation of Agricultural Producers World Congress of Young Farmers, Argentina.



Financial Statements



INDEPENDENT AUDITOR'S REPORT

To the Minister for Agriculture, Fisheries and Forestry

Scope

I have audited the accompanying financial statements of the Cotton Research and Development Corporation for the year ended 30 June 2007, which comprise: a statement by the Directors and Executive Director; income statement; balance sheet; statement of changes in equity; cash flow statement; schedules of commitments and contingencies; a summary of significant accounting policies; and other explanatory notes.

The Responsibility of the Directors for the Financial Statements

The directors are responsible for the preparation and fair presentation of the financial statements in accordance with the Finance Minister's Orders made under the *Commonwealth Authorities and Companies Act 1997* and the Australian Accounting Standards (including the Australian Accounting Interpretations). This responsibility includes establishing and maintaining internal control relevant to the preparation and fair presentation of the financial statements that are free from material misstatement, whether due to fraud or error; selecting and applying appropriate accounting policies; and making accounting estimates that are reasonable in the circumstances.

Auditor's Responsibility

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

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

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

GPO Box 707 CANBERRA ACT 2601
19 National Circuit BARTON ACT 2600
Phone (02) 6203 7300 Fax (02) 6203 7777

Independence

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

Auditor's Opinion

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

- (a) have been prepared in accordance with the Finance Minister's Orders made under the *Commonwealth Authorities and Companies Act 1997*, and the Australian Accounting Standards (including the Australian Accounting Interpretations); and
- (b) give a true and fair view of the matters required by the Finance Minister's Orders including the Cotton Research and Development Corporation's financial position as at 30 June 2007 and of its financial performance and its cash flows for the year then ended.

Australian National Audit Office



Ron Wah
Senior Director

Delegate of the Auditor-General

Canberra
30 August 2007

COTTON RESEARCH AND DEVELOPMENT CORPORATION

Statement by Directors and Executive Director

In our opinion, the attached financial statements of the year ended 30 June 2007 are based on properly maintained financial records and give a true and fair view of the matters required by the Finance Minister's Orders made under the Commonwealth Authorities and Companies Act 1997

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

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

Signed



Mike Logan
Chair

28 August 2007



Lisa Wilson
Director

28 August 2007



Bruce Finney
Executive Director

28 August 2007



Robin Logan
General Manager –
Business and Finance

28 August 2007

COTTON RESEARCH AND DEVELOPMENT CORPORATION

INCOME STATEMENT

for the period ended 30 June 2007

	Notes	2007 \$	2006 \$
INCOME			
Revenue			
Revenue from Government	3A	4,576,667	4,907,880
Industry Levies	3B	4,168,402	6,714,797
Interest	3C	1,051,656	888,998
Other revenues	3D	1,712,320	3,098,112
Total revenue		<u>11,509,045</u>	<u>15,609,787</u>
Total Income		<u>11,509,045</u>	<u>15,609,787</u>
EXPENSES			
Employee benefits	4A	1,314,869	1,185,165
Suppliers	4B	410,306	419,489
Grants	4C	10,122,933	11,139,809
Depreciation and amortisation	4D	39,042	26,985
Write-down and impairment of assets	4E	–	15,169
Total Expenses		<u>11,887,150</u>	<u>12,786,617</u>
Surplus (Deficit)		<u>(378,105)</u>	<u>2,823,170</u>

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

COTTON RESEARCH AND DEVELOPMENT CORPORATION

BALANCE SHEET

as at 30 June 2007

	Notes	2007 \$	2006 \$
ASSETS			
Financial Assets			
Cash and cash equivalents	5A	13,331,471	15,750,353
Trade and other receivables	5B	<u>2,429,500</u>	<u>2,256,968</u>
<i>Total financial assets</i>		<u>15,760,971</u>	<u>18,007,321</u>
Non-Financial Assets			
Land and buildings	6A,C	497,739	455,000
Infrastructure, plant and equipment	6B,C	95,230	93,880
Intangibles	6D	103,523	44,000
non-financial assets	6E	<u>7,539</u>	<u>29,930</u>
<i>Total non-financial assets</i>		<u>704,031</u>	<u>622,810</u>
Total Assets		<u>16,465,002</u>	<u>18,630,131</u>
LIABILITIES			
Payables			
Suppliers	7A	37,936	58,313
Grants	7B	732,791	2,553,565
Other	7C	<u>36,877</u>	<u>30,994</u>
<i>Total payables</i>		<u>807,604</u>	<u>2,642,872</u>
Provisions			
Employee provisions	8	<u>200,125</u>	<u>151,881</u>
<i>Total provisions</i>		<u>200,125</u>	<u>151,881</u>
Total Liabilities		<u>1,007,729</u>	<u>2,794,753</u>
Net Assets		<u>15,457,273</u>	<u>15,835,378</u>
EQUITY			
Reserves		135,592	135,592
Retained surpluses		<u>15,321,681</u>	<u>15,699,786</u>
Total Equity		<u>15,457,273</u>	<u>15,835,378</u>
Current Assets		15,768,510	18,037,251
Non-Current Assets		696,492	592,880
Current Liabilities		947,364	2,758,702
Non-Current Liabilities		60,365	36,051

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

COTTON RESEARCH AND DEVELOPMENT CORPORATION

STATEMENT OF CHANGES IN EQUITY

as at 30 June 2007

	Accumulated Results		Asset Revaluation Reserve		Total Equity	
	2007 \$	2006 \$	2007 \$	2006 \$	2007 \$	2006 \$
Opening Balance						
Balance carried forward from previous period	15,699,786	12,876,616	135,592	31,373	15,835,378	12,907,989
Adjustment for errors	–	–	–	–	–	–
Adjustment for changes in accounting policies	–	–	–	–	–	–
Adjusted opening balance	15,699,786	12,876,616	135,592	31,373	15,835,378	12,907,989
Income and expense						
Income and expenses recognised directly in Equity	–	–	–	104,219	–	104,219
Sub-total income and expenses recognised directly in Equity	–	–	–	104,219	–	104,219
Surplus (Deficit) for the period	(378,105)	2,823,170	–	–	(378,105)	2,823,170
Total income and expenses	(378,105)	2,823,170	–	104,219	(378,105)	2,927,389
Closing balance at 30 June	15,321,681	15,699,786	135,592	135,592	15,457,273	15,835,378

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

COTTON RESEARCH AND DEVELOPMENT CORPORATION

CASH FLOW STATEMENT

for the period ended 30 June 2007

	Notes	2007 \$	2006 \$
OPERATING ACTIVITIES			
Cash received			
Commonwealth contributions		4,576,667	6,034,103
Industry levies		5,147,317	6,044,458
Interest		944,999	886,979
Net GST received		–	72,608
Other cash received		754,563	3,134,259
<i>Total cash received</i>		<u>11,423,546</u>	<u>16,172,407</u>
Cash used			
Employees		1,246,650	1,208,444
Suppliers		369,116	437,573
Grants		11,889,392	10,125,819
Net GST paid		194,615	–
<i>Total cash used</i>		<u>13,699,774</u>	<u>11,771,836</u>
Net cash from or (used by) operating activities	9	<u>(2,276,228)</u>	<u>4,400,571</u>
INVESTING ACTIVITIES			
Cash used			
Purchase of property, plant and equipment		142,655	68,894
Purchase of intangibles		–	–
<i>Total cash used</i>		<u>142,655</u>	<u>68,894</u>
Net cash from or (used by) investing activities		<u>(142,655)</u>	<u>(68,894)</u>
<i>Net increase or (decrease) in cash held</i>		(2,418,883)	4,331,677
Cash at the beginning of the reporting period		<u>15,750,354</u>	<u>11,418,677</u>
Cash at the end of the reporting period	5A	<u>13,331,471</u>	<u>15,750,354</u>

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

COTTON RESEARCH AND DEVELOPMENT CORPORATION

SCHEDULE OF COMMITMENTS

as at 30 June 2007

	2007	2006
	\$	\$
BY TYPE		
Commitments Receivable		
Lease rental income	8,250	24,750
GST recoverable on commitments	<u>2,090,189</u>	<u>2,080,708</u>
<i>Total Commitments</i>	<u>2,098,439</u>	<u>2,105,458</u>
Other commitments		
Operating leases (1)	112,106	10,984
Research grant commitments (2)	<u>22,879,976</u>	<u>22,876,809</u>
<i>Total other commitments</i>	<u>22,992,082</u>	<u>22,887,793</u>
Net commitments by type	<u>20,893,643</u>	<u>20,782,335</u>
BY MATURITY		
Commitments Receivable		
One year or less	781,031	1,027,174
From one to five years	<u>1,317,408</u>	<u>1,078,284</u>
<i>Total commitments receivable</i>	<u>2,098,439</u>	<u>2,105,458</u>
Operating lease commitments		
One year or less	49,825	10,984
From one to five years	<u>62,281</u>	<u>–</u>
<i>Total operating lease commitments</i>	<u>112,106</u>	<u>10,984</u>
Research grant commitments		
One year or less	8,450,770	11,015,683
From one to five years	<u>14,429,206</u>	<u>11,861,126</u>
<i>Total research grant commitments</i>	<u>22,879,976</u>	<u>22,876,809</u>
Net commitments by maturity	<u>20,893,643</u>	<u>20,782,335</u>

NB: Commitments are GST inclusive where relevant

- Operating leases included are effectively non-cancellable and comprise of agreements for the provision of motor vehicles for senior executives
- Research grant commitments are amounts payable under grant agreements in respect of which the recipient is yet to perform the services required or meet eligibility conditions

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

COTTON RESEARCH AND DEVELOPMENT CORPORATION

SCHEDULE OF CONTINGENCIES

as at 30 June 2007

The Cotton Research and Development Corporation has no contingent assets or liabilities.

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

COTTON RESEARCH AND DEVELOPMENT CORPORATION

NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENTS
for the period ended 30 June 2007

Note 1:	Summary of Significant Accounting Policies	98
Note 2:	Events after the Balance Sheet Date	104
Note 3:	Income	105
Note 4:	Expenses	105
Note 5:	Financial Assets	106
Note 6:	Non-Financial Assets	106
Note 7:	Payables	109
Note 8:	Provisions	109
Note 9:	Cash flow reconciliation	110
Note 10:	Contingent Liabilities and Assets	110
Note 11:	Director Remuneration	110
Note 12:	Related Party Disclosures	111
Note 13:	Executive Remuneration	111
Note 14:	Remuneration of Auditors	111
Note 15:	Average Staffing Levels	111
Note 16:	Financial Instruments	112
Note 17:	Reporting of Outcomes	113

Note 1: Summary of Significant Accounting Policies

1.1 Basis of Preparation of Financial Report

The Financial Statements and notes are required by clause 1 (b) of Schedule 1 to the Commonwealth Authorities and Companies Act 1997 and are a General Purpose Financial Report.

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

The Financial Statements and notes have been prepared in accordance with:

- Finance Minister's Orders (FMOs) for reporting periods ending on or after 1 July 2006; and
- Australian Accounting Standards and Interpretations issued by the Australian Accounting Standards Board (AASB) that apply for the reporting period.

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

The Financial report is presented in Australian dollars and values are rounded to the nearest dollar unless otherwise specified.

Unless an alternative treatment is specifically required by an Accounting Standard or the FMOs, assets and liabilities are recognised in the Balance Sheet when and only when it is probable that future economic benefits will flow to the Corporation and the amounts of assets or liabilities can be reliably measured. However, assets and liabilities arising under agreements equally proportionately unperformed are not recognised unless required by an Accounting Standard. Liabilities and assets that are unrecognised are reported in the Schedule of Commitments and the Schedule of Contingencies (other than unquantifiable, which are reported at Note 10).

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

1.2 Significant Accounting Judgements and Estimates

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

- The fair value of land and buildings has been taken to be the market value of similar judgements as determined by an independent valuer.

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

1.3 Statement of Compliance

Australian Accounting Standards require a statement of compliance with International Financial Reporting Standards (IFRSs) to be made where the financial report complies with these standards.

Some Australian equivalents to IFRSs and other Australian Accounting Standards contain requirements specific to not-for-profit entities that are inconsistent with IFRS requirements. The Corporation is a not for profit entity and has applied these requirements, so while this financial report complies with Australian Accounting Standards including Australian Equivalents to International Financial Reporting Standards (AEIRFSs) it cannot make this statement.

Adoption of new Australian Accounting Standard requirements

No accounting standard has been adopted earlier than the effective date in the current period.

Other effective requirement changes

The following amendments, revised standards or interpretations have become effective but have had no financial impact or do not apply to the operations of the Corporation.

Amendments

- 2005-1 Amendments to Australian Accounting Standards [AASBs 1, 101,124]
- 2005-4 Amendments to Australian Accounting Standards [AASBs 139,132,1,1023 and 1038]
- 2005-5 Amendments to Australian Accounting Standards [AASBs 1 and 139]
- 2005-6 Amendments to Australian Accounting Standards [AASB 3]
- 2005-9 Amendments to Australian Accounting Standards [AASBs 4, 1023, 139 and 132]
- 2006-1 Amendments to Australian Accounting Standards [AASB 121]
- 2006-3 Amendments to Australian Accounting Standards [AASB 1045]

Interpretations

- UIG 4 Determining whether an Arrangement contains a Lease
- UIG 5 Rights to Interests arising from Decommissioning, Restoration and Environmental Rehabilitation Funds
- UIG 7 Applying the Restatement Approach under AASB 129 Financial Reporting in Hyperinflationary Economies
- UIG 8 Scope of AASB 2
- UIG 9 Reassessment of Embedded Derivatives

Future Australian Accounting Standard requirements

The following new standards, amendments to standards or interpretations have been issued by the Australian Accounting Standards Board but are effective for future reporting periods. It is estimated that the impact of adopting these pronouncements when effective will have no material financial impact on future reporting periods.

Financial instrument disclosure

AASB 7 Financial Instruments: Disclosures effective for reporting periods beginning on or after 1 January 2007 (the 2007-08 financial year) and amends the disclosure requirements for financial instruments. In general AASB 7 requires greater disclosure than that presently. Associated with the introduction of AASB 7 a number of accounting standards were amended to reference the new standard or remove the present disclosure requirement through 2005-10 Amendments to Australian Accounting Standards [AASB 132, AASB 101, AASB 114, AASB 117, AASB 133, AASB 139, AASB 1, AASB 4, AASB 1023 & AASB 1038]. These changes have no financial impact but will effect the disclosure presented in future financial reports.

Other

The following standards and interpretations have been issued but are not applicable to the operations of the Corporation.

- AASB 1049 Financial Reporting of General Government Sectors by Governments
- UIG 10 Interim Financial Reporting and Impairment

1.4 Revenue

Revenue from the sale of goods is recognised when:

- The risks and rewards of ownership have been transferred to the buyer;
- The seller retains no managerial involvement nor effective control over the goods;
- The revenue and transaction costs incurred can be reliably measured; and
- It is probable that the economic benefits associated with the transaction will flow to the Corporation.

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

- The amount of revenue, stage of completion and transaction costs incurred can be reliably measured; and
- The probable economic benefits with the transaction will flow to the Corporation.

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

Receivables for goods and services, which have 30 day terms, are recognised at the nominal amounts due less any provision for bad and doubtful debts. Collectability of debts is reviewed at balance date. Provisions are made when collectability of the debt is no longer probable.

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

Revenues from Government

The full amount of the allocated revenue from government for agency outputs for the year is recognised as revenue.

1.5 Employee Benefits

Liabilities for services rendered by employees are recognised at the reporting date to the extent that they have not been settled.

Liabilities for 'short-term employee benefits' (as defined in AASB 119) and termination benefits due within twelve months of balance date are measured at their nominal amounts.

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

All other employee benefit liabilities are measured at the present value of the estimated future cash outflows to be made in respect of services provided by employees up to the reporting date.

Leave

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

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

The liability for long service leave has been determined by reference to the work of an actuary as at 30 June 2007. The estimate of the present value of the liability takes into account attrition rates and remuneration increases through promotion and inflation.

Superannuation

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

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

The liability for defined benefits is recognised in the financial statements of the Australian Government and is settled by the Australian Government in due course.

The Corporation makes employer contributions to the Employee Superannuation Scheme at rates determined by an actuary to be sufficient to meet the cost to the Government of the superannuation entitlements of the Corporation's employees. The Corporation accounts for the contributions as if they were contributions to defined contribution plans.

From 1 July 2005, new employees are eligible to join the PSSap scheme.

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

1.6 Leases

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

Where a non-current asset is acquired by means of a finance lease, the asset is capitalised at either the fair value of the lease property or, if lower, the present value of minimum lease payments at the inception of the contract and a liability is recognised at the same time and for the same amount.

The discount rate used is the interest rate implicit in the lease. Leased assets are amortised over the period of the lease. Lease payments are allocated between the principal component and the interest expense.

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

1.7 Borrowing costs

No Borrowing costs were incurred by the Corporation during the year.

1.8 Cash

Cash means notes and coins held and any deposits held at call with a bank or financial institution. Cash is recognised at its nominal amount.

1.9 Financial risk management

The Corporation's activities expose it to normal commercial financial risk. As a result of the nature of the Corporation's business and internal and Australian Government policies, dealing with the management of financial risk, the Corporation's exposure to market, credit, liquidity and cash flow and fair value interest rate risk is considered to be low.

1.10 Investments

Investments are initially measured at their fair value.

After initial recognition, financial investments are to be measured at their fair values except for:

- a) loans and receivables which are measured at amortised cost using the effective interest method;
- b) held-to-maturity investments which are measured at amortised cost using the effective interest method; and
- c) investments in equity instruments that do not have a quoted market price in an active market and whose fair value cannot be reliably measured and derivatives that are linked to and must be settled by delivery of such unquoted equity instruments, which are measured at cost.

1.11 Derecognition of Financial Assets and Liabilities

Financial assets are derecognised when the contractual rights to the cash flows from the financial assets expire or the asset is transferred to another Entity. In the case of a transfer to another Entity, it is necessary that the risks and rewards of ownership are also transferred.

Financial liabilities are derecognised when the obligation under the contract is discharged, cancelled or expires.

1.12 Impairment of Financial Assets

Financial assets are assessed for impairment at each balance date.

Financial Assets held at Amortised Cost

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

Financial Assets held at Cost

If there is objective evidence that an impairment loss has been incurred on an unquoted equity instrument that is not carried at fair value because it cannot be reliably measured, or a derivative asset that is linked to and must be settled by delivery of such an unquoted equity instrument, the amount of the impairment loss is the difference between the carrying amount of the asset and the present value of the estimated future cash flows discounted at the current market rate for similar assets.

Available for Sale Financial Assets

If there is objective evidence that an impairment loss on an available for sale financial asset has been incurred, the amount of the difference between its cost, less principal repayments and amortisation, and its current fair value, less any impairment loss previously recognised in expenses, is transferred from equity to the Income Statement.

1.13 Interest Bearing Loans and Borrowings

No borrowing costs or interest were incurred by the Corporation during the year.

1.14 Supplier and other payables

Supplier and other payables are recognised at amortised cost. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

1.15 Contingent Liabilities and Contingent Assets

Contingent Liabilities and Contingent Assets are not recognised in the Balance Sheet but are reported in the relevant schedules and notes. They may arise from uncertainty as to the existence of a liability or asset, or represent an existing liability or asset in respect of which settlement is not probable or the amount cannot be reliably measured. Contingent assets are reported when settlement is probable, and contingent liabilities are recognised when settlement is greater than remote.

1.16 Acquisition of Assets

Assets are recorded at the cost of acquisition except as stated below. The cost of acquisition includes the fair value of assets transferred in exchange and liabilities undertaken. Financial assets are initially measured at their fair value plus transaction costs where appropriate.

Assets acquired at no cost, or for nominal consideration, are initially recognised as assets and revenues at their fair value at the date of acquisition, unless acquired as a consequence of restructuring of administrative arrangements. In the latter case, assets are initially recognised as contributions by owners at the amounts at which they were recognised in the transferor entity's accounts immediately prior to the restructuring.

1.17 Infrastructure, plant and equipment

Asset recognition threshold

Purchases of infrastructure, plant and equipment are recognised initially at cost in the Balance Sheet, except for purchases costing less than \$1,000, which are expensed in the year of acquisition (other than where they form part of a group of similar items which are significant in total).

Revaluations

Fair values for each class of asset are measured at the market selling price.

Following initial recognition at cost, infrastructure, plant and equipment are carried at fair value less accumulated depreciation and accumulated impairment losses. Valuations are conducted with sufficient frequency to ensure that the carrying amounts of assets do not differ materially from the assets' fair values as at the reporting date. The regularity of independent valuations depends upon the volatility of movements in market values for the relevant assets.

Revaluation adjustments are made on a class basis. Any revaluation increment is credited to equity under the heading of asset revaluation reserve except to the extent that it reverses a previous revaluation decrement of the same asset class that was previously recognised through surplus and deficit. Revaluation decrements for a class of assets are recognised directly through surplus and deficit except to the extent that they reverse a previous revaluation increment for that class.

Any accumulated depreciation as at the revaluation date is eliminated against the gross carrying amount of the asset and the asset restated to the revalued amount.

Depreciation and amortisation

Depreciable infrastructure, plant and equipment assets are written-off to their estimated residual values over their estimated useful lives to the Corporation using, in all cases, the straight line method of depreciation.

Depreciation rates (useful lives), residual values and methods are reviewed at each reporting date and necessary adjustments are recognised in the current, or current and future periods, as appropriate.

Depreciation rates applying to each class of depreciable asset are based on the following useful lives:

	2007	2006
Buildings on Freehold land	40 years	40 years
Infrastructure, plant and equipment	3–10 years	3–10 years
Intangibles – Computer software developed in-house	5 years	5 years

The aggregate amount of depreciation allocated for each class of asset during the reporting period is disclosed at Note 6C.

Impairment

All assets were assessed for impairment at 30 June 2007. Where indications of impairment exist, the asset's recoverable amount is estimated and an impairment adjustment made if the asset's recoverable amount is less than its carrying amount.

The recoverable amount of an asset is the higher of its fair value less costs to sell and its value in use. Value in use is the present value of the future cash flows expected to be derived from the asset. Where the future economic benefit of an asset is not primarily dependent on the asset's ability to generate future cash flows, and the asset would be replaced if the Corporation were deprived of the asset, its value in use is taken to be its depreciated replacement cost.

No indicators of impairment were found for assets at fair value.

1.18 Intangibles

The Corporation's intangibles comprise internally developed software for internal use. These assets are carried at cost.

Software is amortised on a straight line basis over its anticipated useful life. The useful life of the Corporation's software is 5 years. This is unchanged from the previous year.

All software assets were assessed for indications of impairment as at 30 June 2007. None were found to be impaired.

1.19 Taxation

The Corporation is exempt from all forms of taxation except fringe benefits tax (FBT), payroll tax and the goods and services tax (GST).

Revenues, expenses and assets are recognised net of GST:

- except where the amount of GST incurred is not recoverable from the Australian Taxation Office; and
- except for receivables and payables.

Note 2: Events after the Balance Sheet Date

No matters or circumstances have arisen since the end of the financial year which significantly affected or may affect the operations of the Corporation, the results of these operations or state of affairs of the Corporation in subsequent years.

	2007	2006
	\$	\$
Note 3: Income		
<i>Revenue</i>		
Note 3A: Revenue from Government		
Revenues from Government		
Grant revenue from Related Entity	4,576,667	4,907,880
Total revenue from Government	<u>4,576,667</u>	<u>4,907,880</u>
Note 3B: Industry Contributions		
Industry Contributions	4,168,402	6,714,797
Total contributions revenue	<u>4,168,402</u>	<u>6,714,797</u>
Note 3C: Interest Revenue		
Interest on deposits	1,051,656	888,998
Total Interest Revenue	<u>1,051,656</u>	<u>888,998</u>
Note 3D: Other Revenues		
Royalties	1,285,634	2,499,134
Project refunds	76,697	358,739
Levy Penalties	–	1,412
Grants Revenue	311,203	216,750
Other Revenue	38,786	22,077
Total Other Revenues	<u>1,712,320</u>	<u>3,098,112</u>
Note 4: Expenses		
Note 4A: Employee benefits		
Wages and salaries	1,150,057	1,054,871
Superannuation	129,212	126,369
Leave and other entitlements	35,600	3,925
Total employee benefits	<u>1,314,869</u>	<u>1,185,165</u>
Note 4B: Suppliers		
Provision of goods – external entities	350,632	349,621
Operating lease rentals	57,483	67,259
Workers compensation premiums	2,191	2,609
Total supplier expenses	<u>410,306</u>	<u>419,489</u>
Note 4C: Grants		
The Corporation makes grants to support the research and development of issues relating to the Australian cotton industry		
NON-PROFIT INSTITUTIONS		
Commonwealth organisations	2,306,353	3,513,726
State Departments	1,566,465	1,861,287
Universities and colleges	345,048	234,920
Other research institutions	4,189,575	4,047,139
Corporate activities	537,710	451,739
	<u>8,945,151</u>	<u>10,108,811</u>
OTHER ENTITIES		
Commercial entities	1,177,782	1,030,997
Total grants expense	<u>10,122,933</u>	<u>11,139,808</u>

	2007	2006
	\$	\$
Note 4D: Depreciation and amortisation		
Depreciation		
Infrastructure, plant and equipment	15,842	18,981
Buildings	9,179	6,391
<i>Total depreciation</i>	<u>25,021</u>	<u>25,372</u>
Amortisation		
Intangibles:		
Computer software	14,021	1,613
<i>Total amortisation</i>	<u>14,021</u>	<u>1,613</u>
<i>Total depreciation and amortisation</i>	<u>39,042</u>	<u>26,985</u>
Note 4E: Write-down and impairment of assets		
Revaluation decrements – plant & equipment	–	15,169
<i>Total write-down and impairment of assets</i>	<u>–</u>	<u>15,169</u>
Note 5: Financial Assets		
Note 5A: Cash and cash equivalents		
Cash at bank	2,080,971	4,499,853
Cash on hand	500	500
Deposits on Call	11,250,000	11,250,000
<i>Total Cash and cash equivalents</i>	<u>13,331,471</u>	<u>15,750,353</u>
Note 5B: Trade and other receivables		
Industry levies receivable	757,536	1,736,452
Interest receivable	440,815	334,158
Royalties receivable	1,150,446	–
GST receivable from ATO (Net)	54,097	152,416
Other receivables	26,606	33,942
<i>Total Trade and other receivables (gross)</i>	<u>2,429,500</u>	<u>2,256,968</u>
Receivables are aged as follows:		
Not overdue	<u>2,429,500</u>	<u>2,256,968</u>
Receivables (net) are represented by:		
Current	<u>2,429,500</u>	<u>2,256,968</u>
Note 6: Non-Financial Assets		
Note 6A: Land and buildings		
Freehold land (at fair value)	130,000	130,000
<i>Total freehold land</i>	<u>130,000</u>	<u>130,000</u>
Buildings on freehold land		
– Fair value	376,918	325,000
– Accumulated depreciation	(9,179)	–
<i>Total buildings on freehold land</i>	<u>367,739</u>	<u>325,000</u>
<i>Total land and buildings (non-current)</i>	<u>497,739</u>	<u>455,000</u>
No indicators of impairment were found for land and buildings		

	2007	2006
	\$	\$
Note 6B: Plant and equipment		
Office Equipment		
– Fair value	40,971	39,540
– Accumulated depreciation	(4,068)	–
Total Office Equipment	<u>36,903</u>	<u>39,540</u>
Note 6C:		
Computer Equipment		
– Fair value	27,392	15,990
– Accumulated depreciation	(7,751)	–
Total Computer Equipment	<u>19,641</u>	<u>15,990</u>
Fixture and Fittings		
– Fair value	42,709	38,350
– Accumulated depreciation	(4,023)	–
Total Fixture and Fittings	<u>38,686</u>	<u>38,350</u>
Total Infrastructure, Plant and Equipment (non-current)	<u>95,230</u>	<u>93,880</u>

No indicators of impairment were found for infrastructure, plant and equipment

Note 6C: Analysis of Property, Plant & Equipment

Table A: Reconciliation of the opening and closing balances of property, plant and equipment (2006–07)

Item	Land	Buildings	Total Land	Office	Computer	Fixtures	Total	Total
	\$	\$	& Buildings \$	Equipment \$	Equipment \$	& Fittings \$	Infrastructure \$	\$
As at 1 July 2006								
Gross book value	130,000	325,000	455,000	39,540	15,990	38,350	93,880	548,880
Accumulated depreciation/ amortisation and impairment	–	–	–	–	–	–	–	–
Net book value 1 July 2006	130,000	325,000	455,000	39,540	15,990	38,350	93,880	548,880
Additions by purchase	–	51,918	51,918	1,431	11,402	4,359	17,192	69,110
Revaluations and impairment through equity	–	–	–	–	–	–	–	–
Depreciation/amortisation expense	–	(9,179)	(9,179)	(4,068)	(7,751)	(4,023)	(15,842)	(25,021)
Disposals	–	–	–	–	–	–	–	–
Net book value 30 June 2007								
Net book value as of 30 June 2007 represented by:								
Gross book value	130,000	376,918	506,918	40,971	27,392	42,709	111,072	617,990
Accumulated depreciation/ amortisation and impairment	–	(9,179)	(9,179)	(4,068)	(7,751)	(4,023)	(15,842)	(25,021)
	130,000	367,739	497,739	36,903	19,641	38,686	95,230	592,969

Table B: Reconciliation of the opening and closing balances of property, plant and equipment (2005–06)

Item	Land	Buildings	Total Land	Office	Computer	Fixtures	Total	Total
	\$	\$	& Buildings \$	Equipment	Equipment	& Fittings	Infrastructure	\$
As at 1 July 2005								
Gross book value	100,000	250,000	350,000	48,476	30,725	32,720	111,921	461,921
Accumulated depreciation/ amortisation and impairment	-	-	-	-	-	-	-	-
Net book value 1 July 2005	100,000	250,000	350,000	48,476	30,725	32,720	111,921	461,921
Additions by purchase	-	7,172	7,172	-	-	14,987	14,987	22,159
Revaluations and impairment through equity	30,000	74,219	104,219	(4,088)	(4,493)	(4,966)	(13,547)	90,672
Depreciation/amortisation expense	-	(6,391)	(6,391)	(4,848)	(10,242)	(3,891)	(18,981)	(25,372)
Impairments recognised in the operating result	-	-	-	-	-	(500)	(500)	(500)
Net book value 30 June 2006	130,000	325,000	455,000	39,540	15,990	38,350	93,880	548,880
Net book value as of 30 June 2006 represented by:								
Gross book value	130,000	325,000	455,000	39,540	15,990	38,350	93,880	548,880
Accumulated depreciation/ amortisation and impairment	-	-	-	-	-	-	-	-
	130,000	325,000	455,000	39,540	15,990	38,350	93,880	548,880

2007
\$

2006
\$

Note 6D: Intangibles

Computer software Valuation (2006 Fair Value):	-	44,000
Internally developed - in progress	117,545	-
Accumulated Amortisation	(14,021)	-
Total intangibles (non-current)	<u>103,523</u>	<u>44,000</u>

Table A - reconciliation of opening and closing balances of intangibles

As at 1 July 2006		
Gross book value	44,000	-
Accumulated depreciation/amortisation and impairment	-	-
Net book value 1 July 2006	<u>44,000</u>	<u>-</u>
Additions:		
by purchase or internally developed	73,544	46,735
Depreciation/amortisation	(14,021)	(1,613)
Net revaluation decrement	-	(1,122)
Net book value 30 June 2007	<u>103,523</u>	<u>44,000</u>
Net book value as of 30 June 2007 represented by:		
Gross book value	117,544	46,735
Accumulated depreciation/amortisation and impairment	(14,021)	(2,735)
	<u>103,523</u>	<u>44,000</u>

No indicators of impairment were found for intangible assets

	2007	2006
	\$	\$
Note 6E: Other Non-Financial Assets		
Prepayments	7,539	29,930
<i>Total other non-financial assets</i>	<u>7,539</u>	<u>29,930</u>

All Other non-financial assets are current assets.

No indicators of impairment were found for Other non-financial assets

Note 7: Payables

Note 7A: Suppliers

Trade creditors	37,936	58,313
<i>Total supplier payables</i>	<u>37,936</u>	<u>58,313</u>

Supplier payables are represented by:

Current	37,936	58,313
Non – Current	–	–
<i>Total supplier payables</i>	<u>37,936</u>	<u>58,313</u>

Settlement is usually made net 30 days.

Note 7B: Grants

Commonwealth organisations	412,623	506,485
State Departments	216,736	113,084
Universities and colleges	29,333	52,191
Other research organisations	74,099	1,881,805
<i>Total Grants Payable</i>	<u>732,791</u>	<u>2,553,565</u>

All grant payables are current. This liability is recognised because grant recipients have not completed the conditions of the grant and are yet to be paid.

Note 7C: Other

Tax payable	36,877	30,994
<i>Total Other Payables</i>	<u>36,877</u>	<u>30,994</u>

Note 8: Provisions

Note 8A: Employee Provisions

Salaries and wages	8,349	3,589
Leave	183,433	147,832
Superannuation	8,343	460
<i>Total employee provisions</i>	<u>200,125</u>	<u>151,881</u>

Employee provisions are represented by:

Current	139,760	115,830
Non-current	60,365	36,051
<i>Total employee provisions</i>	<u>200,125</u>	<u>151,881</u>

Note 9: Cash flow reconciliation**Reconciliation of cash and cash equivalents as per Balance Sheet to Cash Flow Statement**

	2007	2006
	\$	\$
Report cash and cash equivalents as per:		
Cash Flow Statement	13,331,471	15,750,353
Balance Sheet	<u>13,331,471</u>	<u>15,750,353</u>
Difference	-	-
Reconciliation of operating result to net cash from operating activities:		
Operating result	(378,105)	2,823,170
Depreciation and amortisation	39,042	26,985
Net write down of non-current assets	-	15,169
(Increase)/decrease in net receivables	(172,532)	313,953
(Increase)/decrease in prepayments	22,391	(29,930)
Increase/(decrease) in supplier payables	(20,000)	(20,970)
Increase/(decrease) in other payables	5,883	(13,898)
Increase/(decrease) in employee provisions	47,867	(9,331)
Increase/(decrease) in grants payables	<u>(1,820,774)</u>	<u>1,295,423</u>
<i>Net cash from/(used by) operating activities</i>	<u>(2,276,228)</u>	<u>4,400,571</u>

Note 10: Contingent Liabilities and Assets*Remote Receivable:*

The Cotton Research and Development Corporation was established under the *Primary Industries and Energy Research and Development Act, 1989*. This Act states the Commonwealth Government will make payments to the Corporation equal to one half of the Corporation's annual expenditure. However, government matching payments must not exceed industry levy receipts nor exceed 0.5 per cent of the amount that the Minister determines to be the gross value of production (GVP) for that financial year. In 2006-07 Commonwealth contributions were capped to a GVP of \$4,576,667, leaving a remote contingent receivable of \$5.94 million. The probability of receiving this receivable is remote whilst cotton production and prices remain low.

Note 11: Directors' Remuneration

	2007	2006
The numbers of directors of the Corporation included in these figures are shown below in the relevant remuneration bands:		
\$ Nil - \$ 14,999	2	8
\$ 15,000 - \$ 29,999	5	1
\$ 30,000 - \$ 44,999	1	1
\$ 180,000 - \$ 194,999	-	1
\$ 195,000 - \$ 209,999	1	-
Total number of directors of the Corporation	<u>9</u>	<u>11</u>
Total remuneration received, or due and receivable, by directors of the Corporation	<u>\$329,853</u>	<u>\$325,883</u>

Note 12: Related Party Disclosures

Other Transactions with Directors or Director related entities

Grants were made to a number of research institutions which are director related entities. They were approved under the normal terms and conditions of the Corporation. Following full disclosure of their relevant interests, the relevant Directors may or may not take part in discussion and abstain from decisions of the Board.

	2007	2006
	\$	\$
Grants to director related entities:		
Cotton Catchment Communities CRC	4,189,575	3,991,639
CSIRO (Entomology, Plant Industry, Land & Water, Textile and Fibre Technology)	2,306,353	3,513,725
University of Queensland	84,000	83,460
University of New England	16,516	16,516
Queensland Department of Primary Industries and Fisheries	503,694	626,776
Australian Rural Leadership Foundation	23,920	25,000
Australian Centre for Intellectual Property in Agriculture	–	17,600

Note 13: Executive Remuneration

	2007	2006
The number of senior executives who received or were due to receive total remuneration of \$115,000 or more:		
\$ 115,000 to \$ 129,999	2	1
\$ 140,000 to \$ 164,999	1	1
Total	<u>3</u>	<u>2</u>
The aggregate amount of the total remuneration of executives shown above	\$407,331	\$390,360
The aggregate amount of separation and redundancy/termination benefit payments during the year to executives shown above	Nil	Nil

Note 14: Remuneration of Auditors

	2007	2006
	\$	\$
Financial statement audit services are provided to the CRDC by the Auditor General.		
The fair value of the services provided to the Corporation was:	<u>8,500</u>	<u>8,500</u>

No other services were provided by the Auditor-General

Note 15: Average Staffing Levels

	2007	2006
The average staffing levels for the Corporation during the year were:	12	11

Note 16: Financial Instruments

Note 16A: Interest rate risk

Financial instrument	Note	Floating interest rate		Fixed interest rate maturing in						Non-interest bearing		Total		Weighted average effective interest rate			
		2007 \$	2006 \$	1 Year or Less		1 to 5 Years		> 5 Years		2007 \$	2006 \$	2007 \$	2006 \$	2007 %	2006 %		
				2007 \$	2006 \$	2007 \$	2006 \$	2007 \$	2006 \$								
Financial Assets																	
Cash at bank	5A	2,080,971	4,499,853	-	-	-	-	-	-	-	-	-	-	2,080,971	4,499,853	6.00	5.40
Cash on hand	5A	-	-	-	-	-	-	-	500	500	500	500	-	500	500	-	-
Deposits at call	5A	-	-	11,250,000	-	-	-	-	-	-	11,250,000	11,250,000	-	11,250,000	11,250,000	6.40	5.70
Receivables	5B	-	-	-	-	-	-	-	1,617,867	368,100	1,617,867	368,100	-	1,617,867	368,100	-	-
Total		2,080,971	4,499,853	11,250,000	11,250,000	-	-	-	1,618,367	368,600	14,949,338	16,118,453	-	16,465,002	18,630,131	-	-
Total assets																	
Financial Liabilities																	
Trade creditors	7A	-	-	-	-	-	-	-	37,936	58,313	37,936	58,313	-	37,936	58,313	n/a	n/a
Grants Payable	7B	-	-	-	-	-	-	-	732,791	2,553,565	732,791	2,553,565	-	732,791	2,553,565	n/a	n/a
Total		-	-	-	-	-	-	-	770,727	2,611,878	770,727	2,611,878	-	770,727	2,611,878	-	-
Total Liabilities														1,007,729	2,794,753	-	-

Note 16B: Fair Values of Financial Assets and Liabilities

	Notes	2007 \$		2006 \$	
		Total carrying amount	Aggregate fair value	Total carrying amount	Aggregate fair value
Financial Assets					
Cash at bank	5A	2,080,971	2,080,971	4,499,853	4,499,853
Cash on hand	5A	500	500	500	500
Deposits at call	5A	11,250,000	11,250,000	11,250,000	11,250,000
Receivables	5B	1,617,867	1,617,867	368,100	368,100
Total Financial Assets		<u>14,949,338</u>	<u>14,949,338</u>	<u>16,118,453</u>	<u>16,118,453</u>
Financial Liabilities					
Trade creditors	7A	37,936	37,936	58,313	58,313
Grants Payable	7B	732,791	732,791	2,553,565	2,553,565
Total Financial Liabilities		<u>770,727</u>	<u>770,727</u>	<u>2,611,878</u>	<u>2,611,878</u>

Note 16C: Credit risk exposure

The Corporation's maximum exposures to credit risk at the reporting date in relation to each class of recognised financial assets is the carrying amount of those assets as indicated in the Balance Sheet.

The Corporation has no significant exposures to any concentrations of credit risk.

All figures for credit risk referred to do not take into account the value of any collateral or other security.

Note 17: Reporting of Outcomes**Note 17A: Outcomes of the Corporation**

The Corporation is structured to meet one outcome:

"A more sustainable, profitable and competitive cotton industry providing increased environmental, economic and social benefits to regional communities and the nation."

Output 1: Economic – Profitability and International Competitiveness

Output 2: Environmental – Ecologically Sustainable Development

Output 3: Social – People and Communities

Note 17B: Net Cost of Outcome Delivery

	Outcome	
	2007 \$	2006 \$
Total Expenses	11,887,150	12,786,617
Funded by external revenues:		
Industry contributions	4,168,402	6,714,797
Interest	1,051,656	888,998
Other	1,712,320	3,098,112
Total other external revenues	<u>6,932,378</u>	<u>10,701,907</u>
Net cost/(contribution) of outcome	<u>4,954,772</u>	<u>2,084,710</u>

Note 17C: Corporation Revenues and Expenses by Output

	Output 1 Economic		Output 2 Environmental		Output 3 Social	
	2007	2006	2007	2006	2007	2006
	\$	\$	\$	\$	\$	\$
Operating expenses						
Employees	604,840	533,324	420,758	391,104	289,271	260,736
Suppliers	188,741	188,770	131,298	138,431	90,267	92,288
Grants	4,656,549	5,012,914	3,239,339	3,676,137	2,227,045	2,450,758
Depreciation	17,959	18,969	12,493	13,911	8,590	9,273
Total Expenses	5,468,089	5,753,978	3,803,888	4,219,584	2,615,173	2,813,055
Fundedby:						
Revenue from Government	2,105,267	2,208,546	1,464,533	1,619,600	1,006,867	1,079,734
Industry contributions	1,917,465	3,021,659	1,333,889	2,215,883	917,048	1,477,255
Interest	483,762	400,049	336,530	293,369	231,365	195,580
Other Revenues	787,667	1,394,150	547,942	1,022,377	376,710	681,585
Total revenues	5,294,161	7,024,404	3,682,894	5,151,230	2,531,990	3,434,153



Appendix One Selection Committee Report

Cotton Research and Development Corporation Selection Committee

Jenny Varcoe-Cocks
Presiding Member
CRDC Selection Committee
Canberra ACT 2600

30 July 2007

Hon Sussan Ley MP
Parliamentary Secretary to
the Minister for Agriculture, Fisheries and Forestry
Parliament House
Canberra ACT 2600

Dear Ms Ley

In accordance with the requirements of Section 141 of the Primary Industries Research and Development Act 1989, I write to inform you of the activities of the Selection Committee for this past year ending 30 June 2007.

The appointments made to the Cotton Research and Development Corporation Board by Senator the Hon. Richard Colbeck, former Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, on 26 August 2005 were for a period of three years and are still in effect. This means there has not been a requirement for a Selection Committee to be authorised and no costs have been incurred.

I have noted Items 24 to 34 in the Primary Industries Research and Development Amendment Act 2007 concerning the operation of Selection Committees. The CRDC Selection Committee will, of course, comply with the enhanced requirements in future operations.

The position of Government Director was abolished by this amending legislation, leaving the CRDC Board with eight members. The CRDC Board of Directors has advised that, in order to return the Board to nine members, the ninth position formerly occupied by the Government Director should form part of the Committee's normal selection process. This is due in 2008 when the current Directors' three year terms expire.

Yours sincerely
Jenny Varcoe-Cocks
Presiding Member



Appendix Two Additional Activities

COMMUNICATION

The primary focus of CRDC in 2006-2007 has been communication strategies and tactics to drive increased technology adoption.

Increased attention was given to improving online communications, particularly outbound online resources. Three e-Newsletters were created during the year and the CRDC website began redevelopment in June 2007. Both the e-Newsletters and new website are based on an internally accessible content management system. Media and internal audiences have been well served by the development of the e-Newsletters and global search engines now report CRDC web-based content at a far more elevated level, while uptake of media releases in online, print and electronic media has significantly improved since their introduction.

CRDC re-launched its quarterly magazine under the familiar *Spotlight* masthead title in June 2007. The priority of the new format for *Spotlight* has been to sharply strengthen awareness of the knowledge and readily adoptable R&D outcomes from R&D funded and supported by CRDC investments. Content in *Spotlight* is presented in a news format and the publication is wholly managed internally by CRDC.

Industry communications capacity is enhanced by ensuring CRDC publications and website content are now managed in-house by CRDC. A reliable team of content providers was established during the year and this continues to grow under a communications policy that ensures communication quality and increased capacity is available to the industry to support the primary goal of improved adoption rates of industry-funded R&D.

PARTICIPATION IN SIGNIFICANT WORKSHOPS, CONFERENCES AND OTHER ACTIVITIES

2006	
July	RIRDC Farm Health & Safety, Canberra
	Skills Training Meeting, Tamworth
August	Wincott (Women in Cotton) AGM, Gold Coast
	ACGRA 13th Australian Cotton Conference, Gold Coast
	Rural R&D Corporations' NRM Group Conference
September	Technical Textiles and Non-wovens Association. Conference
	Silverleaf Whitefly Workshops, Dalby, Goondiwindi, St George
	Lysimeter Launch, Wee Waa
	On-Farm Energy Use Forum, Narrabri
	TIMS Conference, Goondiwindi
October	Young Australian Rural Network (YARN), Canberra
	ANCID Irrigation Conference, Darwin
	National Cotton Extension Team Workshop, Mt. Tambourine
November	Biosecurity Plan Launch, Dalby
	OHS Management, Melbourne
	Tajik delegation hosted, Narrabri
	EMS Pathways Ginning Workshop, Narrabri
	Land and Water Knowledge Bazaar, Gold Coast
	Australian Future Cotton Leaders Program, Narrabri

December	<p>Science in the Paddock, Canberra</p> <p>LWA Open Day, Canberra</p> <p>National Water Commission, Canberra</p> <p>Corporate Risk Management Workshop, Sydney</p> <p>ACIC Water Committee, Sydney</p>
2007	
February	<p>Beltwide Conference, New Orleans, USA</p> <p>Healthy Farming Families Workshop, Wee Waa</p> <p>Cotton Industry Disease Review, NSW and Queensland</p> <p>Governance Programs for New Director's Training, Brisbane</p> <p>Rural R&D Corporations' NRM Group</p>
March	<p>ABARE Outlook Conference, Canberra</p> <p>Northern Australia Cotton Development Conference, Brisbane</p> <p>AIAST National Conference on Education in Agriculture, Adelaide</p> <p>Rotary Schools Career tour, Wee Waa</p> <p>Cooperative Venture in Capacity Building Fast Track Workshop</p>
April	<p>Industries Skills Shortage Meeting, Sydney</p>
May	<p>National Cotton Extension Team Workshop, Mudgee,</p> <p>EMS Pathways Report, Moree</p> <p>Cotton Trade Show, Moree</p> <p>PISC Forum, R&D Collaboration, Canberra</p> <p>Cotton Seed Distributors 40th Anniversary, Wee Waa</p>
June	<p>Wincott Biodiversity Field Days, Goondiwindi & Mungindi</p> <p>IPM Workshop, Toowoomba</p> <p>Strategic Planning Forum, Canberra</p>



Appendix Three Tracking CRDC's Position: Strategic Plan 2003–2008

	2003–04	2004–05	2005–06	2006–07
	\$ million			
Cotton Crop Size (millions of bales)	1.5	2.8	2.6	1.2 (estimated)
Total Revenue	\$9.94	\$11.95	\$15.61	\$11.51
Industry levies	\$2.58	\$4.58	\$6.71	\$4.17
Australian Government contribution	\$4.77	\$4.32	\$4.91	\$4.58
Royalties	\$0.82	\$1.64	\$2.5	\$1.29
Interest	\$0.75	\$0.70	\$0.89	\$1.05
Other	\$1.02	\$0.71	\$0.6	\$0.43
Expenditure Total	\$12.6	\$12.62	\$12.79	\$11.89
Research and Extension Activities	\$11.34	\$11.11	\$11.14	\$10.12
Financial Assets	\$13.45	\$14.3	\$18.00	\$15.76

CRDC People

Number of Employees: total	12	12	11	12
Number of Employees: full time equivalent	9.7	11	11.6	11.6

Operating Statistics

Number of new R&D proposals received	78	52	100	48
Number of new R&D proposals approved	31	31	43	24
Number of continuing projects approved	111	70	55	72
Number of commissioned projects approved	12	21	32	9
Total number of R&D Projects managed	154	122	165	142
Total number of final reports received	41	11	60	55

These operating statistics include:

Total number of scholarship applications received	9	12	15	9
Total number of new scholarships awarded	2	3	6	4
Total number of travel grant applications received	8	15	22	10
Total number of travel grants awarded	7	12	19	7



Appendix Four Research and Development Portfolio

RESEARCH PROVIDERS

AAW	A&A Williams Pty Ltd	DAQ	Department of Primary Industries, Queensland
ANU	Australian National University	DNR	Department of Natural Resources and Mines, Queensland
BGC	Bill Gordon Consultancy	HEX	Hexima Ltd
CLW	CSIRO Land and Water	MU	Melbourne University
CottTech	CSIRO Plant Industries and Cotton Seed Distributors (CottTech Unincorporated Joint Venture)	NEC	National Centre for Engineering in Agriculture, University of Southern Queensland
CRC	Australian Cotton Cooperative Research Centre (pre July 2005)	QUT	Queensland University of Technology
CRC	Cotton Catchment Communities Cooperative Research Centre (post July 2005)	RIR	Rural Industries Research and Development Corporation
CRDA	Cotton Research and Development Corporation (sponsored activities)	UA	University of Adelaide
CRDC	Cotton Research and Development Corporation	ULA	La Trobe University
CSE	CSIRO Entomology	UNE	The University of New England
CSP	CSIRO Plant Industry	UQ	University of Queensland
CTFT	CSIRO Textile and Fibre Technology	USQ	University of Southern Queensland
DAN	New South Wales Department of Primary Industries (formerly New South Wales Agriculture)	UTS	University of Technology, Sydney
		US	The University of Sydney
		VDPI	Department of Primary Industries, Victoria

Program One: People & Knowledge

CRDC No.	Project Title	Researcher	Start Date	Cease Date
BGC001	Drift management extension strategy for the Northern Region (Commissioned)	Bill Gordon	1-7-06	30-6-09
CRC63	Delivering science to agribusiness: Smart approaches to cotton irrigation management (formerly CSPI64)	Dirk Richards	1-7-04	30-6-07
CRC64	Cotton Industry Development Extension Officer – Central Queensland	Doug Sands	1-7-05	30-6-08
CRC66	Cotton Industry Development Officer – Gwydir	Julie O'Halloran	1-7-05	30-6-07
CRC68	Cotton Training Coordinator	Mark Hickman	1-7-05	30-6-08
CRC93	Delivering Science to Agribusiness – Cotton Management Support Systems	Mike Bange	1-7-05	30-6-07
CRC98	Cotton Extension Support for Lower Namoi	Tracey Farrell	1-1-06	30-11-06
CRC103	Water-use Efficiency of Siphon-less Irrigation Systems	Emma Carrigan	2-11-05	30-6-07
CRC104	Effectiveness of Foliar Nutrition Trial	Lindsay Campbell	1-1-06	31-12-06
CRC115	Accelerating adoption of integrated soil management practices in irrigated cotton and grain (Commissioned)	Guy Roth	1-7-06	30-6-08
CRC123	Travel: Scientific Exchange Angus Crossan – CSIRO Field to Fabric Course, August 2006 (Contingency)	Angus Crossan	21-8-06	25-8-06
CRC142	Delivering Regional Extension in Qld Farming Systems – Darling Downs & Border Rivers (Commissioned)	Rod Gordon and Kate Charleston	1-2-07	30-6-09

CRCI43	Delivering Regional Extension in NSW cotton Farming Systems (Commissioned)	James Hill & Sally Morgan	25–6–07	30–6–10
CRCI45	2006 Boyce Cotton Comparative Analysis (Commissioned)	David Newnham	1–1–07	30–6–08
CRDA003	Contribution to the Chris Lehman Trust (Contingency)	CRDC	1–9–06	30–6–09
CRDA005	2006 Farming Systems Forum	CRDC	1–8–06	31–8–06
CRDA009	Sponsorship of entry to A.C.E.C. for Rotary Youth Tour, March 2007	CRDC	1–3–07	30–6–07
CRDC190C	Farm Health & Safety Joint Venture (RIRDC)	Bruce Pyke	1–7–02	30–6–07
CRDC246	Wincott Inc – Women's Industry Network Cotton	Helen Dugdale	1–9–04	30–8–06
CRDC273	Sustainable Farm Families Project Joint Venture (RIRDC)	Bruce Pyke	1–7–05	30–6–07
CRDC275	Cooperative Venture for Capacity Building Joint Venture (CVCB) (RIRDC)	Bruce Pyke	1–7–05	30–6–07
CRDC287	ACGRA 13th Australian Cotton Conference, August 2006	David Swallow	1–05–06	8–10–06
CRDC288	Sponsorship of post-graduates to attend 13th Australian Cotton Conference, Gold Coast August 2006 (Contingency)	Bruce Pyke	1–07–06	31–08–06
CRDC293	Travel: Greg Parle – ICAC 65th Plenary Meeting, Brazil, September 2006	Greg Parle	8–9–06	14–9–06
CRDC298	Sponsorship of Two Scholarships to Cotton Production Course (Contingency)	CRDC	1–3–07	30–11–08
CRDC299	Rural Industries & Carbon Trading: Opportunities, barriers and risk management (Joint project) (Contingency)	Michael Robinson, LWA	1–3–07	30–6–07
CRDC300	Sponsorship of researchers to attend 4th World Cotton Conference, USA in September 2007 (Contingency)	CRDC	1–4–07	30–9–07
CRDC301	Travel: Greg Parle – Attend 7th meeting of C.S.I.T.C. Task Force, Switzerland in March 2007 (Contingency)	Greg Parle	17–3–07	20–3–07
CRDC302	Support for the Cotton Australia Leadership Program (Contingency)	Simon McInnes	1–6–07	30–6–08
CRDC303	Contribution to Agrifood Awareness (Contingency)	Paula Fitzgerald	1–1–07	30–6–07
CRDC307	2007 DAFF Science & Innovation Awards (Contingency)	Janet Matthews	1–5–07	30–11–07
CRDC309	Travel: Hamish Millar – 2nd International Federation of Agricultural Producers World Congress of Young Farmers, Argentina, July 2007 (Contingency)	Hamish Millar	1–6–07	5–8–07
CRDC312	Sponsorship to ARLF–AVCLP Leadership Forum, Beechworth, June 2007 (Contingency)	CRDC	1–5–07	30–6–07
CRDC313	Sponsorship and support for ACSA Biannual Conference, 6 September 2007 (Contingency)	Tony Geitz	1–5–07	30–9–07
CRDC314	Sponsorship of mentors in "On the fast track – bringing capacity building research & practice together" CVCB project (Contingency)	Ruth Nettle	1–6–07	30–6–08
CRDC315	Travel: Alex Rogan – Scientific Study Tour, Russia (Contingency)	Geoff Burchfield	1–5–07	31–7–07
CRDC316	Cotton Management Support Systems Team – Enhancing product and service delivery (Consultancy)	Lionel Henderson	1–12–06	31–5–07
CRDC317	Cotton & Water Media Campaign (Contingency)	Gavin Anderson	1–3–07	30–6–07
CSP179	Travel: Elizabeth Dennis – International Cotton Genome Initiative, Brazil, September 2006	Elizabeth Dennis	9–9–06	17–9–06
CSP180	Travel: Augusto Becerra – Plant and Animal Genome Conference, California, January 2007	Augusto Becerra	12–1–07	22–1–07
CSP181	Enhancing Cotton Research Capacity at ACRI through Superior IT Support	Tony Pfeiffer	1–7–06	30–6–07
DAQ137	Aligning National Competencies with the Cotton Industry's best management guidelines for strategic training (Farmbis funding)	Mark Hickman	1–10–06	31–10–07
RIR10	Australian Rural Leadership Program – Course 13 (Ben Stephens)	Steve Clark	1–7–05	30–11–07
RIR11	Australian Rural Leadership Program – Course 14	Steve Clark	1–7–06	30–11–08

APPENDIX FOUR – RESEARCH AND DEVELOPMENT PORTFOLIO

VDPI001	Support of the Australian Agricultural and Natural Resources Online (AANRO) Database (Contingency)	Phillip Jones	1–7–05	30–9–10
TOTAL INVESTMENTS Program One		\$1,330,365.00		

Program Two: Integrated Natural Resource Management

CRDC No.	Project Title	Researcher	Start Date	Cease Date
ANU8C	Post-graduate: Karen Ivkovic – Development of a decision support system for water allocation in the Gwydir and Namoi Valleys (in conjunction with ANU7C)	Karen Ivkovic	1–9–02	30–9–06
ANU10	Rollout of WADss: Scoping project (Contingency)	Rebecca Letcher	18–6–07	18–12–07
CRC70	Post-graduate: Susan Lutton – Aquatic biodiversity and the ecological value of ring-tank water storages on cotton farms	Susan Lutton	11–10–04	11–5–08
CRC84	Post-graduate: Lisa Lee – Environmental and Economic Impact of Water Scarcity and Market Reform on the Mooki Basin	Lisa Lee	1–1–05	31–12–07
CRC99	Surface water and groundwater interconnectivity investigation – Upper Namoi NSW	Ian Acworth	1–7–05	30–6–08
CRC101	Capturing our understanding of soil water balance and deep drainage under irrigation	Mark Silburn	1–1–07	31–12–08
CRC105	Pesticide Remediation: Assessing application and integration with on-farm storage systems (Commissioned) – Project 1	Angus Crossan	1–7–05	30–6–08
CRC106	Advancing environmental values in cotton catchments using risk assessment – Project 2	Angus Crossan	1–7–05	30–6–08
CRC110	Post-graduate: Rhiannon Smith – Benefits of establishing and managing native vegetation on cotton farms in the Namoi Catchment	Rhiannon Smith	1–4–06	1–4–09
CRC125	Quantifying deep drainage and its contaminants under irrigated cotton	Anthony Ringrose-Voase	1–7–06	30–6–09
CRC133	Supporting the adoption of BMP in the Cotton Industry in the Namoi Catchment (In-kind support only)	Sheila Donaldson	1–9–06	30–8–09
CRDC297	Enhancing the uptake and implementation of BMP – e-BMP (Contingency)	Dan Hickey	1–4–07	31–7–07
CRDC304	Completion of WVUE Benchmarking tool	Dan Hickey	1–2–07	30–6–07
CRDC310	Pilot Study into BMP adoption practices and attitudes (Contingency)	Phil Kelly	7–3–07	30–6–07
QUT2	Benchmarking and reducing greenhouse gas emissions and improving resource use efficiency	Peter Grace	1–1–07	31–12–09
TOTAL INVESTMENTS Program Two		\$509,298.00		

Program Three: Crop Protection

CRDC No.	Project Title	Researcher	Start Date	Cease Date
CRC30C	Post-graduate – Ingrid Rencken: Role of native vegetation in harbouring beneficial insects and reducing insect pest damage in cotton	Ingrid Rencken	1–1–02	31–7–06
CRC73	Molecular factors determining <i>Thielaviopsis basicola</i> – cotton interactions leading to Black Root Rot disease	Lily Pereg-Gerk	1–7–04	30–6–07
CRC74	Mirid Predation	Mary Whitehouse	1–7–05	30–6–07
CRC77	Improving management of summer weeds in dryland cropping systems with cotton	Jeff Werth	1–7–05	30–6–08
CRC78	Post-graduate: Jason Moulynnox – Survival of the soil-borne fungal pathogen <i>Thielaviopsis basicola</i> in association with cotton and other plants	Jason Moulynnox	1–8–05	31–7–08
CRC81	Facilitating adoption of IPM in northern region broadacre farming systems (was DAQ132)	Melina Miles	1–7–04	30–6–08
CRC89	Supporting IPM for future cotton systems	Lewis Wilson	1–7–05	30–6–08

CRC94	Mortality of <i>Helicoverpa</i> in Bollgard II® cotton fields and implications for Bt resistance management (Commissioned)	Sharon Downes	1–7–05	30–6–08
CRC111	Post-graduate: James Hereward – Is the source of mirids in cotton derived from local dispersal or long distance migration?	James Hereward	1–3–06	28–2–09
CRC126	Validation of the critical period for weed control concept for the timing of herbicide applications in Roundup Ready Flex and other Herbicide tolerant cottons	Graham Charles	1–7–06	30–6–09
CRC135	Maximising the efficiency of Bt refuge crop (was CSE115)	Geoff Baker	1–7–06	30–6–09
CRC138	Post-graduate: TBA – Ecology of Fleabane (<i>Conyza</i> spp) (Commissioned)	Brian Sindel	1–1–07	31–12–09
CRC141	Honours: Rebecca Forbes – Pathogenicity factors involved in <i>T.basicala</i> -cotton interactions (Contingency)	Rebecca Forbes	20–2–07	30–11–07
CRDA004	Silverleaf Whitefly Workshop, 11–12 September 2006 (Workshops budget)	CRDC	11–9–06	12–9–06
CRDA007	2007 Disease Management Review (Workshops budget)	CRDC	1–1–07	30–6–07
CRDA008	Research & Extension in Bt Resistance (REFCOM) Meeting, Toowoomba, in June 2007 (Conferences budget)	CRDC	1–6–07	30–6–07
CSE109	Fitness and mechanism of resistance to Cry2Ab in <i>Helicoverpa armigera</i>	Rod Mahon	1–7–04	30–6–07
CSE112	Monitoring for resistance to transgenic cotton	Sharon Downes	1–7–05	30–6–08
CSE113	Release and post-release monitoring and follow up release of <i>Eretmocerus hayati</i> in cotton production areas	Paul de Barro	1–7–05	30–6–07
CSPI56C	The potential for native Fusarium to give rise to new cotton field pathogens	Bo Wang	1–1–04	30–6–07
CSPI65	Aphids – control, ecology and CBT resistance	Lewis Wilson	1–7–04	30–6–07
DANI77	Diseases of Cotton VIII	David Nehl	1–7–04	30–6–07
DANI79	IPM in Bollgard cotton – New tools and strategies: A farming systems approach	Robert Mensah	1–7–04	30–6–07
DANI84	Resistance management of aphids and mites in cotton	Grant Herron	1–7–05	30–6–08
DANI85	<i>Helicoverpa</i> spp. Insecticide Resistance: Monitoring, mechanisms and management	Louise Rossiter	1–7–05	31–3–07
DANI86	Insecticide resistance management in B-biotype Bemisia tabaci II	Robin Gunning	1–7–05	31–3–07
DANI87	Biochemical resistance mechanisms in <i>Helicoverpa</i> to Bacillus thuringiensis delta endotoxins II	Robin Gunning	1–7–05	31–3–07
DANI88	Severity factors in black root rot of cotton and new control measures	Susanna Driessen	1–7–05	30–6–08
DANI90	Survival & reproduction of the Fusarium Wilt fungus	Chris Anderson	1–7–06	30–6–09
DANI93	<i>Helicoverpa</i> spp. Insecticide Resistance: Monitoring, mechanisms and management (Contingency)	Louise Rossiter	20–3–07	30–6–08
DAQ130	Management of Fusarium wilt of cotton	Joe Kochman	1–7–04	30–6–07
DAQ131	Improved understanding of the damage, ecology and management of mirids and stinkbugs in Bollgard II	Moazzem Khan	1–7–04	30–6–07
DAQ133	Calibration and application of pupae detection dog	Greg Horrocks	1–11–04	30–6–08
DAQ134	Post-graduate: Jamie Hopkinson – Managing cotton aphids with parasitoids	Jamie Hopkinson	1–7–05	30–6–08
UQ36	Post-graduate: Joy Conroy – Investigating the roles of toxins and pathogenicity factors of <i>Fusarium oxysporum</i> f.sp. vasinfectum	Joy Conroy	14–2–05	13–2–08
UQ37	Post-graduate: Jennifer Whan – Investigation of the effects of Silicon application on the resistance of cotton to <i>Fusarium oxysporum</i> f.sp. vasinfectum	Jennifer Whan	1–7–05	30–6–08
TOTAL INVESTMENTS Program Three		\$3,415,363.00		

Program Four: Farming Systems				
CRDC No.	Project Title	Researcher	Start Date	Cease Date
CRC52C	Nutritional constraints to efficient cotton production	Ian Rochester	1–7–03	30–6–07
CRC56C	Post-graduate: Kylie Dodd – The Impact of Sodidity on Cotton Cropping Systems	Kylie Dodd	15–9–03	22–12–06
CRC71	Microbial biodiversity for soil health	David Midgeley	1–1–06	31–12–08
CRC80	Cotton crop management for improved fibre quality	Mike Bange	1–7–04	30–6–07
CRC83	Post-graduate: Stella Loke – Diversity of VAM fungi in soil health	Stella Loke	1–1–03	31–3–07
CRC85	Post-graduate: Nicola Cottee – Development of a method to determine thermotolerance in cotton cultivars	Nicola Cottee	14–3–05	14–3–08
CRC86	Maintaining profitability and soil quality in cotton farming systems II	Nilantha Hulugalle	1–7–05	30–6–08
CRC87	Advancing water management in the cotton industry	Eddie Parr	1–7–05	30–6–08
CRC88	Integrated Cotton Farming Systems for CQ	Richard Sequiera & Paul Grundy	1–7–05	30–6–08
CRC90	Postdoc: Rose Roche – Physiological basis for cotton yields – plant configuration	Rose Roche	1–1–05	30–6–08
CRC96	Deep drainage under irrigated cotton – surface and groundwater implications	Des McGarry	1–7–05	30–6–08
CRC112	Post-graduate: Alison Devereux – Quantifying effects of maize rotation on soil quality and nutrient availability on cotton growth and yield	Alison Devereux	1–8–06	30–6–09
CRC113	Post-graduate: Juan Wang – Subsoil nutrient management and stratification in cotton–grain rotations	Juan Wang	1–1–06	31–12–08
CRC127	Optimal production & water use of high retention cotton and other new technologies	Steve Yeates	1–7–06	30–6–09
CRC128	Plant & Soil factors optimising water use efficiency	James Nielsen	1–7–06	30–6–09
CRC129	Assessing Limited Water Management Strategies in Cotton Farming Systems	Jose Payero	1–4–07	31–3–10
CRC136	Management of Cotton Rhizosphere-microbe interactions for sustainable–improved cotton (was CSEI16)	Oliver Knox	1–7–06	30–6–09
CRC137	Post-graduate: Sam Alomari – Molecular analysis of proteobacterial communities in soil under cotton (Contingency – was US77)	Sam Alomari	1–7–06	30–6–09
CRC140	Post-graduate: John Bennett – Getting the best out of gypsum and lime to combat sodicity in the Macquarie & Lachlan Valleys (Commissioned)	John Bennett	5–3–07	4–3–10
CRDA006	Soil Ecology Research Group Workshop	CRDC	1–8–06	31–8–06
CSPI82	CSIRO Field Experiments @ ACRI	Greg Constable	1–7–06	30–6–07
DANI91	Operational Costs for Cotton Experiments	Tony Meppem	1–7–06	30–6–07
NECI1	Postdoc: Simon White – Optimised irrigation scheduling with the use of continuous 'real time' plant monitoring sensors (PMS) (Commissioned)	Simon White	1–9–05	30–8–08
NECI3	Desktop review of the use of polyacrylamide (PAM) in the Australian cotton industry (Contingency)	Sarah Hood	21–5–07	17–9–07
NECI4	Energy in Cotton (Contingency)	Craig Baillie	11–6–07	31–10–07
UNE39	Post-graduate: Subhadip Ghosh – Effect of organic amendments on soil quality and profitability in cotton farming systems	Subhadip Ghosh	1–8–04	30–6–07
USQ9	Post-graduate: Alison McCarthy – Optimal irrigation of cotton via real-time adaptive control of large mobile irrigation machines (Commissioned)	Alison McCarthy	5–3–07	8–3–10
TOTAL INVESTMENTS Program Four		\$2,097,896.00		

Program Five: Breeding & Biotechnology				
ANU9	Testing transgenic cotton carrying the I-2 resistance gene for resistance to Fusarium wilt	Brett Baillie	1–9–06	31–8–08
CottTech	CottTech Unincorporated Joint Venture	Lionel Henderson	1–9–05	1–12–08
CRC43C	Post-graduate: Derek Collinge – Gene silencing technologies to control <i>Helicoverpa armigera</i>	Derek Collinge	1–7–03	31–3–07
CSPI67	Cotton Biotechnology: Core Project	Danny Llewellyn	1–7–04	30–6–07
CSPI68	Unravelling the molecular basis for cotton fibre quality	Todd Collins	1–9–04	30–6–07
CSPI69C	Development of cottonseed oils with improved nutritional and functional properties	Qing Liu	1–7–04	31–12–07
CSPI70	Capital Item: Uster HVI	Greg Constable	1–7–04	30–6–07
CSPI77	Postdoc: Adriane Machado – Cotton fibre improvement by silencing fuzz fibre development	Adriane Machado	1–10–05	9–10–08
CSPI84	CSIRO Fibre Quality Lab	Greg Constable	1–7–06	30–6–07
UA17	Analysis and Optimisation of cotton fibre-specific gene promoters	Yinghong Liu	1–7–06	30–6–09
TOTAL INVESTMENTS Program Five		\$1,297,469.00		

Program Six: Value Chain				
CRDC No.	Project Title	Researcher	Start Date	Cease Date
CRC91	Commercial Preparation of SiroMat	Stuart Gordon	1–7–05	30–6–07
CRC130	Linking Farming Systems to Fibre Quality & Textile Performance	Stuart Gordon & Michael Bange	1–7–06	30–6–09
CRC131	New Ginning Technology for Australian Cotton – Modified Lint Cleaner (COMMERCIAL-IN-CONFIDENCE)	Stuart Gordon	1–7–06	30–6–09
CRC132	New Ginning Technology for Australian Cotton – Moisture & Contamination	Stuart Gordon	1–7–06	30–6–09
CRDC251	EMS Pathways project	Alan Williams	1–6–04	30–6–07
CRDC294	Harvesting in the Australian Cotton Industry: The practices and their impact on the quality of the Australian crop (EMS Pathways funding)	Rebecca Smith	31–8–08	5–2–07
CRDC295	Ginning for Quality – Best Management Practice (EMS Pathways funding)	Ralph Schulzé	11–9–06	30–11–06
CRDC296	Support for Field to Fabric Course, November 2006 (Contingency)	CRDC	1–11–06	30–11–06
CRDC305	Tracking Australian Cotton (EMS Pathways and Commissioned funding)	Technopak	1–5–07	31–7–07
CRDC308	Supply-chain Track & Trace for Australian 'BMP' cotton – A Pilot Project (EMS Pathways funding)	Tim Wilson, Historic Futures	1–5–06	30–6–07
CRDC311	Support for Field to Fabric Course, July 2007 (Contingency)	CRDC	1–5–07	31–7–07
CTFT14	Cottonscan for Rapid Measurement of Fibre Maturity and Fineness	Geoff Naylor	1–7–05	30–6–07
CTFT16	Improving the Nep Levels in Australian Cotton	Rene van der Sluijs	1–7–06	30–6–09
CTFT17	International inter-laboratory trials to develop reference cottons for fibre maturity and fineness	Graham Higgerson	1–7–06	30–6–08
CTFT18	Premium Cotton Blends (Contingency)	Rene van der Sluijs	18–9–06	31–1–07
CTFT19	Audit of cotton gins (EMS Pathways funding)	Rene van der Sluijs	1–4–07	31–7–07
CTFT20	Review of Management of Moisture in Australian Cotton from the Module through to the Bale (EMS Pathways funding)	Rene van der Sluijs	8–5–07	8–8–07
TOTAL INVESTMENTS Program Six		\$834,833.00		
TOTAL R&D INVESTMENTS 2006–2007		\$9,485,224		



Appendix Five Final Project Reports 2006–07

Project Title	Researcher
Travel: Ray Akhurst – 5th Pacific Rim Conference on Biotech, Canada	Ray Akhurst
Honours: Joanna Sundstrom – Functional analysis of cotton transcription factors	Joanna Sundstrom
Postgraduate: Adriane Machado – Gene discovery in cotton fibre initiation and development by comparing cotton lintless mutants to wild type on cotton ovule cDNA microarrays (IP)	Adriane Machado
Travel: Oliver Knox – Pacific Rim Conference, Victoria, Canada	Oliver Knox
Travel: David Hamilton – 2006 Cotton Beltwide Conference, San Antonio USA – Contingency	David Hamilton
Textile Processing of Variety Trials 2004	Rene van der Sluijs
Evaluation of the Aust. Cotton Industry EMS National Pilot Project	Hassalls & Associates
Triple Bottom Line Reports from Cotton Consultants Australia	Brendan Doyle
Travel: Michael Bange – Beltwide Cotton Conference 2006 and Texas A&M University (College Station)	Michael Bange
Travel: Warwick Stiller – 13th Australasian Plant Breeding Conference, NZ	Warwick Stiller
Travel: Ralph Schulze – 28th International Cotton Conference, Bremen	Ralph Schulze
Spray Drift Workshop Report Darling Downs 2006	Dan Hickey
Improved application and formulation of viral biopesticides against <i>Helicoverpa</i>	Caroline Hauxwell
Postgraduate – John Humphries: Analysis of TTGI homologues in cotton for roles in fibre initiation	John Humphries
Travel: Greg Parle – ICAC 65th Plenary Meeting, Brazil in September 2006	Greg Parle
Improving infiltration of irrigation water under centre Pivots and Lateral Moves	Joe Foley
Postgraduate: Simon White – Partial root zone drying and regulated deficit irrigation for cotton using large mobile irrigation schemes	Simon White
Postgraduate: Damien Lightfoot – Fibre improvement through modulation of transitions in cotton development	Damien Lightfoot
Travel: Scientific Exchange Derek Collinge – 7th International Workshop on Molecular Biology & Genetics, Crete	Derek Collinge
2005–06 CCA Chemical Audit	Brendan Doyle
Masters: Leah MacKinnon – Insectivorous bats, irrigated cotton, indigenous vegetation remnants and intensive production landscapes	Leah MacKinnon
Development of a field method for measuring deep drainage potential	Alex McBratney
Wincott Inc – Women’s Industry Network Cotton	Helen Dugdale
ACRI Computing and Network Support	Tony Pfeiffer
Quantifying deep drainage using lysimetry	Anthony Ringrose-Voase
Rhizosphere biological functions as influenced by GM cotton	Oliver Knox

Project Title	Researcher
Reducing losses of nitrogen from cotton rotation systems	Peter Grace
Ecology of <i>Helicoverpa</i> in relation to transgenic cotton and the efficiency of refuge crops	Geoff Baker
Trichogramma incidence in cotton and grains growing regions of Australia – Consequences for <i>Helicoverpa</i>	Kirsten Scott
Tracking <i>H. armigera</i> migration and the accumulation of insecticide resistance	Kirsten Scott
Genetics of Bt resistance in <i>H. armigera</i> : Resistance to Cry2Ab	Rod Mahon
Damage syndromes, economic thresholds & tolerance of cotton green mirids	Brian Duggan/Lewis Wilson
Expanding WEEDpak: developing integrated weed management packages for the cotton farming systems	Graham Charles
Severity factors in Fusarium wilt of cotton	Chris Anderson
Water relations of the cotton plant	James Nielsen
Physiology of high retention cotton crops	Steve Yeates
CSIRO Field Experiments at ACRI	Greg Constable
Operational costs for cotton experiments	Tony Meppem
Managing Bollgard II cotton farming systems in Southern Qld	Brad Scholz/David Murray
Breeding improved cotton varieties	Greg Constable
CSIRO Plant Breeding Fibre Quality Laboratory	Greg Constable
Evaluation of transgenic cotton with altered fibre traits	Sharon Orford
Interlaboratory trials for fibre maturity reference samples	Geoff Naylor
Scoping Study – New Ginning Technology	Stuart Gordon
Improved quality of ginned Australian cotton: Development of new gin machinery	Stuart Gordon
"Water Wise" Exhibition	Sandy Young
Travel: Greg Parle – 7th meeting of C.S.I.T.C. Task Force, Switzerland in March 2007	Greg Parle
Travel: Liz Dennis – International Cotton Genome Initiatives Conference, Brazil in September 2006	Elizabeth Dennis
Honours: Effectiveness of foliar nutrition	Meredith Errington
Travel: Scientific Exchange Stella Loke – 5th International Conference on Mycorrhizas, Spain in July 2006	Stella Loke
CCA 2006 Survey Program – Reporting on the 2005/06 Cotton Season	Brendan Doyle
Postgraduate: Karen Ivkovic – Development of a decision support system for water allocation in the Gwydir and Namoi Valleys	Karen Ivkovic
Postgraduate – Rose Roche: Training in crop physiology – Physiological determinants of Ultra Narrow Row Cotton	Rose Roche
Travel: Moazzem Khan – 2nd International Lygus Symposium, Monterey, USA in April 2007	Moazzem Khan



Appendix Six Acronyms and Terminology

ABARE	Australian Bureau of Agricultural and Resource Economics
ACC	Australian Cotton Centre
ACGRA	Australian Cotton Growers' Research Association
ACIC	Australian Cotton Industry Council
ACIPA	Australian Centre for Intellectual Property in Agriculture
ACCRC	Australian Cotton Cooperative Research Centre (also Cotton CRC)
ACGRA	Australian Cotton Growers Research Association
ACRI	Australian Cotton Research Institute
ai/ha	Active ingredient per hectare
ANAO	Australian National Audit Office
ANCID	Australian National Committee on Irrigation and Drainage
APVMA	Australian Pesticides and Veterinary Medicines Authority
ARLP	Australian Rural Leadership Program
ARRIP	Australian Agricultural Research in Progress database
AWAF	Department of Agriculture and Food, Western Australia
AWM	Area Wide Management
Bollgard II®	Cotton varieties contain two genes resistant to <i>Helicoverpa</i> spp.
BMP	Best Management Practices
BRS	Bureau of Rural Sciences
<i>Bt</i>	<i>Bacillus thuringiensis</i> (crystal protein gene expressed in Ingard® and Bollgard II® cotton varieties)
CA	Cotton Australia
CAC Act	<i>Commonwealth Authorities and Companies Act 1997</i>
CCA	Cotton Consultants Australia Inc.
Cotton CRC	Australian Cotton Cooperative Research Centre (finished June 2005)
CCC CRC	Cotton Catchments Communities Cooperative Research Centre
CMA	Catchment Management Authority
CRC	Cooperative Research Centre
Corporation, the	Cotton Research and Development Corporation
CRDC	Cotton Research and Development Corporation
CSD	Cotton Seed Distributors Ltd (a grower-owned cooperative)
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CVCB	Cooperative Venture in Capacity Building and Innovation in Rural Industries' after CSIRO
Department, the	refers to the Australian Government Department of Agriculture, Fisheries and Forestry
DOFA	Australian Government Department of Finance and Administration
ESD	Ecologically Sustainable Development
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
FH&SJB	Farm Health & Safety Joint Venture
GM	Genetically modified

GMAC	Genetic Manipulation Advisory Committee
GOA	Groundrig Operators Association
GRDC	Grains Research and Development Corporation
ha.	Hectare
<i>Helicoverpa</i> spp.	Cotton's major insect pests (<i>H. armigera</i> and <i>H. punctigera</i>)
Heliiothis	Insect pest, more properly known as <i>Helicoverpa</i> spp. (<i>H. armigera</i> and <i>H. punctigera</i>)
IBP	Industry Biosecurity Plan
ICAC	International Cotton Advisory Committee
Ingard®	Cotton varieties containing one <i>Bt</i> gene resistant to <i>Helicoverpa</i> spp. (superseded by Bollgard II® species with two genes of resistance)
IP	Intellectual Property
IDM	Integrated Disease Management
IPM	Integrated Pest Management
IWM	Integrated Weed Management
LWA	Land and Water Australia
MDBC	Murray-Darling Basin Commission
MLA	Meat and Livestock Australia
MP	Member of Parliament
NFF	National Farmers' Federation
NHT	Natural Heritage Trust (Australian Government)
NPSI	National Program for Sustainable Irrigation
NRM	Natural Resource Management
NSW	New South Wales
NSW DPI	Department of Primary Industries, New South Wales
NSW DNR	Department of Natural Resources, New South Wales
OGTR	Office of the Gene Technology Regulator
PIERD Act	<i>Primary Industries and Energy Research and Development Act 1989</i>
Pima cotton	<i>Gossypium barbadense</i> . Related to Egyptian cotton, having extra long and fine staples. Limited Australian production in the Darling region.
QDPI&F	Department of Primary Industries and Fisheries, Queensland
QNRM&W	Department of Natural Resources and Water, Queensland
RIRDC	Rural Industries Research and Development Corporation
RRDCC	Rural Research and Development Chairs' Committee
TIMS	Transgenic and Insect Management Strategy Committee
TRC	Technology Resource Centre (at the Australian Cotton Research Institute)
'Upland' cotton	<i>Gossypium hirsutum</i> . Comprises the vast majority of the Australian cotton crop
YARN	Young Australian Rural Network



Appendix Seven Compliance Index

ANNUAL REPORT REQUIREMENTS – CAC ACT

A. REPORT OF OPERATIONS

Preliminary

Exemptions from requirements	nil
Certification by Directors	iii

Division 1: Overview

Standards of presentation

Constructed in the interest of users	all pages
Freedom from ambiguity and jargon	all pages
Appropriate tables, graphs etc	all pages
Report by Chair and Executive Director	1–3
Obtaining information from subsidiaries	n/a

Division 2: General information

Enabling legislation and responsible Minister

Enabling legislation	81
Responsible Minister	82

Organisational structure

Location of offices	74
---------------------	----

Review of operations and future prospects

Statutory objects and functions	81–82
Corporate plan	31–73
Principal outputs and contribution to outcomes	84; 31–73
Efficiency and effectiveness of operations	14; 31–73; 91–114
Links between outcomes, strategies and principal outputs	14; 31–73
Factors influencing performance	1–3; 12–14
Significant events	87
Operational and financial results	12–14; 31–73; 91–114
Significant changes in the state of affairs	87
Developments since the end of the financial year	nil

Judicial decisions and reviews by outside bodies

Effects of Ministerial directions

Notifications of general Government policies	74; 81; 82–83
Reason for any non-compliance	82–83

Division 3: Specific information

Particulars of Directors

Details of Directors	75–78
Board meetings	79

Statement on governance

Corporate governance practices	17; 75; 80; 84
Board committees	79–80
Board training, review, advice, business risk and ethical standards	75; 79; 83

Indemnities and insurance premiums

80

Division 4: Miscellaneous

Other statutory requirements

Compliance with reporting obligations under legislation all pages

Other legislative reporting requirements

Occupational Health and Safety 86

Freedom of Information 86

Ecologically Sustainable Development 86–87

Fraud control 79; 84

Disability strategy 87

B. FINANCIAL STATEMENTS 91–114

C. AUDITOR GENERAL'S REPORT 88–89

ANNUAL REPORT REQUIREMENTS – PIERD ACT

Annual Report requirements

R&D activities 5–11; 27–29; 31–73

R&D expenditure 13–14; 31; 42; 48; 58; 64; 69; 91–114; 119–124

Ecologically Sustainable Development R&D 5–7; 42–47

Revisions of R&D plan nil

Entering into agreements nil

Patents nil

Activities or formation of companies nil

Property transactions nil

Achievement of strategic and annual planning objectives 31–73

Achievement of PIERD Act objects 31–73; 81–82

Sources and expenditure of funds 12–14; 91–114

Selection Committee Report 115

Other reporting requirements

Rural R&D Priorities 25–28

National Research Priorities 25–28

Table of expenditure on Rural R&D Priorities 26

Table of expenditure on National Research Priorities 26

Funding of authorised industry organisation 87

Statement of Expectations

Australian Government Statement of Expectations 23

CRDC Statement of Intent – progress towards implementation 23–24



Appendix Eight Subject Index

- acala type cotton, 68
- accountability, 24
- ACIL Tasman, 15
- adoption of research outcomes that is leading to improved and more sustainable management practices, 11
- advertising agencies
 - payment to, 87
- Agricultural Pesticides and Veterinary Medicines Authority (APVMA), 54
- agronomic and management practices see Program Six: Value Chain, strategy 2
- Annual Operating Plan, 1, 2, 23, 24, 25, 81–82, 83, 84
- Annual Report, 23
- aphids, 57
- Appropriate Internet and Email Access, 4, 83
- Audit Committee, 79–80
 - and fraud control, 84
 - and review of risk management framework and risk register, 4, 79
- Australian Agricultural and Natural Resources Online (AANRO) Database, 86
- Australian Cotton Conference (biennial), 82
 - see also 13th Australian Cotton Conference
- Australian Cotton Ginners Association, 68
- Australian Cotton Growers' Research Association (ACGRA), 22, 24, 81, 83, 84
 - activities undertaken on annual basis, 87
 - and Cotton Industry Biosecurity Plan, 29, 50
 - and Decision Support Steering Group, 38
 - and EMS Pathway project, 72
 - and extension services, 11
 - financial contribution to, 87
 - and 13th Australian Cotton Conference, 33
- Australian Cotton Industry Council (ACIC), 24, 40, 81
- Australian Cotton Research Institute (ACRI), 60, 74
 - Moree Rotary 'Careers in Cotton' tour of, 10
- Australian Cotton Shippers Association (ACSA), 8, 68, 70
- Australian government
 - and CRDC, 23–24
- Australian Government Property Ownership Policy, 82
- Australian National University, 66
- Australian Quality Training Framework, 36
- Australian Resistance Management Plan for Ingard® and Bollgard® biotechnology and IrriMate™, 15
- Australian Weed CRC, 54
- Best Management Practice (BMP), 44, 45, 68, 69, 71, 72
 - extension of to post farm gate issues, 69, 71, 73
 - growers and, 2
 - manual, 2, 6, 27, 38, 39, 44, 45
 - and National Research Priorities and Rural R&D Priorities, 27
 - on-farm adoption of, 73
 - and on-farm practice change, 45
 - and water use efficiency, 60
 - see also Cotton BMP Program; e-BMP; increased adoption of Best Management Practices (BMP) that meets legal requirements, industry benchmarks and catchment scale targets; Program Two: Integrated Natural Resource Management, strategy 1
- Best Management Practices and the Environment, 87
- Best Management Practices Code, 2
- biodiversity, 42
- Biodiversity Field Days, 37
- biopesticides, 29, 51, 52
- biosecurity, 30
 - see also Cotton Industry Biosecurity Plan
- biotechnology, 3, 10, 49
 - see also CottTech suite of cotton biotechnology projects; Program Five: Plant Breeding and Biotechnology; Program Six: Value Chain, strategy 1
- Biotechnology and Integrated Pest Management, 28
- Black root rot, 55, 56
- BMP certification, 6, 44, 45
- BMP General Manager, 6, 45
- BMP Land and Water Management module, 2, 36, 44, 45, 59, 61
 - survey, 6
- BMP Land and Water module, 27, 33
- BMP Minimum Certification Standards, 6, 45
- Board
 - appointments, 74
 - composition, 74, 75–78
 - conflicts of interest, 80
 - directors' responsibilities, 75
 - expertise, 74
 - external review of operations of, 4
 - functions, 75
 - indemnities, 80
 - induction and training, 75
 - meetings, 79
- Board Charter, 3, 4, 84

- Board Committees, 79–80
- Bollgard II®, 5, 7, 28, 47, 49, 51, 56, 57, 65, 66
- Boyce Chartered Accountants, 40, 62
- brand based on fibre quality, 73
- breeding program see Program Six: Value Chain, strategy 1
- Bt* cotton, 5, 52, 57, 63
 - see also Bollgard II®
- Business Plan, 45

- Capacity Building Joint Venture see Joint Venture for Capacity Building
- carbon trading, 1
- catchment and landscape programs, 42
- Catchment Management Authorities, 40
 - and environmental performance indicators for cotton, 2
 - and Extension Team, 32
 - and Healthy Soils for Sustainable Farms, 61
 - and on-farm practice change, 45
 - and water use efficiency, 59
- catchment water quality, 46
- Certified Irrigation Manager credentials, 36
- chain of custody requirements, 73
- Chair
 - new, 3
 - report, with Executive Director, 1–3
 - retiring see Jackson, Bridget
- classing system see Program Six: Value Chain, strategy 4
- climate change, 1
 - see also climate variability and climate change; Program Two: Integrated Natural Resource Management, strategy 5
- climate variability and climate change, 25, 30
- Code of Conduct for Directors and staff, 84
- collaboration and cooperation, 15, 16, 28
 - see also key R&D partner organisations and individuals; Program One: People and Knowledge, strategy 7
- Commonwealth Authorities and Companies Act 1997* (CAC Act), 24, 80, 81, 82–83, ^83, 84, 87
- Commonwealth Disability Strategy, 87
- Commonwealth Fraud Control Guidelines, 82
- Commonwealth Fraud Investigation Manual, 84
- Commonwealth government contributions, 12, 14
- communication, 115
- conferences and exhibitions, 29
- consultants see contractors and consultants
- contractors and consultants, 85
- cooperation see collaboration and cooperation
- Cooperative Venture in Capacity Building (CVCB), 28, 35, 37, 40
 - On the Fast Track cotton extension project, 11, 35
- corporate governance, 74–87
- corporate highlights, 4
- corporate planning, 84
- corporate standards, 17
- cotton agronomy
 - research on see Program Four: Farming Systems, strategy 5
- Cotton and Grains irrigation management workshops, 36
- Cotton Australia
 - and BMP certification, 6, 45
 - and BMP General Manager, 6, 45
 - and BMP Land and Water module, 33
 - and BMP manual, 2, 27, 39
 - and Cotton Basics, 36
 - and Decision Support Steering Group, 38
 - and e-BMP, 2, 27, 39
 - and Extension Team, 32, 33
 - and Future Cotton Leaders Leadership Program, 37
 - Grower Services Managers and Best Management Practices Implementation Officers, 38, 44
- Cotton Basics, 36
- Cotton BMP program, 6, 27, 39, 42, 44
 - review of re OH&S, 39, 44
- Cotton Catchment Communities CRC, 2, 28, 39
 - and Australian Cotton Research Institute, 74
 - and BMP General Manager, 6, 45
 - collaboration with, 4, 9, 15, 21, 40, 87
 - and Cotton Comparative Analysis, 40, 62
 - and Farming Systems Forum, 11, 62, 87
 - and fleabane management, 54
 - and greenhouse gas calculator, 47, 61
 - and greenhouse gas emissions, 47, 61
 - and Healthy Soils for Sustainable Farms, 61
 - and industry-wide extension network, 82
 - and on-farm water storage, 46
 - and rhizosphere interactions of GM and non-GM cotton cultivars, 47
 - and Roundup Ready® and Roundup Ready Flex®, 54
 - and water use efficiency benchmarking, 59
 - and Wincott, 37
- Cotton Comparative Analysis, 40, 62
- Cotton Consultants Australia, 6, 45
- Cotton CRC, 6, 32, 35, 45, 53, 59
- cotton disease research
 - external review of, 4, 54–55, 83
 - see also Program Three: Crop Protection, strategy 3
- cotton EMS Pathway project, 46
 - see also EMS Fibre Pathways project
- cotton extension project
 - within Cooperative Venture in Capacity Building On the Fast Track project, 11
- Cotton Extension Team, 32–33, 44, 59
 - see also Extension Team; National Cotton Extension Team
- cotton farms, 20
 - environmental performance on, 73
- cotton fibre quality see fibre quality; improved cotton fibre quality that meets market and spinner needs
- Cotton Field to Fabric Training Course: Managing for Quality through the Production Chain, 9, 35, 36, 37, 71
- cotton greenhouse gas calculator, 1, 27, 47, 61
- cotton growers
 - levy, 12, 14
 - reduced numbers of, 9, 20
 - and retail interests, 73

- cotton industry, 1, 20–21
 - and drought, 1, 2, 8, 9, 10, 12, 14, 21
 - environmental footprint, 10
 - priorities, 30
 - structure, 21
 - women in, 29
- Cotton Industry Biosecurity Group, 50
- Cotton Industry Biosecurity Plan, 29, 50
- Cotton Levy Act 1982*, 81
- Cotton Pest Management Guide*
 - evaluation of, 11
- cotton premiums, 70
 - see also Program Six: Value Chain, strategy 5
- cotton prices, 1, 8, 10, 12
- cotton production, 1, 2, 12, 14, 20, 21
 - and drought, 20, 68
 - public perception of, 42
- Cotton Production Course, 35
- Cotton Research and Development Corporation (CRDC), 16–19, 74
 - accountability, 24
 - and Australian government, 23–24
 - government policies, 23
 - Statement of Expectations, 23, 83
 - Board see Board
 - communication, 24
 - corporate governance, 74–87
 - financial statements, 88–114
 - legislation, 81
 - functions under, 81–82
 - mission, 16
 - organisational structure, 85
 - outcome, 16
 - performance reporting, 23
 - powers, 82
 - Report of Operations, 31–87
 - research accountabilities, 83
 - roles, 23
 - Statement of Intent, 23
 - vision, 16
- cotton row spacing, 62–63
- cotton stocks
 - unsold, 69
- cotton textile and oilseed marketplace see Program Five: Plant Breeding and Biotechnology, strategy 4
- cotton varieties, 28, 29, 65–66
 - with appropriate fibre and seed characteristics see Program Six: Value Chain, strategy 1
 - and fibre fineness, 70
 - management and breeding of higher yielding, disease, insect and herbicide tolerant, 7
 - regionally adapted see Program Five: Plant Breeding and Biotechnology, strategy 1
 - see also rhizosphere interactions of GM and non-GM cotton cultivars
- cotton yield, 10
 - see also improved yield (through improved management and breeding of higher yielding, disease, insect and herbicide tolerant cotton varieties)
- COTTONpak, 39, 53, 60
- Cottonscan, 72
- cottonseed, 69, 70
 - oil, 69, 70, 73
 - see also Program Five: Plant Breeding and Biotechnology, strategy 4
- CottTech suite of cotton biotechnology projects, 29, 67
- Council of Rural Research & Development Corporations, 23
- Council of Rural Research & Development Corporations' Chairs, 15
- crop nutrition management see Program Four: Farming Systems, strategy 3
- Crop Protection see Program Three: Crop Protection
- Crossan, Dr Angus
 - on benefits of CRDC travel grants, 34
- CSIRO, 15, 32, 38
 - core plant breeding program, 65, 66
 - cotton breeding and biotechnology program, 28, 29
 - and cotton fibre quality, 70
 - and cottonseed oil, 70
 - and FIBREpak, 38
 - and rhizosphere interactions of GM and non-GM cotton cultivars, 47
 - and water use efficiency, 59
- CSIRO Plant Industry and Cotton Seed Distributors Ltd, 67
- CSIRO Textile and Fibre Technology, 35, 71, 72
- Decision Support Development Team, 38
- Decision Support Program, 38
- Decision Support Steering Group, 38
- decision support systems see Program One: People and Knowledge, strategy 4
- deep drainage, 27, 46, 60, 61
 - see also Program Four: Farming Systems, strategy 2
- Department of Agriculture, Fisheries and Forestry, 37, 40
 - and CRDC, 23, 24
- Department of Education, Training and the Arts (Qld), 36
- Department of Finance and Administration and CRDC, 23
- Department of Primary Industries and Fisheries (Qld), 32, 57, 59
- Department of Primary Industries (NSW), 32, 51, 59
- disease threats, 29
- documents
 - categories of, 86
- double haploid system of breeding, 66–67
- drought
 - and cotton industry, 1, 2, 8, 9, 10, 12, 14, 21
 - and cotton production, 20, 68
 - and R&D funding, 38
- dryland (non-irrigated) cotton, 20, 52, 54
- e-BMP, 2, 6, 27, 38, 39, 44, 45
- ecologically sustainable development and environmental performance, 86–87

- economic objectives
 - improved cotton fibre quality that meets market and spinner needs, 8
 - improved yield (through improved management and breeding of higher yielding, disease, insect and herbicide tolerant cotton varieties), 7
 - increased profitability through better whole farm management, 8
 - see also Output 1 – Economic: profitability and international competitiveness
- economic performance
 - tracking, 7–8
- empowered people and communities see Planned Social Output: empowered people and communities
- EMS Fibre Pathways project, 2, 8, 28, 68, 71, 72–73
 - see also cotton EMS Pathway project
- energy use, 1, 2, 11, 62
- e-Newsletters, 115
- ENTOpak, 39
- Environment and Water Team, 33, 44
- Environment Protection and Biodiversity Conservation Act 1999*, 86
- environmental footprint
 - cotton industry, 10
- environmental management systems see Program Two: Integrated Natural Resource Management, strategy 2
- environmental objectives
 - improved water use efficiency (WUE), 7
 - increased adoption of Best Management Practices (BMP) that meets legal requirements, industry benchmarks and catchment scale targets, 6
 - industry-wide adoption of improved integrated pest management systems, 5
 - industry-wide adoption of improved integrated weed management systems, 6
 - see also Output 2 – Environmental: sustainable production systems and catchments
- environmental performance
 - tracking, 5–7
- environmental performance indicators for cotton, 2
- environmental performance on cotton farms, 73
- equal employment opportunity, 86
- Equal Employment Opportunity and Harassment Policy, 4, 83, 86, 87
- Ertmocerus hayati*, 51
- Executive Director
 - and fraud control, 84
 - report, with Chair, 1–3
- executive summary, 1–15
- expenditure
 - 2006–07, 13
 - coming year, 14
- Extension, Education and Training
 - implementation of recommendations of review of, 29, 32
- Extension Officers
 - recruitment of new, 1
 - see also Regional Extension Officer positions
- extension services, 11
 - Extension Team, 32–33, 44
 - workshop, 11, 32
 - see also Cotton Extension Team; National Cotton Extension Team; National Water Extension Team; Water Extension Team
 - Extension Team agronomist, 33
- F rank, 55, 56
- farm carbon footprint, 2
- Farm Health and Safety Joint Venture, 28, 39, 40
- farm management strategies see Program Two: Integrated Natural Resource Management, strategy 3
- FarmBis Queensland, 36
- Farming Systems see Program Four: Farming Systems
- Farming Systems Forum, 11, 62, 87
- Farmsafe Australia
 - OH&S training, 10
- fertiliser use, 2, 61
- fibre development, 66
- fibre initiation, 66
- fibre maturity, 72
- fibre measurement see Program Six: Value Chain, strategy 4
- fibre micronaire of Australian cotton, 70, 72
- fibre quality, 8, 66, 70, 71
 - brand based on, 73
 - see also Program Six: Value Chain, strategy 1; Program Six: Value Chain, strategy 2; Program Six: Value Chain, strategy 4
- FIBREpak, 38, 39
- Field to Fabric project, 8, 63, 70, 71
 - see also Cotton Field to Fabric Training Course: Managing for Quality through the Production Chain
- Final Project Reports 2006–07, 125–126
- financial highlights, 12–14
- financial position, 13
- financial statements, 88–114
- financial variations, 1
- fleabane, 54
- framework for evaluation of R&D investments, 15
- fraud control, 84
- Fraud Control Plan, 84
- Fraud Control Policy (Commonwealth government), 84
- freedom of information, 86
- Freedom of Information Act 1982*, 86
- furrow irrigation, 15, 46, 59, 60, 61, 63
- Fusarium wilt, 55–56
 - tolerance/resistance, 7, 28, 56, 66
 - see also F rank
- Fuscom Committee, 56
- Future Cotton Leaders Leadership Program, 37
- General Manager – Business and Finance
 - and fraud control, 84
 - and freedom of information, 86
- genes
 - and fibre initiation, 66
 - improved or novel see Program Five: Plant Breeding and Biotechnology, strategy 3
 - promoter, for fibre development, 66
 - that influence fibre quality, 66

- Geographic Information Systems (GIS)
 and salinity mapping, 60, 61
 germplasm, 3
 ginning practices, 68, 71
 improvements see Program Six: Value Chain,
 strategy 3
 glyphosate, 49, 53, 54, 65, 66
 GM cotton, 49, 59, 62
 see also rhizosphere interactions of GM and non-
 GM cotton cultivars
 'Good-i' clothing see *under* IZUMIYA
 Government Protective Security, 4, 83
 Grains Research and Development Corporation
 (GRDC), 32, 38, 49
 green mirids, 51
 greenhouse gas calculator see cotton greenhouse gas
 calculator
 greenhouse gas emissions, 27, 62
 agriculture and, 47
 BMP for, 44
 reduction of, 1, 10
 see also see Program Two: Integrated Natural
 Resource Management, strategy 5
 growers
 and Best Management Practice, 2
- healthy and resilient communities in cotton producing
 regions, 10
 Healthy Soils Extension Specialist, 32
 Healthy Soils for Sustainable Farms, 61
Helicoverpa armigera, 51, 57, 63, 66
 herbicide, 10
 residual, 6, 28, 46, 52
 riverine contamination by, 6, 19
 see also improved yield (through improved
 management and breeding of higher yielding,
 disease, insect and herbicide tolerant cotton
 varieties)
- highlights
 corporate, 4
 financial, 12–14
 Triple Bottom Line, 5–11
 HVI measurements, 69, 72
- improved cotton fibre quality that meets market and
 spinner needs, 8
 improved skills and qualifications of people at all levels
 of the industry, 9
 improved water use efficiency (WUE), 7
 improved yield (through improved management
 and breeding of higher yielding, disease, insect and
 herbicide tolerant cotton varieties), 7
 increased adoption of Best Management Practices
 (BMP) that meets legal requirements, industry
 benchmarks and catchment scale targets, 6
 increased profitability through better whole farm
 management, 8
 independent auditor's report, 88–89
 'Industry Partnerships – Corporate Governance for
 Rural Women' initiative, 37
 industry stakeholder reporting, 84
- industry-wide adoption of improved integrated pest
 management systems, 5
 industry-wide adoption of improved integrated weed
 management systems, 6
 information packages and tools see Program One:
 People and Knowledge, strategy 5
 information technology (IT) audit (annual), 83
 innovative precision agricultural systems see Program
 Four: Farming Systems, strategy 4
 insect and mite pest management see Program Three:
 Crop Protection, strategy 1
 insect threats, 29
 insecticide, 5, 10, 52
 resistance see Program Three: Crop Protection,
 strategy 4
 Insecticide Resistance Management Strategy (IRMS), 57
 integrated fame management practices see Program
 Four: Farming Systems
 Integrated Natural Resource Management see Program
 Two: Integrated Natural Resource Management
 Integrated Pest Management (IPM), 10, 49, 51, 62
 see also industry-wide adoption of improved
 integrated pest management systems; Program
 Three: Crop Protection
 Integrated Weed Management (IWM), 10, 49, 52–53,
 54
 see also industry-wide adoption of improved
 integrated weed management systems; Program
 Three: Crop Protection, strategy 2
 Intellectual Property Committee, 80
 intellectual property management, 80
 Intellectual Property Operating Principles, 80
 Intellectual Property Policy, 3, 80
 Intergovernmental Panel on Climate Change (PCC),
 27, 47
 International Mill Survey (2004), 68
 Irrigated Cotton/Grains Management Course, 36
 irrigation practices, 46
 and water use efficiency, 59, 60
 see also furrow irrigation
 irrigation workshops, 36–37
 Irrimate®, 59
 IZUMIYA
 and 'Good-i' clothing, 8, 46, 73
- Jackson, Bridget, 2, 3, 4, 74
 Joint Venture for Capacity Building, 15
- key R&D partner organisations and individuals, 41
 key targets, 19
 Knowledge Management in Cotton and Grain Irrigation
 project, 38, 40
- Land and Water Australia, 15, 61
 legislation, 81
 letter of transmittal, iii
 levy, 12, 14
 Liberty Link®, 7, 53, 54, 65, 67
 location of office, 74
 lysimeters, 60

- management practices see adoption of research outcomes that is leading to improved and more sustainable management practices
- management strategies
 - whole farm see Program Four: Farming Systems, strategy 4
- markets see Program Five: Plant Breeding and Biotechnology, strategy 4; Program Six: Value Chain, strategy 5
- Ministerial Directions, 82–83
- Ministers
 - powers and responsibilities, 82
- mission, 16
- mites, 57
- Moree Rotary 'Careers in Cotton' tour of the Australian Cotton Research Institute, 10, 35
- Murray-Darling Basin Commission, 40

- National Centre for Engineering in Agriculture, 15
- National Cotton Extension Team, 10, 11, 17, 27, 32, 61, 63, 82
- National Heritage Trust Initiative – Healthy Soils for Sustainable Farms, 32
- National Program for Sustainable Irrigation (NPSI), 1, 15, 28, 40, 59
- National Program or Sustainable Irrigation (NPSI), 38
- National Research Priorities, 23, 25–30, 65
 - addressing: inputs and outcomes, 27–29
- National Training Coordinator, 36
- National Water Commission
 - collaboration with, 15
- National Water Extension Team, 59
- National Water Research award, 60
- Natural Resource Management (NRM), 25, 30, 43
 - investments, 43
 - outcomes, 2
 - working group, 40
 - see also Program Two: Integrated Natural Resource Management; regional NRM catchment management targets
- Natural Resource Management Reporting Framework, 15
- nitrous oxide, 1, 10, 27, 47
- NutriLOGIC, 61
- NUTRIpak, 39

- objectives see Program output/objectives
- Occupational Health and Safety (Commonwealth Employment) Act 1991*, 86
- occupational health and safety (OH&S), 86
 - audit, 83, 86
 - and BMP, 39, 44
 - training, 10, 85, 86
 - see also Program One: People and Knowledge, strategy 6
- office location, 74
- Office of the Gene Technology Regulator (OGTR), 54
- oilseed marketplace see Program Five: Plant Breeding and Biotechnology, strategy 4; Program Six: Value Chain, strategy 1

- On-Farm Energy Use
 - Farming Systems Forum, 62
- on-farm practice change, 45
- on-line surveys, 11
- Operating Plan see Annual Operating Plan
- organisational structure, 85
- Outcome, 14, 16, 19
- outcomes
 - Program One: People and Knowledge, 31
 - Program Two: Integrated Natural Resource Management, 42
 - Program Three: Crop Protection, 48
 - Program Four: Farming Systems, 58
 - Program Five: Plant Breeding and Biotechnology, 64
 - Program Six: Value Chain, 69
- Output 1 – Economic: profitability and international competitiveness, 14, 18
 - see also economic objectives
- Output 2 – Environmental: sustainable production systems and catchments, 14, 18
 - see also environmental objectives
- Output 3 – Social: empowered people and communities, 14, 18
 - see also social objectives
- overseas travel for researchers, 9, 36
 - see also travel grants

- partner organisations and individuals, 41
- People and Knowledge see Program One: People and Knowledge
- performance reporting, 23
- pest management see industry-wide adoption of improved integrated pest management systems
- pesticide, 28, 49, 66
 - see also biopesticides
- Planned Economic Output: profitability and international competitiveness, 7–8, 14, 18, 87
- Planned Environmental Output: sustainable production systems and catchments, 5–7, 14, 18, 87
- Planned Social Output: empowered people and communities, 9–11, 14, 18, 87
- Plant Breeding and Biotechnology see Program Five: Plant Breeding and Biotechnology
- plant physiology
 - research on see Program Four: Farming Systems, strategy 5
- post farm gate sector, 72, 73
 - issues, 69
- post-doctoral projects, 29, 36
- post-doctoral targets, 9
- post-graduate scholarships, 29, 36, 37
- post-graduate targets, 9
- precision agricultural systems
 - innovative see Program Four: Farming Systems, strategy 4
- Primary Industries and Energy Research and Development Act 1989 (PIERD Act)*, 24, 30, 74, 79, 80, 82, 84, 87
 - objectives, 81
- Primary Industries and Energy Research and Development Amendment Act 2007*, 80, 81

- Primary Industries Levies and Collections Act 1991*, 81
- Production Chain course (CSIRO Textile and Fibre Technology), 35
- productivity and adding value, 25, 30
- professional development see Program One: People and Knowledge, strategy 2; staff training and development
- profitability and international competitiveness see Planned Economic Output: profitability and international competitiveness
- Program One: People and Knowledge, 18
- background, 32
 - expenditure, 13
 - and National Research Priorities, 26
 - objective, 18, 31
 - outcome, 31
 - projects, 119–121
 - report of operations, 31–41
 - and Rural R&D Priorities, 26
 - strategy 1 – cotton extension team, 31, 32–33
 - strategy 2 – professional development, 31, 33, 35–37
 - strategy 3 – women in cotton industry, 31, 37–38
 - strategy 4 – decision support systems, 31, 38
 - strategy 5 – information packages and tools, 31, 38–39
 - strategy 6 – occupational health and safety, 31, 39–40
 - strategy 7 – collaboration and partnerships, 31, 40
 - Triple Bottom Line investment, 31
- Program Two: Integrated Natural Resource Management, 18
- background, 43
 - expenditure, 13
 - and National Research Priorities, 26
 - objective, 18, 42
 - outcome, 42
 - projects, 121
 - report of operations, 42–47
 - and Rural R&D Priorities, 26
 - strategy 1 – environmental issues in Cotton BMP program, 42, 44
 - strategy 2 – environmental management systems, 42, 45–46
 - strategy 3 – farm management strategies, 42, 46
 - strategy 4 – environmental impact of new transgenic traits, 42, 46–47
 - strategy 5 – climate change and greenhouse gas emissions, 42, 47
 - Triple Bottom Line investment, 42
- Program Three: Crop Protection, 18
- background, 49
 - expenditure, 13
 - and National Research Priorities, 26
 - objective, 48
 - outcome, 48
 - projects, 121–122
 - report of operations, 48–57
 - and Rural R&D Priorities, 26
 - strategy 1 – insect and mite pest management, 48, 51–52
 - strategy 2 – weed management, 48, 52–54
 - strategy 3 – cotton diseases, 48, 54–56
 - strategy 4 – resistance management strategies for insecticides and transgenic technologies, 48, 56–57
 - strategy 5 – transgenic crop technology, 48, 56–57
 - Triple Bottom Line investment, 48
- Program Four: Farming Systems, 18
- background, 59
 - expenditure, 13
 - and National Research Priorities, 26
 - objective, 58
 - outcome, 58
 - projects, 123
 - report of operations, 58–63
 - and Rural R&D Priorities, 26
 - strategy 1 – water use efficiency, 58, 59–60
 - strategy 2 – salinity, sodicity and deep drainage, 58, 60–61
 - strategy 3 – soil health and crop nutrition management, 58, 61
 - strategy 4 – profitability with whole farm management strategies and innovative precision agricultural systems, 58, 62
 - strategy 5 – research on cotton agronomy and plant physiology, 58, 62–63
 - Triple Bottom Line investment, 58
- Program Five: Plant Breeding and Biotechnology, 18
- background, 65
 - expenditure, 13
 - and National Research Priorities, 26
 - objective, 64
 - outcome, 64
 - projects, 124
 - report of operations, 64–68
 - and Rural R&D Priorities, 26
 - strategy 1 – regionally adapted cotton varieties, 64, 65–66
 - strategy 2 – targeted, innovative biotechnology, 64, 66–67
 - strategy 3 – reduction in time required for introduction of improved or novel genes into elite cotton varieties, 64, 67
 - strategy 4 – monitoring of signals from cotton textile and oilseed marketplace, 64, 68
 - Triple Bottom Line investment, 64
- Program Six: Value Chain, 18
- background, 70
 - expenditure, 13
 - and National Research Priorities, 26
 - objective, 69
 - outcome, 69
 - projects, 124
 - report of operations, 69–73
 - and Rural R&D Priorities, 26
 - strategy 1 – breeding program for appropriate fibre and seed characteristics, 69, 70
 - strategy 2 – agronomic and management practices, 69, 71

- strategy 3 – ginning improvements, 69, 71
- strategy 4 – fibre measurement and classing system, 69, 72
- strategy 5 – new markets and high premiums for cotton, 69, 72–73
- Triple Bottom Line investment, 69
- Program output/objectives
 - Program One: People and Knowledge, 18, 31
 - Program Two: Integrated Natural Resource Management, 18, 42
 - Program Three: Crop Protection, 18, 48
 - Program Four: Farming Systems, 58
 - Program Five: Plant Breeding and Biotechnology, 64
 - Program Six: Value Chain, 69
- projects
 - Crop Protection, 121–122
 - Farming Systems, 123
 - Final Project Reports 2006–07, 125–126
 - Integrated Natural Resource Management, 121
 - People and Knowledge, 119–121
 - Plant Breeding and Biotechnology, 124
 - Value Chain, 124
- Protective Security Policy, 83
- publications, 17
- Queensland government
 - and Land and Water Management Planning process, 27, 45
- Queensland Murray Darling Committee, 46
- R&D expenditure
 - management of, 1
- R&D investments, 1
 - framework for evaluation of, 15
- RDC NRM Working Group, 15
- Regional Extension Officer positions, 32
- Regional NRM Bodies
 - and environmental performance indicators for cotton, 2
 - and on-farm practice change, 45
- regional NRM catchment management targets
 - and BMP Land and Water Management module, 61
- Remuneration Committee, 80
- Report of Operations
 - corporate governance, 74–87
 - Program One: People and Knowledge, 31–41
 - Program Two: Integrated Natural Resource Management, 42–47
 - Program Three: Crop Protection, 48–57
 - Program Four: Farming Systems, 58–63
 - Program Five: Plant Breeding and Biotechnology, 64–68
 - Program Six: Value Chain, 69–73
- representative bodies
 - payment to, 87
- research accountabilities, 83
- Research and Development Portfolio, 119–124
- research outcomes that is leading to improved and more sustainable management practices see adoption of research outcomes that is leading to improved and more sustainable management practices
- research program management systems, 15
- research providers, 119
- resistance management strategies for insecticides and transgenic technologies, Program Three: Crop Protection, strategy 4
- retail interests
 - and cotton producers, 73
 - see also IZUMIYA
- revenue
 - 2006–07, 12–13
 - coming year, 14
- Review of the Corporate Governance of Statutory Authorities and Office Holders (Uhrig Review), 23, 81, 83
- rhizosphere interactions of GM and non-GM cotton cultivars, 47
- risk management, 83
- risk management framework and risk register
 - review of, 4, 79, 83
- Risk Management Plan, 83, 84
 - for 2007–2008, 4
- riverine contamination by herbicide, 6, 19
- Roundup Ready®, 6, 27, 28, 46, 49, 52, 53, 54, 57, 65, 66
- Roundup Ready Flex®, 7, 27, 46, 53, 54, 65, 66, 67
- row spacing see cotton row spacing
- Rural Industries Research and Development Corporation (RIRDC), 35, 39, 40
- Rural R&D Priorities (RRDP), 23, 25, 26, 65, 83
 - addressing: inputs and outcomes, 27–29
- Rural Research and Development Corporations (RDCs)
 - collaboration with, 15, 23, 40
 - and risk management, 83
 - see also Council of Rural Research & Development Corporations' Chairs
- Rural Skills Strategy Advisory Group, 36
- salinity, 27, 42, 46, 60, 61
 - mapping, 60, 61
 - see also Program Four: Farming Systems, strategy 2
- Selection Committee Report, 115
- Service Charter, 84
- Sicala 350B, 65, 66
- Sicot 70BRF, 65, 70
- Sicot 71BR, 65
- Sicot 75 (2007), 65
- significant changes in the state of affairs, 87
- significant events, 87
- Silverleaf whitefly, 51, 52, 57
- Silverleaf whitefly workshop, 32, 51
- SiroMat, 72
- SJV cotton, 68
- social objectives
 - adoption of research outcomes that is leading to improved and more sustainable management practices, 11
 - healthy and resilient communities in cotton producing regions, 10
 - improved skills and qualifications of people at all levels of the industry, 9
 - see also Output 3 – Social: empowered people and communities

social performance
 tracking, 9–11
 sodicity of soil, 27, 45, 60–61, ^61
 see also Program Four: Farming Systems, strategy 2
 Soil Biology Growers Survey and Research Review, 61
 soil health see Program Four: Farming Systems, strategy 3
 sponsorships, 35, 37
Spotlight, 115
 spray drift management strategy, 49
 Spray Drift Workshops, 27, 32, 40
 SPRAYpak, 39
 staff, 4, 84
 appointments, 84
 changes, 84
 staff training and development, 4, 84–85
 stakeholders
 stakeholder priorities, 30
 stakeholder relations, 22–30
 see also industry stakeholder reporting
 Statement of Expectations, 23, 83
 Statement of Intent, 23
 Statement of Principles, 17
 strategic elements, 18–19
 Strategic Plan 1998–2003, 81
 Strategic Plan 2003–2008, 1, 3, 23, 25, 81, 83, 87
 tracking CRDC's position, 118
 Strategic Plan for 2008–2013, 3, 22, 24, 25, 81, 84
 Strategic Plans, 84
 structure of cotton industry, 21
 supply chain and markets, 25, 30
 Sustainable Farm Families project, 39, 40
 sustainable management practices see adoption of
 research outcomes that is leading to improved and
 more sustainable management practices
 sustainable production systems and catchments
 see Planned Environmental Output: sustainable
 production systems and catchments

 Terms of Employment, 4, 83
 13th Australian Cotton Conference, 9, 27, 33, 37, 87
 Tobacco Streak Virus, 55
 tracking economic performance, 7–8
 tracking environmental performance, 5–7
 tracking social performance, 9–11
 transgenic technologies see Program Three: Crop
 Protection, strategy 4; Program Four: Farming
 Systems, strategy 5
 transgenic traits introduced into cotton varieties
 environmental impact research for see Program
 Two: Integrated Natural Resource Management,
 strategy 4
 see Program Five: Plant Breeding and
 Biotechnology, strategy 1; Program Five: Plant
 Breeding and Biotechnology, strategy 3
 travel grants, 34, 37
 Triple Bottom Line accountability and reporting, 3
 Triple Bottom Line highlights, 5–11
 Triple Bottom Line objectives, 19
 see also economic objectives; environmental
 objectives; social objectives

 Triple Bottom Line Outcome and Outputs, 14, 18
 see also Outcome; Output 1 – Economic:
 profitability and international competitiveness;
 Output 2 – Environmental: sustainable production
 systems and catchments; Output 3 – Social:
 empowered people and communities

 Uhrig Review see Review of the Corporate
 Governance of Statutory Authorities and Office
 Holders (Uhrig Review)
 University of New England, 35, 56

 value added developments, 25, 30, 69
 Value Chain see Program Six: Value Chain
 vegetable oil seed market, 70
 vision, 16

 water distribution systems, 37, 46, 60
 Water Extension Team, 59
 water quality, 42, 46
 water shortages, 2, 10, 14, 20, 42
 water storage, 37, 46, 60
 Water Team, 27, 33, 37
 Water Track®, 59
 Water Use Efficiency (WUE), 10, 27, 45
 benchmarking, 39, 59
 improved, 7
 in Queensland, 59
 see also Program Four: Farming Systems, strategy 1
 WATERpak, 38, 39, 60
 website, 115
 weed management see industry-wide adoption of
 improved integrated weed management systems;
 integrated weed management
 WEEDpak, 39, 53, 54
 weighing lysimeters, 60
 whole farm management see increased profitability
 through better whole farm management
 whole farm management strategies see Program Four:
 Farming Systems, strategy 4
 Wincott – Women in Cotton, 29, 37, 38
 women in cotton industry, 29
 see also Program One: People and Knowledge,
 strategy 3
 workshops, conferences and other activities
 participation in, 116–117
 World Cotton Research Conference 4, 9



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