Australian Government

Cotton Research and Development Corporation

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Development Corporation

Annual Report
2007–08

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 sixteen RDCs, 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 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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Australian Government

Cotton Research and Development Corporation

LETTER OF TRANSMITTAL

3 October 2008

The Hon Tony Burke MP
Minister for Agriculture, Fisheries and Forestry
Parliament House
Canberra ACT 2600

Dear Minister

It is with great pleasure that I submit the Corporation's Annual Report for 2007–08, 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 11 August 2008.

Yours sincerely

Mike Logan
Chair

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FROM THE CHAIR AND EXECUTIVE DIRECTOR

Looking back…..

The period of operation of the CRDC Strategic Plan 2003–2008 ended in 2008 as it had begun in 2003: with the continuation of an unprecedented, lengthy drought, exacerbated by low cotton prices and increasing competition for available water from irrigated grains, which are enjoying a price boom. In addition, the industry faced uncertainty in its terms of trade with a volatile Australian dollar exchange rate.

Despite this, Australian cotton growers continued to produce the highest yields per hectare of premium quality cotton in the world. The low water availability did however mean that the total crop area was the smallest in 30 years. The latest forecast for the 2008 harvest is a crop of 0.6 million bales, estimated to be worth $275 million in export value, compared with a historical average of near $1 billion. Looking further back, cotton production in Australia has been well below normal levels for the last six drought-affected years.

In the final year of operation under the Strategic R&D Plan, the Corporation was able to maintain R&D investments at a level that underpinned the achievement of the Plan's strategic outcomes. This report highlights the importance of those outcomes to the industry and Australia.

Delivering return on investment

During the reporting year CRDC submitted two of its research projects for cost benefit analysis using a new R&D evaluation framework developed for the Council of Rural Research and Development Corporations (RDCs) Chairs. The first reports, released in February 2008, confirmed a high level of return on public and industry investment in these areas. The final report has not yet been released and this project is ongoing.

The first of the two independent analyses examined the deployment of *Bt* transgenic cotton and related research inputs across a number of scientific areas, in partnership with other public and private organisations. CRDC's investments have allowed the successful management of potential resistance to the transgenic cotton varieties by major pest species. The cost benefit analysis estimated that the CRDC investments would return $201 over the next 20 years for each levy payers' dollar invested across the entire supply chain in *Bt* technologies. The return on matching funds provided by the Australian Government was estimated at $488 for every dollar invested.

The second research project studied was the development of tools and techniques to measure irrigation water use efficiency more accurately. This project provided a foundation for water savings and supported the development of Irrimate technology, which has enabled cotton irrigators to 'measure and manage' their water resources for furrow irrigation more effectively. The analysis showed a return of $131 for each dollar of levy payers' investments and $184 on the Australian Government's matching funds.

The challenges of climate change

As far back as 2003, CRDC established a specific strategy to tackle this issue. The research conducted to address this strategy has established a strong foundation for tackling both climate change mitigation and adaptation. Research conducted within the Integrated Natural Resource Management and Farming Systems programs has helped to clarify the level of greenhouse gas emissions resulting from cotton production. It has also increased awareness of the environmental and economic cost of over-fertilising. This research has provided an on-farm energy use calculator, EnergyCalc, which will assist farmers to become more fuel and energy efficient and hence more environmentally sustainable and profitable. The outcomes from research on crop rotations and nutrition have assisted growers to improve management practices for fertiliser efficiency and storing carbon in the soil.

Building future leadership capacity

Recognising the importance of strong industry leadership, particularly in the current challenging environment, CRDC invested in the Australian Future Cotton Leaders Program, initiated by Cotton Australia with the support of the Australian Government Department of Agriculture, Fisheries and Forestry. The 21 participants finished the program with improved self-confidence, together with skills for effective presentation. CRDC was pleased to note that the six women chosen to participate all had an active background of involvement within the Women's Industry Network – Cotton, or WINCOTT. In line with recommendations in the 1998 National Plan for Women in Agriculture, WINCOTT began with seed funding and in-kind support from CRDC. It is now a self-sufficient and important source of knowledge and training for women in the industry.

An R&D sum that is greater than the parts

Collaboration in the R&D efforts of research providers and rural industries remains a key mechanism for maximising the efficiency and effectiveness of R&D investment. The nature and extent of this collaborative work is detailed on page 15 and throughout the report on the six R&D programs. In particular, the Corporation continued to engage with research providers, the Cotton Catchment Communities CRC and sister RDCs on matters ranging from administrative processes, collaborating with small individual projects and large national programs such as the National Climate Change Research Strategy for Primary Industries (CCRSPI) and the National Program for Sustainable Irrigation (NPSI). In 2007–08, more than 79 per cent of CRDC funded projects involved collaboration between three or more partners and co-investment in excess of $16 million.

Concurrently, the Corporation focused on the development of its next Strategic R&D Plan for 2008–2013, in consultation with our industry and government stakeholders. The process of seeking external views on emerging issues and challenging existing thinking as to the industry's operating environment was a valuable capacity-building outcome in itself.

Looking forward….

The cotton industry enters the 2008–09 year still under the impact of persistent drought. In its Annual Operating Plan 2008–09, the Corporation has budgeted for cotton production of 1.5 million bales, which is less than 50 per cent of pre-drought production and an eight per cent reduction in expenditure from last year. Our key challenge as the principal investor in industry R&D is to maintain core capacity within areas of high priority research under these circumstances.

The next year also brings opportunity as the Corporation begins to implement the new five-year strategic R&D Plan. The Plan describes a quite different operating environment for the Australian cotton industry. Australian cotton producers need to remain globally competitive, at the same time as remaining a valued enterprise within the Australian farming landscape. Emerging issues of increasing competition for land, water, food, energy and labour are seen to be limiting factors and have led CRDC to summarise its future R&D priorities as "a quest for sustainable competitive advantage".

This change in emphasis means that, while a realignment of R&D investments to target incremental improvements remain important, investments in higher risk and potentially transformational research will be essential for the future of the cotton industry.

At the same time, agriculture faces new challenges in how it collectively responds to national issues such as climate change. The Australian Government has now ratified the Kyoto Protocol and announced a Carbon Pollution Reduction Scheme. The industry's commitment to addressing this challenge is evident in the theme of the major biennial research conference, New Beginnings – Cotton in a Climate of Change. CRDC is a foundation sponsor of this conference, held in August 2008. A further 23 per cent of CRDC research investment in 2008–09 is addressing climate change mitigation and adaptation.

To address global competitiveness, CRDC's focus is to invest in research and development of new services and evolved products along the supply chain to create additional value in both cotton lint and cottonseed for the benefit of the Australian cotton industry and the nation.

Bruce Finney, Executive Director, and Mike Logan, Chair, CRDC

In seeking to improve profitability, the Australian cotton industry has identified connections between improved productivity, natural resource management and addressing climate change. CRDC research and development investments are actively seeking avenues to further improve water, fertiliser and energy use efficiency while at the same time further reduce greenhouse gas emissions.

The capacity of the Australian cotton industry to innovate, adapt and adopt research so that it can respond to cotton production in a climate of change is critical to the impact of the Plan. Hence, the building of capacity, in all of its contexts, remains an overarching goal.

The strategic R&D Plan is an outward-looking response to the views taken by industry and government. While the R&D Plan expresses a five-year vision, the investments made and the initiatives taken create impacts that continue well into the future.

Continuous improvement

The term of the current Board ends in September. An internal Board performance review during 2008 identified the importance and improvement of the induction process for new Directors. Similarly, the Board decided to adopt a process of more regular reviews of strategic goal achievement at meetings.

R&D impact assessment will continue to be an important focus, as the RDCs collectively evaluate returns on investment. Following the success of pilot cost benefit analyses in 2007–08, the RDCs have committed to study a random sample of research projects using the methods developed in the initial studies. Beyond this, the Corporation is actively improving its use of assessment of potential returns in its R&D investment decisions. This will be of great assistance in determining future investment priorities for the benefit of the Australian cotton industry and nation as a whole.

Industry and government: a productive partnership

From its beginnings in the 1960s the Australian cotton industry has placed great emphasis on the value of its R&D. The partnership with the Australian Government has lead to Australian producers' adoption of world-leading research that has contributed to unparalleled productivity growth and improved practices in cotton production, borne out by the uniquely Australian combination of the world's best cotton yields and improved environmental performance. This partnership now looks to sustain these achievements and address new challenges effectively.

A new future beckons for Australian agriculture and the cotton industry. The impact of user-driven R&D, with its inherent high rates of adoption, remains as important to the future as it has been in the past.

Mike Logan
Chair

Bruce Finney
Executive Director

CORPORATE HIGHLIGHTS

This was the concluding year of the CRDC 2003–2008 Strategic R&D Plan. The outcomes of the Plan have been reported annually and we note that of 16 triple-bottom-line industry targets that were established, 14 were effectively met and only two were partially met.

In an exhaustive and broadly scoped process engaging all industry stakeholders, CRDC completed development of its 2008–2013 Strategic R&D Plan. This strategic document establishes new directions for R&D investments for the next five years and beyond. Three investment programs are established to secure a competitive sustainable advantage for the Australian industry.

CRDC was involved with all RDCs to establish a common framework for the evaluation of the outcomes of R&D investments. A product of this exercise was for the evaluation of two highly successful R&D investments in stewardship of biotechnology and water use efficiency for irrigation.

Independent analyses estimated that CRDC investments are set to return $201 over the next 20 years for each levy payers' dollar invested across the entire supply chain in *Bt* technologies. $488 was returned for every dollar invested on matching funds provided by the Australian Government.

Analysis for CRDC's investment for the development of tools and techniques that more accurately measured water use efficiency showed a return of $131 for each dollar of levy payers' investments and $184 on the Australian Government's matching funds.

The Irrimate technology was one of two projects CRDC submitted for the RDCs' common framework for the evaluation of the outcomes of R&D investments

Industry consultation was a key step in shaping the new five-year strategic plan

The reporting year commenced with Vice Chair, Dick Browne, continuing in the role of Acting Chair. On 24 August 2007, the Parliamentary Secretary to the former Minister for Agriculture, Fisheries and Forestry announced the appointment of Mike Logan as the Corporation's new Chair.

CRDC, together with other RDCs and the Primary Industries Standing Committee Scientific Committee, contributed to the successful development of the National Climate Change Research Strategy for Primary Industries (CCRSPI). Further contributions to the implementation of this joint strategy will be made in 2008–09.

David Coleman began work as the new General Manager – Business and Finance in January 2008. David brings an extensive background in IT, outsourcing, the agrichemical industry, superannuation, and industrial and rural property sectors.

Lee-Anne Melbourne commenced work as Acting Project Administration Manager in November 2007.

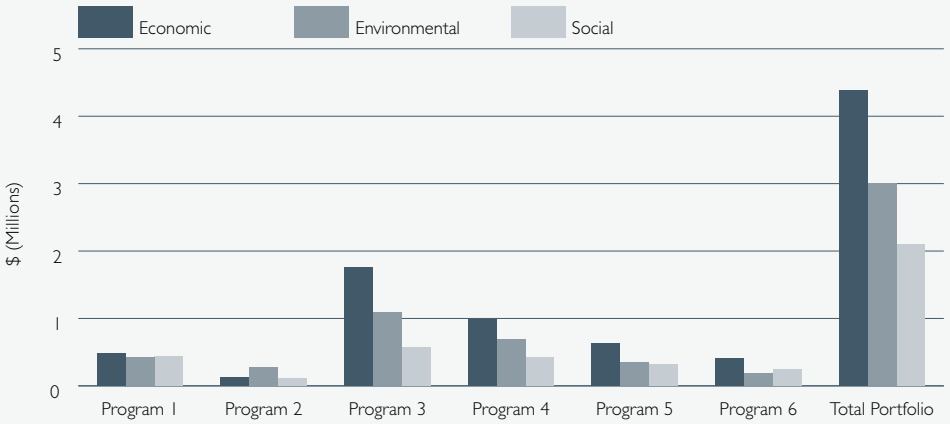
David Coleman with his administrative team, Margaret Wheeler, Lee-anne Melbourne and Dianne Purcell

Chloe Pokarier undertook work experience at CRDC during the year as part of a school-based traineeship program developed by CRDC with the help of the Aboriginal Employment Strategy.

Trainee, Chloe Pokarier, with her CRDC supervisor, Dianne Purcell

TRIPLE BOTTOM LINE HIGHLIGHTS

Figure 1 Triple Bottom Line Investments by Program 2007–08



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	EVALUATION OF PROGRESS
A 50 per cent reduction by 2008 in 2004 quantities of insecticide used	**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).** Progress during current 5 year period: • 2003–04: 3.47 kg ai/ha (kilogram of active ingredient per hectare) • 2004–05:1.32 kg ai/ha (a reduction of 62 per cent from 2003–04) • 2005–06: 0.97 kg ai/ha (a reduction of 71 per cent from 2003–04) • 2006–07: 0.77 kg ai/ha (a reduction of 78 per cent from 2003–04) • 2007–08 data not available due to low production. The period 2003–04 to 2006–07 showed a reduction of 68 per cent compared with the period 1998–99 to 2002–03, which had an average insecticide use of 5.12 kg ai/ha. *(Source: Cotton Consultants Australia Market Audits)* Data collected from 233 growers in May/June 2008 indicated that 90 per cent had implemented changes over the previous five years, reflecting IPM best practice.

ENVIRONMENTAL OBJECTIVE Industry-wide adoption of improved integrated weed management systems	
TARGET	EVALUATION OF PROGRESS
A 20 per cent reduction by 2008 in 2004 quantities of residual herbicide used	**Target met ahead of time.** Up to 2005–06, Cotton Consultants Australia reports a 32.4 per cent 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 (IWM) practices. No data is available for 2007–08 due to low production.
A continued decline in riverine contamination by herbicides used only in cotton production	**On target. Combined average detections of four residual herbicides used on cotton in north west NSW rivers have declined by 29 per cent over the four seasons 2003–04 to 2006–07 compared with the previous five seasons (1998–99 to 2002–03).** *(Source: NSW Department of Natural Resources)* This decline is thought to be due to the reduction in the use of these herbicides because of the adoption of Roundup Ready® technology but also the reduced river flows associated with the drought.

ENVIRONMENTAL OBJECTIVE Increased adoption of Best Management Practices (BMP) that meets legal requirements, industry benchmarks and catchment scale targets	
TARGET	EVALUATION OF PROGRESS
80 per cent of cotton production audited against BMP Minimum Certification Standards by 2007	**Achievement of target was not met. Survey results (below) and recent feedback from cotton consultants 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, in addition to overall numbers of farms that have completed the BMP audit process.** In January 2007, Cotton Australia estimated that 40 per cent of farm entities were either fully certified against BMP standards or had received a Pre-Certification Assessment and produced an estimated 45 to 50 per cent of the national cotton crop. New steps to increase implementation: • CRDC, Cotton Australia and the Cotton Catchment Communities CRC appointed a BMP General Manager who is developing 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. • A revision of BMPs is underway and a new electronic version of the BMP manual (e-BMP) is under development.

ENVIRONMENTAL OBJECTIVE (cont) **Increased adoption of Best Management Practices (BMP) that meets legal requirements, industry benchmarks and catchment scale targets**	
	A Cotton Consultants Australia survey relating to the BMP Land and Water Management module, commissioned by CRDC and the Cotton Catchment Communities CRC, showed a larger proportion of the BMP accredited growers, compared with the non-BMP accredited growers, during the period: • 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 • Planted native trees in riparian areas • Provided 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)**	
TARGET A 20 per cent improvement in WUE on farms by 2008, measured against the 2004 median, in bales per megalitre	EVALUATION OF PROGRESS **Target effectively met.** While it has not been possible to gather the data to directly measure this target, other measurements indicate significant progress by the industry in improving water use efficiency. Since this target was set in 2004, CRDC has contributed to initiatives within the cotton industry to improve water use efficiency and its measurement. An analysis of 36 farms in 2006–07 using a comprehensive standard for water use, the Gross Production Water Use Index (GPWUI) which takes into account rainfall and soil moisture, measured an increase of 40 per cent in water use efficiency compared with a similar study nine years before. Significant progress on water use efficiency has also been made through the industry's yield improvement. This has been due in part to improved higher yielding varieties and continuous improvement in agronomy and achieved with no net increase in the quantity of water required per hectare. 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. A recent survey of cotton consultants reported on the water management of 233 cotton growers, indicating that over 70 per cent had implemented on-farm changes since 2003 to improve water use efficiency. In a separate survey of 71 cotton growers in June 2008, 97 per cent reported that they had improved their water use efficiency since 2003.

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)**	
TARGET	EVALUATION OF PROGRESS
A ten per cent improvement in cotton yield per hectare (two per cent annual or ten per cent over five years)	**Target achieved ahead of time. Cotton yields over the five seasons covered in CRDC's just completed Strategic Plan have averaged an estimated 1,850 kilograms of lint per hectare, compared to an average of 1575 kilograms in the previous five years: a 17 per cent improvement.** Australian cotton farms have the world's highest cotton yields per hectare (30 per cent ahead of the nearest country). A recent survey of cotton crop consultants indicated that the five major drivers of increased yields over the last five years were improved: • water use efficiency • cotton varieties • nitrogen fertiliser efficiency • management of other plant nutrients • management of crop rotations.
ECONOMIC OBJECTIVE **Improved cotton fibre quality that meets market and spinner needs**	
TARGET	EVALUATION OF PROGRESS
Evidence of continuous improvement in five key parameters measured in spinning mill benchmark surveys by 2007	**Target met, with improvements in micronaire, fibre length and strength, contamination and short fibre content.** Despite drought conditions, the quality of the 2007–08 crop was excellent and almost all micronaire counts were in the acceptable range. The Australian Cotton Shippers Association (ACSA) received feedback (in 2003) from key international clients concerned about the fibre micronaire of Australian cotton being too high. High micronaire has not been a problem in recent years and this was the case in 2007–08. Feedback from mills regarding Australian cotton continues to show that it is preferred over many of our competitors because of the high quality, efficient delivery and very low contamination. The latter is a feature that the industry is seeking to maintain through the development of ginning and, potentially, storage and handling sector BMPs.
Evidence that prices for Australian cotton remain above those for competitive cotton growths	**Despite drought, the 2007–08 season delivered high quality cotton and Australian cotton remained among the top prices listed for the highest category of upland cotton on the Liverpool *Cotton Outlook* 'A' index and continued to perform well against the industry SJV benchmark. (The SJV is the San Joaquin Valley (California) international benchmark).**

ECONOMIC OBJECTIVE Increased profitability through better whole farm management	
TARGET	EVALUATION OF PROGRESS
Evidence that profit margins are maintained or improving over time (2003 to 2008 both annually and trends over time)	**Target not met.** **Profitability trends for average performing farms are declining. In contrast, the trend for the top 20 per cent of farms is stable based on their capacity to produce higher yields at lower cost.** *(Source: the CRDC-supported BOYCE Cotton Comparative Analysis 2006).* Ongoing and widespread drought conditions, relatively low prices and escalating fuel, fertiliser and chemical prices exerted a significant impact on whole-farm profitability on most cotton farms since 2003, and particularly 2007–08.

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
Between 2003 and 2008: • At least 15 new post-graduates working in areas of high priority future need	**Post-graduate targets have been met.** Two post-graduates commenced during the period 2003–04, three in 2004–05, six in 2005–06, three in 2006–07 and one in 2007–08 totalling 15 in all. A 2007 survey of the 79 PhD students supported to date by CRDC found that 47 still work in cotton-related science, 18 are working in other science-related fields and three are working on farms.
• At least ten new post-doctoral positions working in areas of high current need	**Post-doctoral targets have been met.** Since 2003, CRDC has supported 11 projects involving post-doctoral scientists. Of these, seven have been new post-doctoral projects. One new post-doctoral project was established in 2007–08.
• 80 per cent of cotton growers having attended a relevant training course in OH&S, IPM or Water Management	**Target has been met. Over the past five years:** • **80 per cent attended spray application courses** • **60 per cent attended OH&S training** • **58 per cent Integrated Pest Management courses.** **Courses for water management and soil health were also popular, with over 50 per cent of growers attending courses.** During 2007–08, courses on spray drift, water management and fibre management were among the most popular with cotton growers and consultants. Approximately 20 per cent of cotton growers attended at least one module of the new water management course program.

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 (e.g., 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

Achievement of this target is on track.

The adoption of biotechnology and sound integrated pest and weed management programs has contributed to a 68 per cent reduction in the quantities of insecticide applied and up to a 32 per cent reduction in total (residual and non-residual) in-crop herbicide use, addressing cotton's impact on regional environments.

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 are being further developed through research.

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

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

Workers compensation claims for the cotton industry for the five years 1998–99 to 2002–03 averaged 86 per year and for the three years 2003–04 to 2005–06 averaged 67 per year: a reduction of over 20 per cent.

A 17 per cent increase in yields achieved since 2003, compared with the average for the previous five seasons, lower chemical inputs and continued improvements in the use of limited water supplies have 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

TARGET

At least five adoption evaluations conducted per year by members of the National Cotton Extension Team

EVALUATION OF PROGRESS

Target met.

The Cotton CRC water extension team conducted over 40 on-farm evaluations of water use efficiency using the commercial program WaterTrack Rapid during the year.

A survey commissioned in May 2008 and completed by 41 cotton consultants evidenced practice change and adoption of research by their clients over the past five years. These consultants worked with grower clients who produced over 60 per cent of the 2007–08 cotton crop.

FINANCIAL HIGHLIGHTS

Revenue 2007–08

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

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.

The drought-reduced production levels in both 2006–07 and 2007–08 meant significantly decreased bale levy receipts for 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).

Following a drought-affected season in 2006–07, the 2007–08 growing season was also badly affected by drought. This meant that forecast production of 1.0 million bales for 2007–08, whilst conservative at the time, proved to be significantly higher than the estimated actual cotton crop size of 550,000 bales (*Source: ABARE, June 2008*). Therefore, revenue of $6.96 million for 2007–08 is 39.5 per cent lower than the 2006–07 total of $11.51 million and 5 per cent below budgeted income of $7.30 million.

Figure 3 CRDC's 2007–08 Revenue by Source

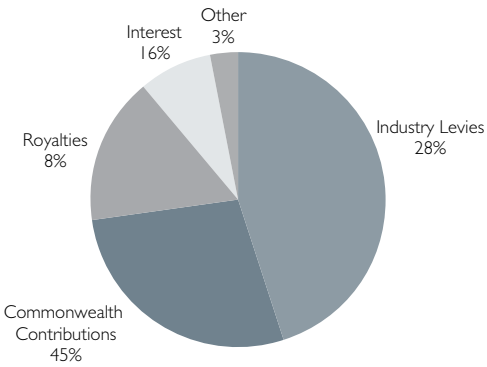
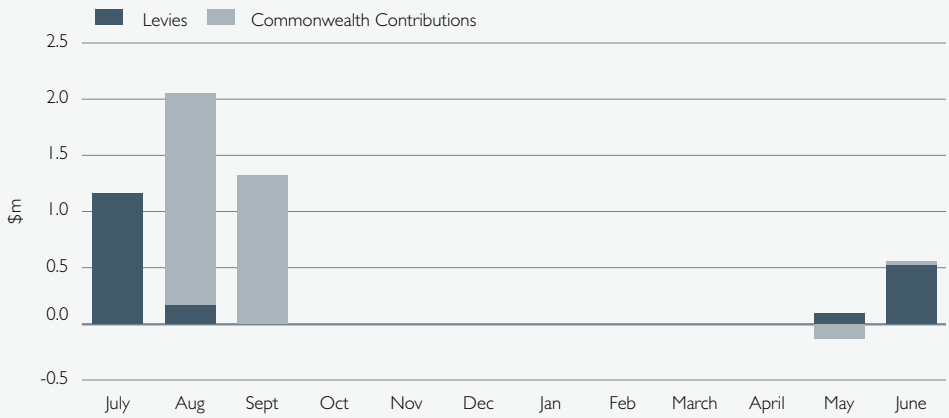


Figure 2 2007–08 Levy and Commonwealth Contributions



R&D Program Breakdown*

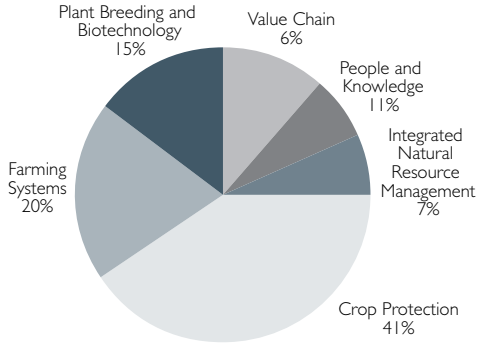
	People and Knowledge	Integrated Natural Resource Management	Crop Protection	Farming Systems	Plant Breeding and Biotechnology	Value Chain	Total
No of projects	31	18	33	22	9	8	121
Program expenditure	$0.91m	$0.57m	$3.28m	$1.59m	$1.18m	$0.52m	$8.05m

*Excludes Cotton Catchment Communities CRC untied cash contribution of $100,000, external grant expenditure of $72,201 and Corporate research activities of $476,286.

Total revenue of $6.96 million for 2007–08 comprised:

- Industry levy revenue of $1.95 million, which includes $1.33 million (49 per cent) of the 2006–07 crop and $0.62 million (50 per cent, estimated) of the 2007–08 crop
- $3.13 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
- $0.59 million in royalties from sales of CRDC-funded CSIRO-bred seed varieties, which is 22 per cent below budget
- $1.10 million from interest, which was 23 per cent above budget and $0.05 million above the previous year
- $0.19 million from other sources, including project refunds and external grant revenue.

Figure 4 Expenditure by R&D Program 2007–08



Expenditure 2007–08

Total expenditure for 2007–08 was $10.46 million, equal to budget expectations. Research expenditure on CRDC's six strategic research programs and research-related Corporate activities was $8.70 million. Other areas of expenditure for the Corporation included employees and operational expenditure.

Financial position

CRDC reported an actual net deficit of $3.506 million for 2007–08 as against a conservative budgeted deficit of $3.199 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 2006–07 and 2007–08 crops both contributed to the Corporation's 2007–08 income, with both crops around half of the estimated crop size.

The Corporation's total equity position of $11.95 million at 30 June 2008 is a decline of $3.52 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. Therefore, the Corporation was obliged to call on reserves to supplement research investment and operational needs, as has been the case in the previous five years, all of which were affected by drought. The equity to expenditure ratio for 2007–08 was 88 per cent, which was a planned deviation from 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

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

Total Budgeted Revenue:	$7,300,964
Total Actual Revenue:	$6,957,976
Total Budgeted Cost of Outputs:	$10,500,000
Total Actual Cost of Outputs*:	$10,463,718

Output 1 – Economic

Profitability and international competitiveness

Actual revenue:	$3,200,669
Budgeted cost:	$4,830,000
Actual cost:	$4,813,310

Output 2 – Environmental

Sustainable production systems and catchments

Actual revenue:	$2,226,552
Budgeted cost:	$3,360,000
Actual cost:	$3,348,390

Output 3 – Social

Empowered people and communities

Actual revenue:	$1,530,755
Budgeted cost:	$2,310,000
Actual cost:	$2,302,018

* Total cost is shown rather than total price because the Corporation is primarily funded through industry levies rather than based on the price of its Outputs. All research projects and their funding contribute 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. The Queensland cotton regions received significant summer rain; however, a number of NSW cotton regions have not received significant rain to date. This means that the outlook for the 2008–09 season is uncertain, as cotton planting does not occur until September.

Water availability will continue to be a significant constraint on NSW 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 1.5 million bales for the 2008–09 season, which will be harvested from March to May 2009 and ginned from March to September.

The Corporation has forecast an operating deficit of $3.2 million for 2008–09, which will be funded from existing cash reserves. This reflects revenue of $6.43 million (compared with 2007–08 revenue of $6.96 million), with 68 per cent derived from industry levies and Commonwealth government contributions.

The size of levy and Government contributions is heavily reliant upon crop production, which is budgeted to be only 1.5 million bales for the 2008–09 crop. This follows on from a very low figure of 0.55 million bales in 2007–08, the other production year that contributes to income in the 2008–09 year. Continuing low international cotton prices will also have a negative impact on the Gross Value of Production (GVP).

Under the PIERD Act, the Australian Government's matching of expenditure of levies on eligible R&D is capped at 0.5 per cent of the gross value of production or the cumulative levy receipts (whichever is the lesser). If GVP falls as predicted, the Corporation expects that this will activate the '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 2008–09. Forecast expenditure for the coming year is $9.69 million, down from $10.46 million in 2007–08. This level of expenditure will produce an operating deficit of $3.2 million, which will be funded from the Corporation's reserves and will be an exception to expenditure to equity policy guidelines.

COLLABORATION AND COOPERATION

Collaboration is an important tool for 'making the whole greater than the parts' in managing taxpayer and industry contributions. CRDC actively collaborates with a wide range of R&D providers, industry, government and community organisations on both a formal and informal basis where this adds value to outcomes.

Importantly, collaboration extends beyond co-investment. Cooperation, coordination and communication are equally important to avoiding duplication in research and maximising the impact of research outcomes.

The scale of this collaboration extends from large national research programs to small local projects and administration. Building on the industry's strategic R&D investments in 2007–08, CRDC collaborated with other Rural Research and Development Corporations (RDCs) to bring a national focus in dealing with climate change, soil health, irrigation, crop protection, farm safety and human capacity. Collaboration is normal business practice as evidenced by the 121 project investments in 2007–08, with 79 per cent involving collaboration between 3 or more partners, bringing co-investment in excess of $16 million.

As in the previous year, CRDC's largest financial investment in collaboration in 2007–08 was with the Cotton Catchment Communities CRC. CRDC invested four million dollars in the CRC, with all but $100,000 of that tied to specific projects which were required to directly address both CRDC's and the CRC's strategic objectives through this collaborative research framework.

CRDC also seeks opportunities to undertake collaborative research with other RDCs. CRDC has been an enthusiastic participant in activities including joint national strategic R&D planning with the Primary Industries Standing Committee, impact evaluation 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 supporting the RDCs to collectively maximise their ongoing contribution to a sustainable and profitable Australian agricultural sector.

CRDC works with other RDCs at both strategic and conceptual levels and seeks opportunities to increase further the range of collaborative research projects and programs. Examples are:

- the Climate Change Research Strategy for Primary Industries (CCRSPI). All RDCs and the members of the Primary Industries Standing Committees are participants.
- 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.
- together with other RDCs, CRDC re-invested in the new Collaborative Partnership for Farming and Fishing Health and Safety.
- the Corporation continues to work closely with Catchment Management Authorities and other regional bodies on natural resource issues and 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.
- a project to improve the standardisation of Life Cycle Assessment across rural industries, together with the Rural Industries Research and Development Corporation, Sugar Research and Development Corporation, Meat and Livestock Australia, Dairy Australia, Australian Pork Limited and the Australian Chicken Meat Federation.
- a project to investigate economic impacts of an emissions trading scheme on agricultural industries, together with the Australian Farm Institute, Australian Wool Innovation and Dairy Australia. This has proved to be timely, with the recent announcement by the Australian Government of a Carbon Pollution Reduction Scheme.

An important benefit of collaboration with other RDCs is the ability it has provided for an independent assessment of whether R&D investments are delivering a satisfactory return on investment. During the reporting year CRDC submitted two of its research projects for cost benefit analysis using a new R&D evaluation framework developed for the Council of Rural

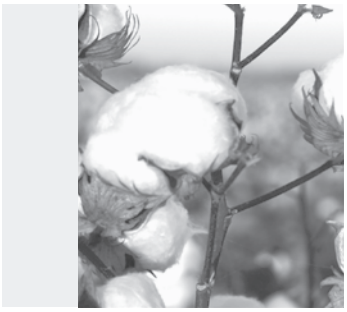
Research and Development Corporations Chairs. The first evaluations, completed in February 2008, confirmed a high level of return on public and industry investment in these areas, as detailed in the Chair and Executive Director's Report on page one. The final report has not yet been released and this project is ongoing.

CRDC, the Rural Industries Research and Development Corporation, Land and Water Australia and the National Water Commission jointly purchased the same software to administer research programs and continued to work collaboratively to ensure it functions efficiently.

Community collaboration in 2007–08 has included a new Aboriginal school-based traineeship program, developed by CRDC with assistance from the Aboriginal Employment Strategy. CRDC once again sponsored primary school students to attend the 2007 NSW Youth River Health Conference. These initiatives are discussed further in Program One on page 40.

While much has been achieved to date through collaboration, the CRDC and Council of Rural Research and Development Corporations Chairs have identified further opportunities. CRDC will pursue these opportunities vigorously over the life of its new Strategic R&D Plan 2008–2013.

In a joint Aboriginal Employment Strategy initiative that aims to understand how to build the industry's future capacity, five students gained paid work experience at the Australian Cotton Research Institute and CRDC



Context

ABOUT CRDC

Our Vision 2003–2008

A globally responsible cotton industry.

Our Mission 2003–2008

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

We achieved 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 2003–2008

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

We achieved 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

In addition, 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

Moreover, 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 environmental, social and economic values associated with cotton production systems and to increase benefits 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. It organises workshops, seminars and field days for a range of purposes. Also it reviews research and progresses 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.

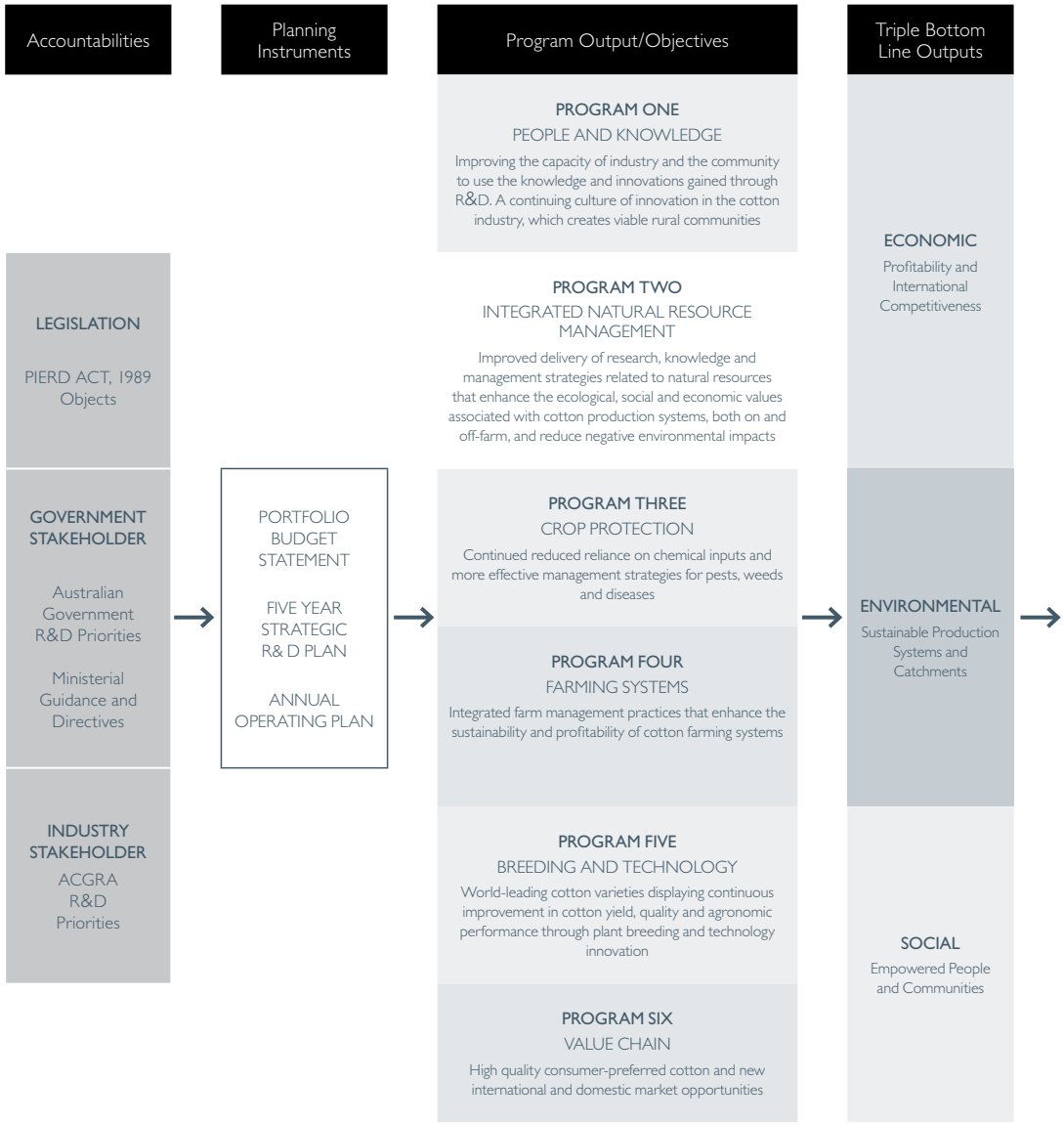
CRDC researchers are actively involved in the dissemination of research results, working with the CRDC-supported National Cotton Extension Team.

Our Corporate standards

Under the Board's Charter and the staff's Statement of Principles, CRDC:

- is committed to the set of values embodied in the strategic plan
- is committed to excellence and productivity
- is committed to providing the highest levels of accountability to stakeholders
- will act legally, ethically, professionally and responsibly in the performance of their duties
- strives to maximise return on investment of industry and public funds invested through our Corporation
- strives to make a difference in improving the knowledge base for sustainable cotton production in Australia
- values 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
- values the contribution, knowledge and expertise of the people within our organisation and that of our contractual consultants, external program coordinators and research providers
- promotes active, honest and effective communication
- is committed to the future of rural and regional Australia
- complies with and promotes best practice in corporate governance
- is committed to meet all statutory obligations and accountability requirements in a comprehensive and timely manner

Our Strategic Elements 2003–2008



Triple Bottom Line Objectives	Key Targets	Outcome
Evidence that tools and knowledge products are contributing Employment of people in R&D Improved relative economic returns of cotton crops Increased returns per megalitre of water Increased yields per hectare and per megalitre of water Evidence of management options and farming practices that reduce costs or improve profitability Evidence that new cotton varieties are increasing yield, improving fibre quality and potential returns Improved fibre quality to reduce financial discounts received by growers Increased market opportunities evidence by market analysis of pricing demand for Australian cotton in the world market	A 10% improvement in cotton yield per hectare by 2008 Evidence of continuous improvement in 5 key parameters measured in spinning mill benchmark surveys Evidence that prices for Australian cotton remain above those for competitive cotton growths in 2005 and 2007 Evidence that profit margins are improving over time: 2003–2008 both annually and trends over time	A more sustainable, profitable and competitive cotton industry providing increased environmental, economic and social benefits to regional communities and the nation
Reduced chemical inputs Improved water use efficiency Increased adoption of BMP Broader environmental coverage of BMP and recognition in the market place EMS evaluated as a farm management tool Improved trends in landscape and catchment indicators such as salinity, water quality and biodiversity Benchmark soil health and improved nutrient recover Published refereed science on environmental impacts of new transgenic technology Benchmarked greenhouse gas emissions, energy use and climate change impacts	A 50% reduction in 2004 quantities of insecticide used by 2008 A 20% reduction on 2004 quantities of residual herbicide used by 2008 Continued decline in riverine contamination by herbicides used only in cotton production by 2008 80% of cotton production audited against BMP Minimum Certification Standards by 2007 A 20% improvement in farm WUE against the 2004 median by 2008 measured in bales per megalitre	→
Improved skills and qualifications of people at all levels of the industry Scholarships to students Study exchanges and conference support for people at all levels of the industry Improved OH&S performance in workplaces and reduced health and injury risks Employment of people in R&D including age, gender trends and location More women in key industry roles Capacity building activities with industry, schools, universities and community groups that improve social capital Evidence of proactive stewardship of transgenic and conventional technology Collaborative links and partnerships established to improve knowledge exchange into and out of the industry High quality cotton (lint and seed) that meets market needs and consumer preference Improved perception of cotton production by the community	Between 2003 and 2008: • 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 Healthy and resilient communities in cotton producing regions though: • 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 At least 5 adoption evaluations conducted per year by members of the National Cotton Extension Team	

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.

Australian cotton farmers are noted as early adopters of R&D outcomes and many cooperate in the R&D trials that assist in achieving those outcomes

Due to the drought conditions of recent years, the number of cotton enterprises currently producing the crop is around 800, down from a peak of around 1200 prior to this period of drought.

In addition to climatic changes in recent years, the continuing low price for cotton and recent higher prices for crops such as wheat have meant that growers now regard cotton more as a key crop enterprise within a sustainable rotation system supported by broad acre irrigation technologies and farming systems that optimise natural rainfall, soil fertility and available irrigation water.

Other rotational crops grown by cotton farmers include summer crops such as sorghum, sunflowers and soybeans, and legume and cereal winter crops such as faba beans and wheat. The rotation can also include crops such as vetch, grown specifically to improve soil health and nutrition.

Farmers make an assessment each year as to which will be the most profitable and sustainable crops for the current climatic, agronomic and market conditions. A legacy of R&D-driven achievements in breeding and crop management over the past decade ensures that farmers factor in a cotton crop in their farming system as a resilient and adaptable crop. Further, the modern cotton cropping system is well adapted to the challenges posed by climate change.

Cotton grown within a non-irrigated farming system has always been dependent on rain-fed production. In years of adequate rainfall, it comprises up to 20 per cent of the total crop. Dryland growers base their assessment of whether to grow cotton on much the same criteria as an irrigation farming system that relies on the availability of water.

The average Australian cotton farm is 4630 hectares in size, of which 362 hectares is planted to cotton and 2840 hectares is used for dryland cropping or livestock grazing. Cotton production is highly mechanised, capital intensive, technologically sophisticated and requires high levels of management expertise. 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.

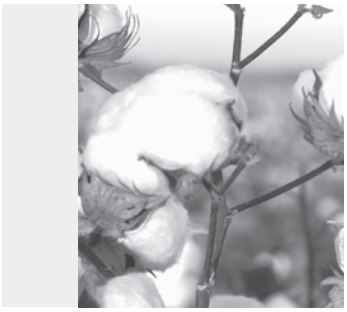
The average yield for irrigated cotton in Australia is over 1800 kilograms per hectare. This is the world's highest cotton yields, which is attributable almost entirely to improved cotton breeding and better crop management systems achieved with a significantly reduced impact on the environment.

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.

The economic and environmental health of the industry can be attributed largely to high quality collaborative research and development, much of it coordinated and funded by CRDC. The continued R&D effort by CRDC and its government and industry stakeholders, in conjunction with the Cotton Catchment Communities CRC, remains of paramount importance to the industry. R&D is an essential tool for the cotton industry 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.

2008 and beyond

Water storages remained at low levels in most catchments at the end of the 2007–08 growing season. In planning for the year ahead, CRDC has forecast a crop of 1.5 million bales but this is dependent on a range of factors. Water availability is still expected to be a constraint on production in the coming year, international prices continue well below the historical average and the Australian dollar is volatile. Above average winter and spring rains are forecast and, should this eventuate, it will provide renewed levels of confidence that could influence the amount of cotton planted. At the same time, many farmers are looking for cash flow injections from winter cereals, so the outlook for cotton in the 2008–09 season remains uncertain.



Stakeholder Relations

THE AUSTRALIAN COTTON GROWERS RESEARCH ASSOCIATION

The Australian Cotton Growers Research Association (ACGRA), is CRDC's legislated industry representative body, acting on behalf of the cotton industry. As a grower-owned organisation, ACGRA also carries out or facilitates a range of R&D-related roles that spread across the cotton industry.

ACGRA R&D priorities

- 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

Research Responsibilities

ACGRA has been integral to each stage of formulation of CRDC's R&D program since the Corporation was established. A formal process allows ACGRA to ensure the industry's priorities are reflected in each five-year Strategic Plan. Each year ACGRA and CRDC hold a formal joint review of the current Strategic Plan to ensure its continuing relevance to the industry. In 2007–08, ACGRA worked with CRDC on development of the Corporation's new five-year plan, which began implementation in July 2008.

Each year, ACGRA evaluates new project proposals received by CRDC 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. In 2007–08, ACGRA had a specific research committee for each of the six CRDC programs and each ACGRA member sits on at least one of the committees. Each committee then considers research and/or adoption applications in detail and reports its views to the Association as a whole at the annual ACGRA research review meeting.

As well as its role with CRDC, ACGRA is also responsible for liaising on research issues generally on behalf of the cotton industry: for example, with the State Departments of Primary Industries. ACGRA is a member of the Australian Cotton Industry Council and represented on its four committees, and is the cotton industry member of Plant Health Australia. ACGRA is a participant in the Cotton, Catchment Communities CRC, with both funding and in-kind commitments.

Transgenic and Insect Management Strategy Committee (TIMS)

TIMS is an ACGRA sub-committee and it provides the chair and up to five grower members of the committee. TIMS also includes representatives from CSIRO, state departments of primary industries, CRDC and the Cotton Catchment Communities CRC. The committee is responsible, in close consultation with the relevant scientific experts and technology providers, for developing the industry-wide resistance management strategies for conventional insecticides and transgenic cotton.

As a grower-owned organisation, ACGRA facilitates a wide range of important R&D advisory functions which add significantly to the effective decisions that drive industry research and its development

NORCOM

NORCOM – Industry development in Northern Australia – is an industry-based stewardship committee convened by ACGRA that oversees R&D relating to the development of new cotton growing areas (currently North Queensland). Although CRDC does not invest in this area at present, NORCOM provides advice to the Cotton Catchment Communities CRC – CRDC's major collaborative partner.

Industry Biosecurity Group

ACGRA coordinated the development of the Cotton Industry Biosecurity Plan in 2006. With industry and government stakeholders, ACGRA convenes the Industry Biosecurity Group.

The Australian Cotton Conference

ACGRA has organised, financed and administered 13 highly successful and well-attended R&D conferences in the past. This industry forum covers the major issues of industry concern as well as important research developments and innovations and their adoption by industry. The 14th conference, *New Beginnings – Cotton in a Climate of Chang*e, held in August 2008 was, for the first time, organised jointly by ACGRA and the Australian Cotton Shippers Association to formalise the R&D focus on the entire production chain that has been a feature of recent conferences. CRDC is a foundation sponsor of the conferences.

THE AUSTRALIAN GOVERNMENT

Meeting Australian Government expectations

On 1 March 2007, Ms Sussan Ley MP, Parliamentary Secretary to the then Minister for Agriculture, Fisheries and Forestry, provided CRDC with an 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. Ms Ley provided CRDC with a second Statement of Expectations on 11 September 2007 and the Corporation once again responded with a Statement of Intent. Both the Statements of Expectations and the CRDC Statements of Intent can be found on the CRDC website, www.crdc.com.au

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 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.

The Australian Government issued new rural research and development priorities in May 2007 and these are listed on page 31. Because these priorities were released after submission of the CRDC Annual Operating Plan for 2007–08 to the Australian Government, the plan incorporated the former, rather than the current, priorities. Consequently, this report also addresses the former priorities.

As can be seen from the tables on page 25, each CRDC program addresses most of the National and Rural Research Priorities and some address all. Information about the principal contributions to these priorities in 2007–08 begins on page 26; further details can be found throughout the Report of Operations – Research and Development.

Composition of National Research Priorities attributed to each CRDC R&D Program 2007–08 ($'000)

National Research Priorities (NRP)	An Environmentally Sustainable Australia							Promoting and Maintaining Good Health				Frontier Technologies for Building and Transforming Australian Industries					Safeguarding Australia					Total
	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	
Program 1	87	30	73	7	22	0	1.5	0	0	0	174	231	92	0	46	321	0	0	0	0	0	**1086**
Program 2	97	33	82	8	25	0	1.7	0	0	0	25	77	31	0	15	107	0	0	0	0	0	**503**
Program 3	95	33	80	8	25	0	1.6	0	0	0	0	905	362	0	181	1259	0	0	24	0	0	**2975**
Program 4	104	36	88	9	27	0	1.8	0	0	0	329	434	174	0	87	604	0	0	0	0	0	**1893**
Program 5	31	11	26	3	8	0	0.5	0	0	0	233	225	90	0	45	313	0	0	0	0	0	**984**
Program 6	0	0	0	0	0	0	0	0	0	0	188	85	34	0	17	118	0	0	0	0	0	**442**
Total	**413**	**142**	**349**	**38**	**107**	**0**	**7**	**0**	**0**	**0**	**949**	**1,957**	**783**	**0**	**391**	**2,724**	**0**	**0**	**24**	**0**	**0**	7,883

Composition of Rural Research and Development Priorities attributed to each CRDC R&D Program 2007–08 ($'000)

Rural Research & Development Priorities (RRDP)	Sustainable Natural Resource Management		Improving Competitiveness through a Whole of Industry Approach		Maintaining & Improving Confidence in the Integrity of Australian Agricultural, Food, Fish and Forestry Products		Improved Trade and Market Access		Use of Frontier Technologies		Creating an Innovative Culture		Protecting Australia from Invasive Diseases and Pests		Other Research		Total	
Expenditure	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%
Program 1	221	20.3	121	11.1	50	4.6	3	0.3	299	27.5	393	36.2	0				1086	100
Program 2	247	49.1	7	1.4	15		4	0.8	113	22.5	117	23.2	0				503	100
Program 3	242	8.2		3.0					1321	44.4	1387	46.6	24	0.8			2975	100
Program 4	264	14.0	36		29		265	14.0	659	34.8	640	33.8	0				1893	100
Program 5	79	8.0	92	1.5	0		140	14.2	375	38.1	298	30.3	0				984	100
Program 6	0		43		0		145	32.8	164	37.1	90	20.4	0				442	100
Total Expenditure	**1,054**		**300**		**93**		**557**		**2,931**		**2,925**		**24**				7,884	100%

STAKEHOLDER RELATIONS

Addressing Australian Government research priorities

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 Outputs and Outcomes 2007–08:

INPUT	Ongoing improvement, expansion and implementation of the Best Management Practices (BMP) program
PROGRESS	The number of cotton farms involved in the BMP program at a pre-certification or full certification level, although impacted by the drought during 2007–08, has reached 40 per cent. In 2007–08, a revision of the existing BMP manual, and the development of an electronic version have set the groundwork for a full revision of the program in 2008–09. BMP will then provide a clearer value proposition for participation by the remaining 60 per cent of growers by clearly linking BMP to better outcomes – not only for environmental management but also for the farm business – and reinvigorate the link between research knowledge and the BMP guidelines. A strategic plan has been developed for the revision of the BMP program in 2008–09 and a BMP General Manager appointed to ensure the revision process is focused and coordinated.
INPUT	35 workshops on spray drift management conducted in 2007–08 under an extension project by CRDC and the Grains Research and Development Corporation (GRDC), in conjunction with local catchment management bodies.
PROGRESS	Cleaner waterways both on and off farm; however, damage caused by spray drift from application of the herbicide 2,4-D was still significant for many cotton crops during 2007–08. Cotton is highly sensitive to this herbicide and the season saw the largest planting for many years of other summer crops in which it is widely used.
INPUT	Support for Roundup Ready® resistance strategies and integrated weed management (IWM).
PROGRESS	Contamination of rivers by herbicides used in cotton has declined in direct relationship to the introduction of Roundup Ready® and Roundup Ready FLEX® cotton, with further gains made in 2007–08. The latest research findings show that IWM continues as the main weed control focus, with more than 90 per cent of growers using some or all IWM measures.
INPUT	Research to improve integrated chemical and non-chemical management of insect and mite pests.
PROGRESS	Biopesticides show the potential to control green mirids biologically and should provide significant environmental benefits when commercialised. The Environmental Impact Quotient scores for insecticide use in the 2006–07 season show a fall of up to 91 per cent from the highs measured in the late 1990s. Bollgard II® varieties' market share increased another six per cent to 96 per cent in 2007–08. Averaged over the past five seasons, Bollgard II® crops required less than 15 per cent of the insecticide required for conventional crops.
INPUT	Research addressing deep drainage and salinity on-farm and at a catchment scale, and sodicity on-farm.
PROGRESS	A better understanding of how to achieve sustainable groundwater use and catchment health: options for reducing water losses through deep drainage are being clarified and research utilising evidence from 35 lysimeters has shown how farmers can reduce deep drainage. A summer scholarship project has provided detailed measurements of soil water, distribution of irrigation water and changes to the water balance in an irrigated cotton system, using electromagnetic induction (EM).

	Research has identified crop rotations that can reduce the impact of sodicity and offer both improved environmental benefits and increased profitability. Research on management of sodic soils with the addition of gypsum and/or lime is underway. Research has shown that only a limited salinity risk exists in cotton growing areas. Extensive information is now available on GIS and able to predict where salinity problems might occur.
INPUT	Research on greenhouse gas emissions in the cotton industry.
PROGRESS	CRDC contributed to the successful development of the National Climate Change Research Strategy for Primary Industries (CCRSPI). Further contributions to implementation will be made in 2008–09. An on-farm energy use calculator, EnergyCalc, now provides a useful tool to help growers to become more fuel and energy efficient, and thus more environmentally sustainable and profitable. Workshops for irrigated cotton and grain farmers on efficiency for irrigation pumps are heightening awareness of the potential for energy efficiency gains and cost savings. Over 700 people used a greenhouse gas on-line calculator developed with the assistance of CRDC investments to calculate their greenhouse gas footprint. Nitrogen Use Efficiency farm trials held in all cotton growing valleys show that an average saving of 40 kilograms of nitrogen per hectare is possible without affecting yield. This would represent savings of $7.4 million to the industry and has the potential to reduce greenhouse gas emissions of nitrous oxide by 21,500 tonnes.
INPUT	A major water use efficiency research effort: development of measurement that is more viable; whole farm water use and efficiency linked to BMP; better irrigation timing and water placement.
PROGRESS	New case studies and information resources are assisting on-farm water use efficiency: improved pump efficiency, options for leaky water storages, new irrigated grain supplements for WATERpak.
INPUT	Investment in cotton breeding and biotechnology program.
PROGRESS	CRDC investments mean healthier cottonseed oil. A business case has identified commercial opportunities. Further work will depend on market interest.
INPUT	Multidisciplinary approaches to farm management to complement catchment and landscape environmental outcomes.
PROGRESS	An initial simple set of environmental performance indicators has been developed for use on multi-commodity (cotton, grains, beef) enterprises to measure soil health, water quality, biodiversity, industry health and carbon emission performance. Research shows native fish are more abundant compared to exotic varieties in on-farm water storages than in nearby rivers. 100 indigenous tree species were identified in one cotton valley, providing growers with better identification and conservation information. Landholders have responded enthusiastically to Groundwater Field Days based on CRDC research outcomes and seek to use updated information to benefit catchments. CRDC and Rural Industries Research and Development Corporation's *Growing Trees on Cotton Farms* is now used more widely in the agricultural sector, generating strong demand for a revision.

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 Outputs and Outcomes 2007–08:

INPUT	Collaborative research with some 40 key partners, along 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; an investment of four million dollars in the Cotton Catchment Communities CRC for research that addresses both organisations' strategic needs
PROGRESS	A wide range of gains: environmental (eg, sustainable irrigation), economic (eg, financial benchmarking) and social (eg, community benefits, capacity building, Farm Health & Safety).
INPUT	Monitoring of signals from the cotton textile and oilseed marketplace to ensure Australian cotton maintains a place at the high end of the market.
PROGRESS	Trials have shown that opportunities may exist for blending premium Australian upland cotton types with Pima cotton to increase textile value. Despite drought, the 2007–08 season delivered high quality cotton. Australian cotton remained among the top prices listed for the highest category of upland cotton on the Liverpool *Cotton Outlook* 'A' index and continued to perform well against the industry SJV benchmark.
INPUT	Support for the CSIRO plant breeding and biotechnology program. This includes development and progress towards commercialisation of healthier cottonseed oil.
PROGRESS	After eighteen years, CRDC anticipates that the major investment it has made to the CSIRO cotton plant breeding and biotechnology program will effectively cease following a Cotton Breeding Australia joint venture by CSIRO and Cotton Seed Distributors Ltd, indicating that CRDC no longer needs to address market failure. CSIRO-bred cotton varieties, developed with CRDC support, currently represent over 90 per cent of the Australian market and are well represented around the world. Two new varieties commercially released in 2008 were products of previous CRDC investments. 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 and levels of resistance continued to improve in 2007–08.
INPUT	Research and promotion to achieve safe, healthy workplaces.
PROGRESS	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. CRDC, in conjunction with the Australian Centre for Agricultural Health and Safety, has begun a project to document and quantify the impact new technologies have had on health and safety in the industry. When completed, the study will aid a more integrated approach to health and safety risk assessment, management and reporting for the industry. The Collaborative Partnership for Farming and Fishing Health and Safety has been established and includes cropping-based industries plus the Fisheries Research and Development Corporation (FRDC). CRDC has begun the process of updating the *Safe Harvesting of Cotto*n video into a new DVD format with the latest information.

National Priority
Frontier technologies for building and transforming Australian industries

Rural Priority
Use of frontier technologies

Contributing R&D Programs: all programs

Principal contributing Inputs and progress towards Outputs and Outcomes 2007–08:

INPUT	Investment in the CSIRO cotton biotechnology program (cotton is one of only two major rural industry in Australia using biotechnology).
PROGRESS	Cotton varieties with a range of enhanced characteristics are using less insecticide and herbicide, and have increased quality and yield and resistance to pests and disease. The CottTech suite of cotton biotechnology projects concentrates on fundamental science and allows researchers to undertake more creative and original research. Genes that reduce the impact of waterlogging are being investigated within CottTech. A number of genes have been isolated and the first small plot field trial was conducted in 2008. Refining the technology will occur after assessment of the 2007–08 yield results. A new short-term CottTech project is determining whether the genome for the Australian strains of Fusarium wilt fungus can be sequenced. 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	Investment in the development of innovative SiroMat and Cottonscan fibre measurement technologies.
PROGRESS	Further development and testing in 2007–08 confirm that they offer more precise and sophisticated measurement of cotton maturity and fineness. Business cases have been prepared and commercialisation opportunities are being investigated.
INPUT	Final stage of implementation of recommendations from a major 2005–06 review of Extension, Education and Training.
PROGRESS	The establishment of new generalist and specialist positions, rigorous evaluation of activities and collaboration and coordination with other organisations such as Catchment Management Authorities means all major cotton regions now have access to newly focused, coordinated and high-level extension services.
INPUT	15 PhD scholarships in 2007–08 (and 79 since 1992). Seven travel grants, including five to support Australian researchers to attend World Cotton Research Conference in September 2007.
PROGRESS	Skills and knowledge acquisition in a range of cotton-related and natural resource management areas that will enhance the capacity of the cotton industry and wider agricultural sector. Facilitation of national and international R&D collaboration.
INPUT	19 sponsorships for industry personnel to attend conferences, exhibitions and leadership courses in Australia and overseas. This included growers, tertiary and secondary students.
PROGRESS	Increased human capacity across the cotton industry.
INPUT	Investment in the inaugural Australian Future Cotton Leaders Program, initiated by Cotton Australia with the support of the Australian Government's Department of Agriculture, Fisheries and Forestry.
PROGRESS	Participants gained improved self-confidence and the skills to present their ideas effectively.

INPUT	Logistical support for women in the cotton industry (through WINCOTT Women Industry Network – Cotton); financial support for women to undertake leadership courses.
	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. Owing to participation in the CRDC-supported WINCOTT initiative, many more women have confidence to compete for entry to leadership courses. All six women competitively selected to participate in the Australian Future Cotton Leaders program (sponsored by CRDC) are active in WINCOTT.
INPUT	A pivotal role in 2007–08 in planning the biennial ACGRA Australian Cotton Conference, held in August 2008 on the topic "New Beginnings – Cotton in a Climate of Change".
PROGRESS	A high proportion of cotton growers and consultants attend the conference to learn about new industry R&D. The conference has amalgamated for the first time with the Australian Cotton Shippers Association conference and will encompass the entire cotton industry, from researchers through to brand owners.
INPUT	Support for the *Cotton Field to Fabric Training Course: Managing for Quality through the Production Chain.*
PROGRESS	50 industry participants in the fully booked 2007–08 courses demonstrated a strong recognition of the importance of maintaining quality through the production chain: a major focus of CRDC's new Strategic Plan for 2008 to 2013. Demand for places in the course from countries that consume Australian cotton is also increasing.
INPUT	Development of a Diploma of Agriculture, Certified BMP Farm Manager.
PROGRESS	Participants have gained formal recognition of cotton industry skills and potential cotton industry training requirements have been identified.
INPUT	Investment in the Cooperative Venture in Capacity Building.
PROGRESS	This program is now completed and the planned outcome achieved. It has improved the skills of rural industries personnel and demonstrated the strength of the RDCs model.

National Priority
Safeguarding Australia

Rural Priority
Protecting Australia from invasive diseases and pests

Contributing R&D Program: Program Three

Principal contributing Inputs and progress towards Outputs and Outcomes 2007–08:

INPUT	Research relating to endemic or potential disease threats.
PROGRESS	Research is aiding in development of a compound that utilises the plant's own defence mechanism to resist infection by Fusarium wilt and Black Root Rot. The rate of spread of cotton's major disease, Fusarium wilt, is reducing, due to improved management and hygiene. Improvements in resistance in newer varieties allow growers to plant-back into fields known to have Fusarium. Tobacco Streak Virus was confirmed in cotton that was in close proximity to the principal host, parthenium weed. Monitoring and investigation of its impact will continue. Fusarium wilt and Black Root Rot were problematic in the 2007–08 season. Research indicated a link to specific soil factors and further research will be undertaken.

INCORPORATING STAKEHOLDER PRIORITIES

The Strategic Plan 2003–2008 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 2007–08, the implementation of that plan and reporting for the year.

Objects of the PIERD Act 1989

a. Increase economic, environmental and social benefits
b. Achieve sustainable use and management of natural resources
c. Make more effective use of human resources and skills
d. Improve accountability for expenditure

National Research Priorities

Australian Government

December 2002

An Environmentally Sustainable Australia

Transforming the way we utilise our land, water, mineral and energy resources through a better understanding of human and environmental systems and the use of new technologies

Promoting and Maintaining Good Health

Promoting good health and well being for all Australians

Frontier Technologies for Building and Transforming Australian Industries

Stimulating the growth of world-class Australian industries using innovative technologies developed from cutting-edge research

Safeguarding Australia

Safeguarding Australia from terrorism, crime, invasive diseases and pests, strengthening our understanding of Australia's place in the region and the world, and securing our infrastructure, particularly with respect to our digital systems

Priorities for Rural R&D

Australian Government

March 2003*

Sustainable natural resource management

Improved 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

Creating an innovative culture

***Note:** The Australian Government issued new priorities in May 2007 and these are listed below. Because the new priorities were released after submission of the CRDC Annual Operating Plan for 2007–08 to the Australian Government the plan incorporated the old, rather than the new, priorities so it is these that are reported against.

May 2007

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

Biosecurity
Protect Australia's community, primary industries and environment from biosecurity threats.

Cotton Industry Priorities

Australian Cotton Growers Research Association

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

COTTON RESEARCH AND DEVELOPMENT CORPORATION
Annual Operating Plan and Annual Report for 2007–08

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 2007–08:	31
Compared with 2006–07:	41
Expenditure in 2007–08:	$0.91 million
Compared with planned expenditure:	$1.09 million
Compared with 2006–07:	$1.33 million

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

Overview

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 been CRDC's long-term investment in people and their capacity to access and use knowledge. This commitment continued throughout the period of the Strategic Plan 2003–2008 even though the level of expenditure fell in line with CRDC's drought-related reduction in income.

The Corporation has continued to give a high priority in its new Strategic Plan for 2008–2013 to supporting the cotton industry's people to conduct research, transfer research outcomes and improve the skills and capacity of the whole industry and its local communities.

STRATEGY ONE

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

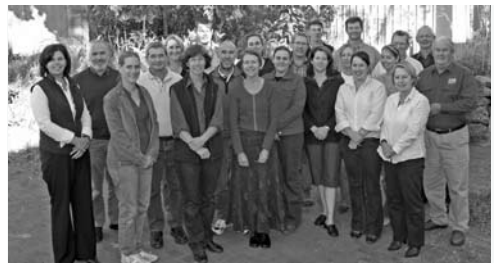
CRDC remains the major investor in the National Cotton Extension Team, which is managed by the Cotton Catchment Communities CRC. The CRDC program management team is closely involved in ongoing evaluation and development of the team's extension activities.

Following a review of the team in 2005–06 and its refining and enhancement in 2006–07, the next stage of the process, in 2007–08, saw a significant sharpening and focusing of the team's activities. Coordination with officers from associated organisations improved significantly and fortnightly regional roundup teleconferences, with up to 40 participants, ensure this process remains on track. 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 costly duplication.

The team undertook many well attended collaborative field days and research meetings for the industry and its surrounding communities on diverse subjects such as birds on farms, healthy soils, overhead irrigation systems, efficient pumps and biodiversity.

Growers at a Birds on Farms workshop organised by the industry extension team.

Planning is now underway to widen awareness of the benefits the Extension Team can provide to growers. A workshop in May 2008 produced plans for the next twelve months, including regional planning with all cooperating organisations. A national planning team worked on plans for industry-wide issues at this workshop. These will flow to all regional areas.



National Cotton Extension Team workshop, May 2008

A major focus in 2007–08 has been capacity building within the extension team, encompassing training on how best to build capacity amongst growers and local communities. In 2007, CRDC encouraged members of the extension team to submit individual projects to *On the Fast Track*, which is part of the Cooperative Venture for Capacity Building (CVCB) program. This project, which ended in April 2008, equipped capacity-building practitioners with knowledge and tools developed during the CVCB program and provided them with mentors to help further enhance their own projects. CRDC staff also undertook a CVCB *On the Fast Track* project to identify possible synergies between the cotton CVCB projects. Despite the significant differences in topics and methods, this project identified eleven synergies needed for a successful capacity-building project, which will form a knowledge base for future activities.

The Cotton Extension Team members who participated in the CVCB *On the Fast Track* project attended a summing-up session in Roma, Queensland

CRDC invested significant funds and logistical support to facilitate the appointment of a Healthy Soils Extension Specialist, as part of a cotton project under the *National Heritage Trust Initiative – Healthy Soils for Sustainable Farms*. This appointment has allowed a streamlined, consistent and coordinated approach to soil extension throughout the irrigated cotton and grain growing areas in eastern Australia. Soil health workshops saw 88 per cent of participants identify areas in which they could increase the sustainability of their farming practices and 75 per cent identified areas in which they could increase the profitability of their farming practices. Twelve Healthy Soils Case Studies, developed with CRDC support, are now available for extension use.

CRDC projects support the employment of several members of the Water Extension Team. During 2007–08, team members delivered 21 Cotton and Grains Irrigation Workshops throughout cotton growing regions, to 185 irrigators and consultants. The workshops are aligned with the cotton industry's Best Management Practices (BMP) program and references to the relevant sections are delivered as part of the training module in the course. The Water Extension Team also conducted workshops in Goondiwindi, Gunnedah, Dalby and Moree on centre pivot and lateral move overhead irrigation systems.

In an attempt to reduce the incidence of spray drift and off-target impacts, 35 grower workshops were conducted in 2007–08 under an extension project supported by CRDC and the Grains Research and Development Corporation (GRDC). These workshops, conducted in conjunction with Catchment Management Authorities, also subsidised the cost of spray nozzles that reduce drift by delivering larger droplets. Despite these efforts, damage caused by spray drift from application of the herbicide 2,4-D was still significant for many cotton crops during 2007–08. Cotton is highly sensitive to this herbicide and the season saw the largest planting for many years of other summer crops in which it is widely used.

MEASURES OF SUCCESS

- CRDC's high level of investment in the National Cotton Extension team means all major cotton regions have access to newly focused, coordinated and high-level extension services
- Successful workshops held throughout the cotton regions increased awareness of sustainable irrigation management and the importance of biodiversity on cotton farms
- A CRDC project identified eleven common factors or synergies across six very different CVCB projects. These were instrumental in the success of the projects and provided a model for future capacity-building projects.

STRATEGY TWO

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

CRDC conducted the 'Aligning National Competencies with the Cotton Industry's Best Management Guidelines for Strategic Training' project in 2007, funded by Queensland FarmBi$ Targeted Industry Initiative. Accreditation for the industry's BMP program is awarded to the farm rather than to the individuals responsible for achieving the BMP accreditation, so the project concentrated on providing recognised qualifications for those individuals. The project identified alignment to 19 competencies in the Australian Training Framework and ten were selected to form a Diploma of Agriculture providing qualifications as a Certified BMP Farm Manager. Indications are that the formal endorsement of the Certified BMP Farm Manager concept in January 2008 will stimulate the recognition of existing skills and subsequent identification of further training requirements, and encourage greater involvement by farmers in the BMP process.

"I already have an applied science degree but still think the BMP certificate is worthwhile for farm employees like myself. When an employee moves on, it proves to be valuable evidence of the skills they have acquired."

Brian Strand

Brian Strand, *right*, with CRDC-funded National Training Coordinator, Mark Hickman, manages a farm that has been BMP-certified for several years. He completed the Certified BMP Farm Manager Diploma of Agriculture in 2007–08

CRDC staff and researchers presented current and recently concluded research results from CRDC-supported projects to leading producers, consultants and agribusiness at the Cotton Collective series of meetings convened by the Cotton Catchment Communities CRC and held in Narrabri in August 2007.

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 secondary school students from north west NSW. Guest speakers outlined the wide 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.

CRDC provided 19 sponsorships for industry personnel to attend conferences, exhibitions and leadership courses in Australia and overseas. This included growers, tertiary and secondary students, these activities also enhance the skills base in local communities.

Ann Frizell (Armidale) Tiffany Hunt (Warialda) James John and Brittany Valentine (Wee Waa) with PhD student Baoquain Lu at the Australian Cotton Research Institute, as part of the 'Careers in Cotton' tour

CRDC awarded a scholarship for the Cotton Catchment Communities CRC Cotton Production Course at The University of New England, to consulting agronomist, Jemima Maslen, from Hay. This unique course has four study units developed by cotton researchers and other industry personnel

CRDC sponsored four growers to attend the *Cotton Field to Fabric Training Course: Managing for Quality through the Production Chain*, held at CSIRO Materials Science and Engineering in Geelong. This unique and highly regarded course provides an Australian perspective on the global marketplace for Australian cotton fibre. It covers in depth cotton 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 investments in research, development and extension. Demand for the *Field to Fabric* course has been strong, with the two courses held in 2007–08 attended by 50 industry participants. The level of interest demonstrates a strong and ever-growing recognition within the industry of the importance of maintaining quality through the production chain: a major focus of CRDC's new Strategic Plan for 2008–2013. Demand for places in the course from countries that consume Australian cotton is also increasing.

In 2007–08, CRDC provided 15 post-graduate scholarships to students undertaking scientific research relating to cotton or broader natural resource management. CRDC also funded four post-doctoral projects and one honours project.

CRDC investments allowed nine researchers to travel overseas during the reporting year. Funding for a number of individual projects included payment for researchers to undertake travel related to the research project.

Participants comment on the Field to Fabric course:

"As well as the diverse range of topics, there was an equally diverse range of participants – a mixture of growers, ginners, marketers, industry personnel and a reasonably large contingent of overseas visitors from China, America, South Africa and Singapore. This gave all the participants a chance to discuss their own area of knowledge and to gain an understanding of an international view of Australian cotton."

Alison Young
Grower & Consultant, Wee Waa

"The technology, innovation and research that are being conducted at this facility alone show the endless possibilities that textiles could hold. We, as Australian producers, must continue to be research orientated and innovative if we are to be a part of this future, producing longer, stronger, uniform and contaminant-free fibres."

Scott Armstrong
Grower, St George

Participants in the Field to Fabric training course at CSIRO Textile and Fibre Technology facilities study the post-farm gate value chain of the industry

MEASURES OF SUCCESS

- The *Cotton Field to Fabric Training Course: Managing for Quality through the Production Chain* run in 2007–08 gave 50 industry participants a useful perspective on where they fit in the production chain. The courses in 2007–08 were fully booked
- A newly devised Diploma of Agriculture, Certified BMP Farm Manager is providing formal recognition of cotton industry skills and helping to identify potential cotton industry training requirements
- CRDC funded 15 post-graduate scholarships in 2007–08 in cotton and natural resource management related areas. This ongoing investment in the future capacity of the industry and environmental management agencies is providing benefit to the industry and regional catchments, with spillover benefits to local communities
- A 2007 survey of the 79 PhD students supported to date by CRDC found that 47 still work in cotton related science, 18 are working in other science-related fields and three are working on farms, bringing a long term benefit to the Australian cotton industry and wider agricultural sector
- The Cooperative Venture in Capacity Building, completed in April 2008, improved the skills of rural industries personnel and demonstrated the strength of the Rural R&D Corporations (RDCs) model
- Seven travel grants, including five to support Australian researchers to attend World Cotton Research Conference-4 held in Lubbock Texas in September 2007, and 19 industry sponsorships in 2007–08 facilitated important knowledge acquisition, as well as national and international R&D collaboration.

STRATEGY THREE

Foster the development of opportunities for women in the cotton industry

Earlier CRDC seed funding for the Women's Industry Network – Cotton (WINCOTT) allowed the organisation to become financially independent. Seeing WINCOTT as the most effective means of furthering Strategy Three, CRDC staff members (and CRDC-supported researchers) provide a range of logistical and in-kind support that assists WINCOTT to provide information and linkages to the wider industry, community and government. While anecdotal evidence suggests that WINCOTT has successfully delivered on its terms of reference, a survey of members undertaken in December 2007 sought more formal feedback on the success or otherwise of WINCOTT. Members' responses confirmed the anecdotal evidence by showing an overall high satisfaction rating for WINCOTT services.

In line with recommendations in the 1998 National Plan for Women in Agriculture, WINCOTT activities have been responsible for an increase

The Future Cotton Leaders program is funded by CRDC, Cotton Australia and the Australian Government Department of Agriculture, Fisheries and Forestry

in participation of women across industry, government and community groups. One of the main changes attributed to action under the National Plan has been an increase in the participation of women on the FarmBi$ course, with women now comprising over 30 per cent of participants. This is consistent with the WINCOTT evaluation results that found that members highly valued business information.

WINCOTT has proven to be successful in reaching women actively involved in the cotton industry and promoting their contribution across business and community. It now has 280 women associated with the cotton industry formally involved in the organisation, with additional women participating in WINCOTT-sponsored activities. The extent to which this level of success would have occurred without the support provided by CRDC is difficult to quantify, although many comments received from survey respondents indicated that leadership and investment by an external agent such as CRDC were crucial to the achievement of current outcomes.

MEASURES OF SUCCESS

- Women increasingly participate in, and influence, cotton industry and associated organisations such as natural resource management bodies and Catchment Management Authorities, and other R&D organisations
- During 2007–08, CRDC sponsored a female cotton grower to participate in the Australian Rural Leadership Program, two women in the CSIRO *Field to Fabric* course and one to complete the Cotton Catchment Communities CRC Cotton Production Course at The University of New England. Six women were competitively selected to participate in the Australian Future Cotton Leaders Program
- CRDC financial and logistical support has greatly assisted WINCOTT to grow in strength and breadth and, in turn, to enable significant progress under this CRDC strategy
- All six women competitively selected to participate in the inaugural Australian Future Cotton Leaders program are active in WINCOTT.

STRATEGY FOUR

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

As reported last year, CRDC discontinued financial support for the decision support program in 2007–08, based on an evaluation of the usage by cotton growers and consultants of a range of existing tools and current expenditure constraints. The evaluation showed that overall usage did not justify further investments by CRDC during this period of financial constraints. The review indicated that a number of the simple web-based decision support tools developed with CRDC investments are used on a more regular basis and the Cotton Catchment Communities CRC has maintained many of these.

MEASURES OF SUCCESS

- No longer applicable.

STRATEGY FIVE

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

CRDC invested in the development of an on-farm energy use calculator, EnergyCalc, in 2007–08, using seven farms as case studies to measure the total energy used in growing crops. EnergyCalc can be used to estimate energy requirements for a range of crops and is seen as potentially a useful tool to help farming enterprises become more fuel and energy efficient and hence more profitable and environmentally sustainable. Further testing of the tool is planned and is likely to lead to it being offered on-line through the CRDC website and/or the National Centre for Engineering in Agriculture website.

During the year CRDC facilitated the completion of the first revision of the BMP manual and supported a project to develop the first electronic version of the manual. Both of these developments provide a foundation for a more complete revision of the BMP program, being undertaken under the leadership of the Australian Cotton Industry Council's BMP Committee with a high level of CRDC involvement.

The *Knowledge Management in Irrigated Cotton and Grains* project, supported by the National Program for Sustainable Irrigation (NPSI), CRDC and the Grains Research and Development Corporation (GRDC), is regarded as a key success in Program One. This project drew on commitment from the cotton and grains industry to develop a farming systems approach to water use efficiency across the whole farm. The upgraded WATERpak manual, developed with the assistance of CRDC investments and involvement, has been a key element in communicating best practice irrigation. The main output in 2007–08 has been the development of a supplement on irrigated grain crops for inclusion in WATERpak.

MEASURES OF SUCCESS

- Development of an irrigated grains irrigation supplement has enhanced the breadth and depth of WATERpak for use across the cotton and grains industries
- Development of EnergyCalc means farmers will be able to estimate the energy requirements for a range of crops and provides a useful tool to help farmers become more fuel and energy efficient and hence more profitable and environmentally sustainable.

STRATEGY SIX

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 (RIRDC). A replacement joint venture, the Collaborative Partnership for Farming and Fishing Health and Safety, has now been established and includes cropping-based industries plus the Fisheries Research and Development Corporation (FRDC).

CRDC has begun the process of updating the *Safe Harvesting of Cotton*, video into a new DVD format. This project involves broad industry collaboration aided by a widespread awareness of the need and responsibility to avoid injuries and fatalities in one of the more hazardous operations within the industry.

The introduction of genetically modified cotton and the resulting use of lesser quantities of toxic chemicals and a greatly reduced need for spray applications, means that the risks associated with farm practices such as the application of pesticides have decreased significantly. These changes have not been comprehensively studied or reported in relation to farm health; CRDC, in conjunction with the Australian Centre for Agricultural Health and Safety, has begun a project to document and quantify the impact new technologies have had on health and safety in the industry. When completed, the study will aid a more integrated approach to health and safety risk assessment, management and reporting for the industry.

MEASURES OF SUCCESS

- CRDC's re-investment with other rural R&D corporations in the Farm Health and Safety joint venture – now the Collaborative Partnership for Farming and Fishing Health and Safety – encourages a culture that prevents injuries and deaths on farms.

STRATEGY SEVEN

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

As in the previous year, CRDC's major collaboration was with the Cotton Catchment Communities CRC. CRDC invests four million dollars in 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.

In addition, CRDC collaborated in cooperative ventures with a range of R&D providers, government agencies, private enterprises, natural resource management bodies and community groups. Further details can be found in 'Collaboration and Cooperation' on page 15 in the introductory section of this report.

Five indigenous students from Narrabri and Wee Waa High School are undertaking paid work experience at the Australian Cotton Research Institute and CRDC in Narrabri. This program is part of a School-Based Traineeship program developed by CRDC, with the help of the Aboriginal Employment Strategy. Dr Paula Jones from the Cotton Catchment Communities CRC joined the pilot exercise, which aims to understand how to engage the cotton industry with school-age people. This capacity-building project will foster greater

CRDC sponsored cotton valley students to attend the 2007 NSW Youth River Health Conference

engagement between the indigenous community and the cotton industry, as well as providing students with the necessary employment skills and training to access jobs in the industry. CRDC is optimistic that it can provide other businesses in the cotton industry with a model they can apply.

CRDC sponsored students from Wee Waa Public School, Walgett Community College Primary School, Narrabri Public School and St Francis Xavier School, Narrabri, to attend the 2007 NSW Youth River Health Conference. This conference aims to build the capacity of our future leaders and form a lasting commitment to our youth and the sustainable use of the environment and the industries it supports.

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 36 key partners in 2007–08, along with collaboration with a large number of organisations through programs such as the National Program for Sustainable Irrigation, the Cooperative Venture Capacity Building program, the Farm Health and Safety Joint Venture, the Land and Water Australia-managed Healthy Soils for Sustainable Farms program, the Department of Agriculture, Fisheries and Forestry Sustainable Industries Initiative, Queensland Farmbi$ and the Aboriginal Employment Strategy

UNIVERSITY STUDENTS

- CRDC sponsors at least one student per year to do four units in the Cotton Catchment Communities CRC Certificate of Cotton Production at The University of New England, and sponsors a number of CRDC-researchers as guest lecturers during the course
- CRDC has funded 79 PhD students since 1992. This year, 15 PhD students received $32,000 each per annum to support their research and operations.

COMMUNITY

- CRDC sponsors and contributes to the Australian Cotton Exhibition Centre, Narrabri.
- CRDC is actively involved in many forums with universities and farmers' organisations to support education issues and to encourage the study of agriculture and science in schools and at university.

PRIMARY AND SECONDARY SCHOOL STUDENTS

In 2007–08 CRDC:

- sponsored children from Walgett, Wee Waa, Narrabri Public School and St Francis Xavier, Narrabri to attend The River Health Conference in Inverell
- provided sponsorship and assistance with the Rotary and University of Newcastle "Science and Engineering Challenge" for primary and high school students
- contributed to the Moree Rotary annual youth 'Careers in Cotton' Camp for Year 10 students from schools across northern NSW
- sponsored one student to participate in a science-related tour of Russia
- instigated a program of School-Based Traineeships, in conjunction with the Cotton Catchment Communities CRC and the Aboriginal Employment Strategy and sponsored one of the five participants.

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 2007–08:	18
Compared with 2006–07:	15
Expenditure in 2007–08:	$0.57 million
Compared with planned expenditure:	$0.50 million
Compared with 2006–07:	$0.50 million

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

Overview

The CRDC Strategic Plan 2003–2008, which completed its final year in 2007–08, was predicated on '… 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.' Program Two has been a major part of the Corporation's effort to achieve the vital environmental part of this equation.

This means that Natural Resource Management (NRM) has been a major strategic focus for CRDC, 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 during coming years.

STRATEGY ONE

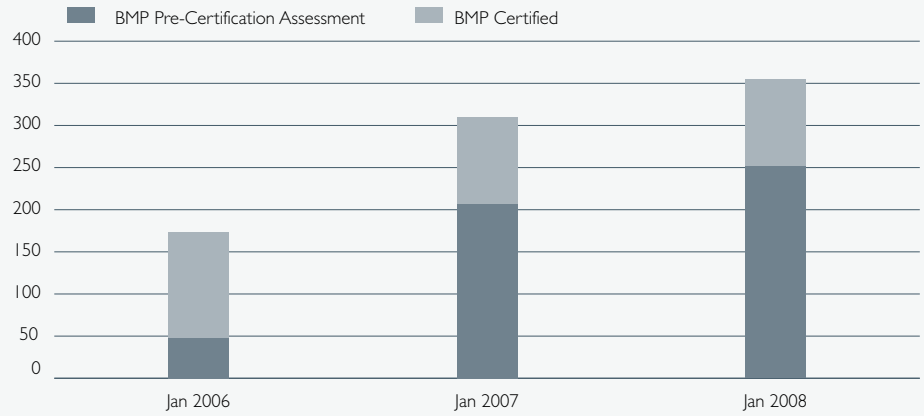
Incorporate a broader range of environmental issues in the Cotton BMP program and facilitate their adoption

The reporting year marked a decade of operation of the Cotton Best Management Practices (BMP) program. The program has helped to focus the industry on continuous improvement in farm and environmental risk management. Therefore, it has been widely recognised outside the industry and internationally in the global cotton industry.

BMP COTTON
BEST MANAGEMENT PRACTICES

BMP is a voluntary program. It has reached a point where almost 40 per cent of cotton farms have attained the stage-one of certification, or have achieved full certification. However, it is unlikely that the remaining 60 per cent of growers will seek BMP certification unless the program represents a better value proposition for their businesses in return for the time and effort it requires them to commit. In

Figure 5 Number of cotton farms achieving first or second stage BMP Certification



Source: Cotton Australia

recognition of this barrier to further uptake of the program, the Australian Cotton Industry Council has encouraged industry organisations, including CRDC, to work collaboratively to revise the BMP program.

During the year CRDC facilitated the first revision of the BMP manual and supported a project to develop the first electronic version of the manual. Both of these developments provide a foundation for the more complete revision of the entire BMP program, being undertaken under the leadership of the Australian Cotton Industry Council's BMP Committee. To help drive and support this process CRDC, Cotton Australia and the Cotton CRC are jointly funding a new position of BMP General Manager. The position was filled in September 2007 and a Strategic Plan for the revision of BMP was released in January 2008. A business plan to support the implementation of the strategic plan has been developed.

The revision of the BMP program provides some exciting opportunities for the industry. In particular, it will provide a clearer value proposition for the grower by linking clearly to improved outcomes in environmental management and farm business. From CRDC's perspective, the revision of BMP will see a reinvigoration of the linkage between research knowledge and the BMP guidelines and recommendations that growers use to improve their practices.

MEASURES OF SUCCESS

- A revision of the existing BMP Manual and the development of an electronic version have provided a solid foundation for the more detailed revision of the whole program now underway
- The appointment of a BMP General Manager is helping to ensure the revision of the BMP program is focused and coordinated
- A Strategic Plan for the comprehensive revision of BMP has been developed.

STRATEGY TWO

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

In 2007–08 CRDC successfully submitted a proposal to the Australian Government's EMS Pathways to Sustainable Agriculture program, resulting in the establishment of a new project, *Environmental Indicators Cotton, Grains and Beef.*

The set of proposed Environmental Performance Indicators (EPIs) developed through the project provides landholders with a means of scoring soil health, water quality, biodiversity, industry health and carbon emission performance of an enterprise. The soil and water indicators can be used to translate changes in practice to changes in soil and water resource conditions, while biodiversity indicators provide a semi-quantitative indication of vegetation and riparian condition. Carbon emission indicators are included in recognition that greenhouse gas emissions are an issue that we must seek to understand, while industry health has been included to provide a gauge of the industry's commitment to environmental management.

These EPIs were found to be broadly consistent with beef and grains industry EPIs. Further, the proposed EPIs reflect the broad objectives of several regional natural resource and catchment management bodies.

Initial assessment of the EPIs with multi-commodity producers, and the use of indicators in general, suggest that even simple indicators such as soil cover are likely to be difficult to use in the real world due to spatial and temporal variability between farms. It became evident that growers do not regularly collect quantitative estimates of inputs or outputs linked to the EPIs. From a grower's perspective, the primary measure of NRM performance is based on the capacity to maintain farm productivity and profitability.

Further testing of the EPIs is required. This would involve a broader range of landholders. Knowledge gained in this project suggests that it would be difficult to introduce new or more formal indicators unless clear, direct and immediate benefit was demonstrated.

MEASURES OF SUCCESS

- An initial, simple set of Environmental Performance Indicators has been developed for use on multi-commodity (cotton, grains and beef) farming enterprises to measure soil health, water quality, biodiversity, industry health, and carbon emission performance

STRATEGY THREE

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 invested in seven projects under this strategy during 2007–08: one project on water quality in relation to pesticide remediation, two on water quantity in terms of modelling and surface/groundwater interconnectivity, two on deep drainage and two on biodiversity.

One of the latter investigated aquatic biodiversity in storage dams on cotton farms. Results indicate that there is a greater percentage of native fish species than introduced species like carp in farm dams than in local rivers. This work suggests that farm dams could have more significant ecological value as refuges for native fish than has been previously recognised.

Another project involving on-farm water storages has developed and assessed artificial wetland systems to assist with the remediation of water-borne pesticide residues. This work has shown that artificial systems are very effective in removing and breaking down residues; however, the potential for uptake of these systems is low at present due to the ongoing impact that dry conditions have had on water supplies held on-farm in many regions.

The second biodiversity project focused on native floodplain vegetation, with carbon sequestration, erosion mitigation, forage production and biodiversity conservation some of the 'ecosystem services' studied. Some early results include:

- the development of an equation to estimate total tree biomass and the amount of carbon stored in the above-ground components of trees
- soil sampling to measure the amount of carbon stored under different vegetation types managed in various ways
- the recording of about 100 species of birds in surveys conducted in five different vegetation types across the Namoi Valley. This measured the importance of different habitats for bird conservation. It is anticipated that landholders will be able to use this information to identify the most valuable bird habitats on their properties
- excellent results on the efficiency and credibility of current methods of satellite imagery of vegetation.

CRDC invests in research to understand the impact of deep drainage, or the loss of water beyond the plant's root zone, both on-farm (covered further in Program Four) and on the health of the catchment.

In 2005 a major investment by CRDC enabled the installation of a large variable tension lysimeter at the Australian Cotton Research Institute. This provides a means of testing the accuracy of results from a network throughout southern Queensland and northern NSW utilising less expensive methods of measuring deep drainage, such as barrel lysimeters and chloride mass balance. Ongoing research indicates that the comparison of the variable tension lysimeter with these simpler methods is allowing results from the network to be better understood and interpreted, thus adding value to this widespread measurement program.

Thirty deep bore data loggers have been installed in southern Queensland to provide data for simulation studies to measure deep drainage. These studies have shown that soil water balance models might be used successfully to investigate relationships between management options such as irrigation frequency and amount, and components of the water balance, such as deep drainage, that need to be managed. If the models deliver accurate data, this may offer future savings by lessening the need for further installations of bores and lysimeters.

MEASURES OF SUCCESS

- The quantification of native and exotic fish species on over 100 cotton farms and waterways has shown that native fish are more abundant, indicating that farm dams may have genuine ecological value as refuges for native fish
- 100 tree species indigenous to the area were identified in one cotton growing valley providing landholders with improved information to identify and preserve the most valuable bird habitats on their properties
- *Growing Trees on Cotton Farms*, a book developed jointly by CRDC and the Rural Industries Research and Development Corporation, is now used in the wider agricultural sector. Strong demand for a revision means this is likely to occur in 2008–09

- Groundwater Field Days, based on outcomes from CRDC research investments, have generated considerable interest from landholders seeking to use the information for the benefit of the catchment.

STRATEGY FOUR

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

While the responsibility for assessing environmental impact of any new transgenic traits falls to the registrant during the registration process, CRDC has invested in research to help understand the impact of the broader application of transgenic technologies after they have been released commercially. For example, a CRDC study of pesticide residues in cotton gin trash from the 2006 harvest, completed in 2007–08, compared residues in gin trash from both conventional and *Bt* (Bollgard II®) cotton crops as well as two methods of trash management following separation at the cotton gin.

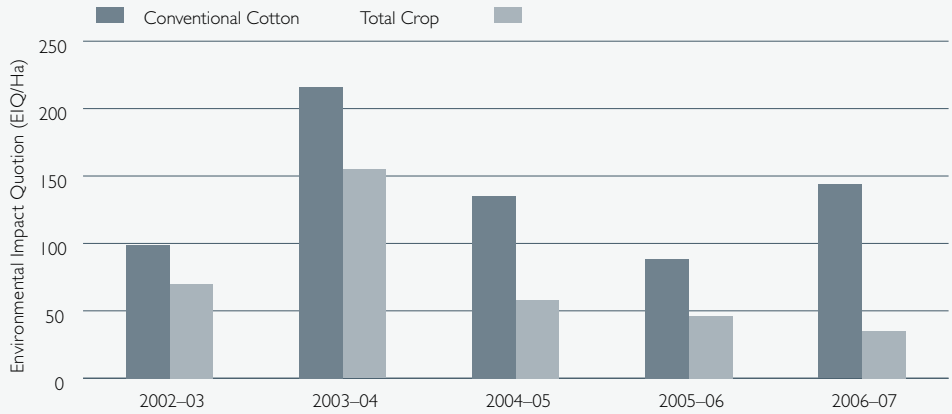
Of six insecticides and one cotton defoliant detected in the conventional cotton gin trash, only one – the cotton defoliant – was used in the Bollgard II® cotton crop. This was the only chemical detected in the Bollgard II® gin trash at similar levels to the conventional gin trash. Active composting of gin trash by adding water, nitrogen and regular mechanical mixing was compared. Gin trash piles were untouched and showed composting to be highly beneficial in speeding up the breakdown of pesticide residues.

Another study has utilised data on insecticide and acaricide use compiled by Cotton Consultants Australia Inc. and purchased by CRDC to estimate the Environmental Impact Quotient (EIQ). The EIQ is an internationally recognised scoring system that converts the quantity of active ingredient applied for each chemical into a score based on a range of environmental indicators such as toxicity to mammals, birds, beneficial insects and fish. Figure 6 summarises the EIQ scores for insecticides in both conventional cotton and the total cotton crop. The difference between the conventional and total represents the impact that *Bt* cotton (that is, single *Bt* gene INGARD® and double *Bt* gene Bollgard II®) has had on insecticide use over time.

MEASURES OF SUCCESS

- Insecticide residues in cotton trash from Bollgard II® crops showed a significant reduction compared to conventional cotton, indicating a further reduction in environmental risk from cotton production
- The Environmental Impact Quotient (EIQ) scores for insecticide use in the 2006–07 season show a fall of up to 91 per cent from the highs measured in the late 1990s.

Figure 6 Estimated Environmental Impact Quotient for insecticides used on Australian cotton crops



Source: A. Crossan and I. Kennedy, University of Sydney

STRATEGY FIVE

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

Research investments by CRDC have helped to clarify the level of greenhouse gas emissions resulting from cotton production. More farmers are becoming aware that over-fertilising increases the amount of nitrogen gases released into the atmosphere and of the environmental and economic cost this represents. Research and on-farm demonstration trials have shown that farmers can optimise their nitrogen fertiliser inputs and reduce costs without any significant effect on production. Being able to demonstrate clear economic benefits from the optimisation of fertiliser use is seen to be a big advantage in reducing greenhouse emissions in cotton systems. Approximately 0.5 to one per cent of the nitrogen gas losses are the greenhouse gas, nitrous oxide.

CRDC invested in the development of an on-farm energy use calculator, EnergyCalc, in 2007–08. Results from seven farms used as case studies to measure all the energy used in growing crops show there is a wide range of energy inputs required to grow irrigated cotton and other crops. Results varied considerably from farm to farm depending on the source of water and the way in which it is managed, as well as the type of crops grown and the operations used to produce them.

EnergyCalc divides energy usage of cotton production into six broadly distinct processes: fallow, planting, in-crop, irrigation, harvesting and post-harvest. Because these operations are generic, EnergyCalc can be used to estimate energy requirements for a range of crops and is seen as potentially a useful tool to help farmers become more fuel and energy efficient and hence more profitable and environmentally sustainable. Further testing of the tool is planned and it is likely to be available on-line through the CRDC website and/or the National Centre for Engineering in Agriculture website. Other research which overlaps and influences greenhouse gas production and energy use is included in Program Four – Farming Systems: in particular, excellent outcomes from research on crop rotations for fertiliser efficiency and storing carbon in the soil.

MEASURES OF SUCCESS

- CRDC, together with other RDCs and the Primary Industries Standing Committee Scientific Committee, contributed to the successful development of the National Climate Change Research Strategy for Primary Industries (CCRSPI). Further contributions to the implementation of this joint strategy will be made in 2008–09
- An initial series of workshops on how to make irrigation pumps more fuel-efficient have been delivered to irrigated cotton and grain farmers. An on-farm case study resulting from one workshop led to a saving of $20,000 per year on energy costs and has heightened awareness of the potential for energy efficiency gains with other farmers
- Over 700 people used greenhouse gas on-line web tools on the Cotton Catchment Communities CRC website in the six months to May 2008. These tools were developed with the assistance of CRDC investments
- Nitrogen Use Efficiency farm trials held in all cotton growing valleys show that an average saving of 40 kilograms of nitrogen per hectare is possible without influencing yield. This level of saving:
    - would represent savings of $7.4 million to the industry at an average price of $860 per tonne of nitrogen (based on the average planted area over the last five years)
    - has the potential to reduce greenhouse gas emissions of nitrous oxide by 21,500 tonnes across the industry (estimated from calculated per hectare carbon dioxide-equivalent emissions).

      Source: BDA Group Benefit Cost Analysis April 2007.

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 2007–08:	33
Compared with 2006–07:	33
Expenditure in 2007–08:	$3.28 million
Compared with planned expenditure:	$2.79 million
Compared with 2006–07:	$3.42 million

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

Overview

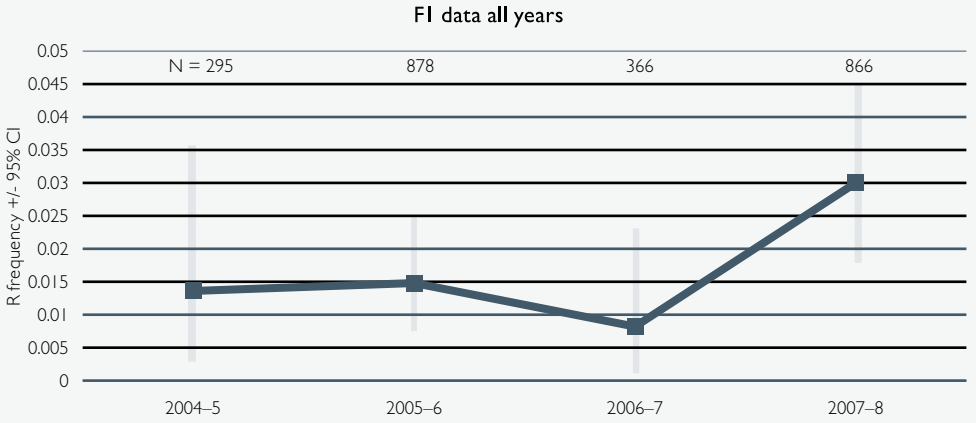
The cotton industry was the first agricultural industry in Australia to move successfully to the commercial use of biotechnology. This has seen the dawn of a new era for crop protection throughout the industry but also the emergence of new challenges and opportunities, which have been addressed through a sustained and targeted R&D effort within this program during the life of the Strategic Plan 2003–2008.

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 2007–08 again saw the widespread planting of Bollgard II® cotton (two-gene *Bt* technology): 96 per cent of the cotton varieties planted across all regions were genetically-modified with 93 per cent containing both the Bollgard II® and Roundup Ready® genes.

During the 2007–08 season the CSIRO resistance monitoring program, supported by CRDC, detected for the first time, a significant increase in the frequency of alleles (one of two or more hereditary genes at the same location), which confer resistance to Cry 2Ab, one of the two *Bt* proteins present in Bollgard II® cotton. CRDC and the cotton industry will be paying particular attention to results of the monitoring program over the next few years and will ensure that the appropriate measures to minimise further increases in resistance will be put into place through the Australian Cotton Growers' Research Association's Transgenic Insecticidal Management Committee (TIMS Committee). Despite an increase in frequency of resistance alleles detected, the technology will continue to serve the industry well for many years to come

While Bollgard II® cotton has been very successful in reducing pesticide use, some pesticides are still required to control insects and weeds. CRDC, in conjunction with the NSW Department of Primary Industries and a commercial partner, Becker Underwood, have been developing a new biopesticide for use in Bollgard II® cotton. This biopesticide, developed from a native fungal pathogen, is highly selective against specific sucking insect pests in cotton and offers the potential to further decrease the amount of pesticide used in cotton. When used as part of an integrated pest management system, the Bollgard II® technology, combined with the biopesticide, has the potential to eliminate the need for additional insecticides in the cotton production system.

Figure 7 Frequency of resistance alleles detected in *Helicoverpa armigera* using the F1 screening test since 2004



Source: Rod Mahon CSIRO 2008

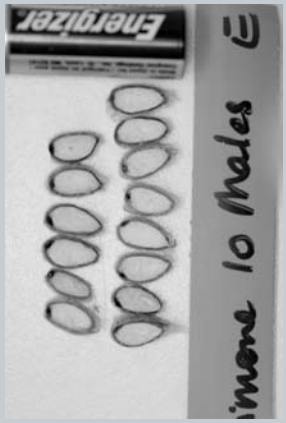
STRATEGY ONE

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

The Bollgard II® technology continued to perform well in the 2007–08 season, during which *Helicoverpa* pressure was relatively light, principally due to ongoing severe drought conditions. Some survivors were noted in St George in the 2006–07 year and CRDC, in conjunction with CSIRO, initiated a research project to try and better understand the reasons for their survival in this region. The few conventional cotton crops grown in the 2007–08 season required a number of sprays for *Helicoverpa* control, whereas generally 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. The industry observed an outbreak of Pale Cotton Stainers in the 2007–08 year. These insects are rarely found in sufficient numbers to be problematic, however in the 2007–08 year they were particularly troublesome for the industry. Pale Cotton Stainers feed through a very fine stylet, hence damaged bolls are difficult to detect. Female cotton stainers also feed upon the seeds located within the bolls and hence cause further devaluation of the crop.

Pale Cotton Stainers can cause staining of cotton lint and tight locking of bolls, reducing both quality and quantity of harvestable cotton lint



Male

Female

Seed damage caused by female Pale Cotton Stainers compared with seeds from bolls fed on by males

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, a co-investment with CRDC, has developed a new biopesticide (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 another six per cent to 96 per cent in 2007–08, demonstrating the usefulness and effectiveness of a technology that requires only 15 per cent of the insecticide required for conventional cotton to manage all pest species
- The greatly reduced use of insecticides delivers significant environmental benefits, including healthier rivers, which, in turn, delivers a spillover benefit to regional communities that rely on these rivers
- Biopesticides, developed with the assistance of CRDC research investments, show potential to control green mirids biologically and should provide significant environmental benefits when commercialised.

STRATEGY TWO

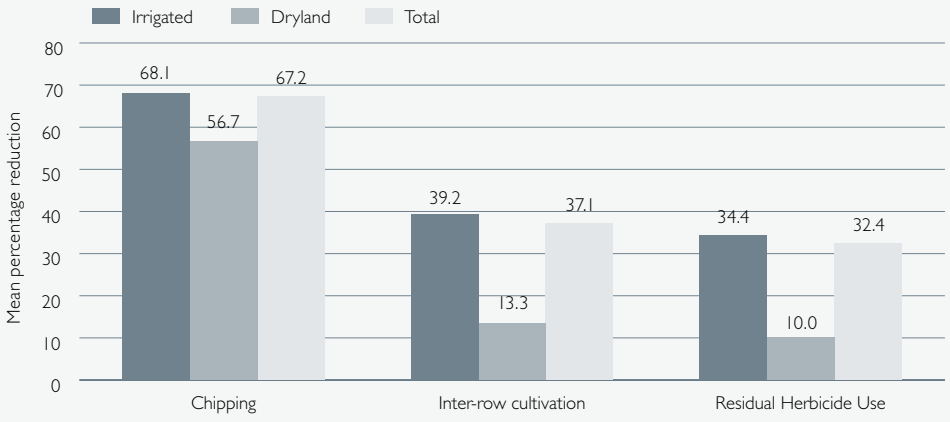
Improve integrated non-chemical and chemical management of weeds

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 in 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 and 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.

With the widespread adoption of herbicide-tolerant cotton varieties, CRDC has invested in the development of integrated weed management systems focusing on the precise delivery of herbicides when and where they are required. These systems, utilising infrared biomass sensors and taking into account the competitive influences of weeds on cotton, aim to ensure that knockdown herbicides are not overused. This mitigates both environmental risks and risks associated with the evolution of

Figure 8 Reduction in weed control methods since the introduction of Roundup Ready®



Source: Cotton Consultants Australia 2006 survey

resistance. The herbicides used in these systems break down more quickly and thus are unlikely to affect riverine environments via movement through soils.

IWM continues to be the central focus of weed research in cotton, with WEEDpak the principal resource and repository of information. The updated version of WEEDpak is available via the Cotton Catchment Communities CRC website, as well as on the CRC's COTTONpak CD. In addition, WEEDpak is available in a printable version on the website. Figure 8 on page 50 illustrates the changes occurring in cotton farming systems due to the introduction of Roundup Ready® cotton varieties. These reductions, while beneficial from both environmental and economic perspectives, indicate an increasing reliance on glyphosate for weed control; hence, the importance of integrated weed management in minimising resistance risks.

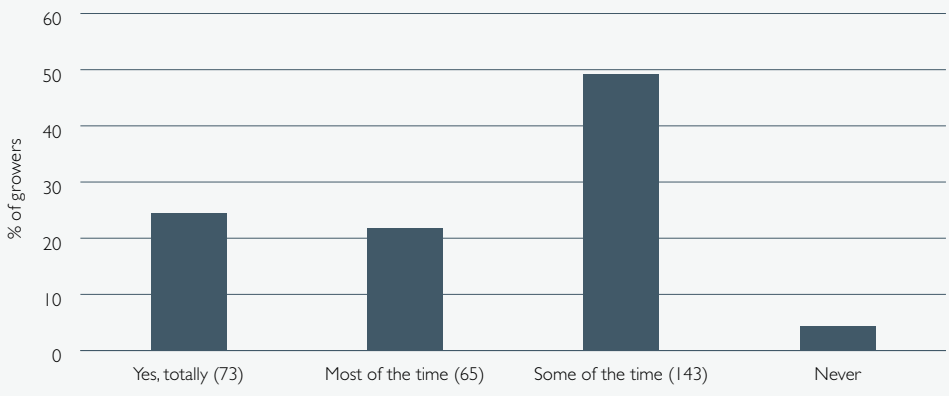
The majority of Australian cotton growers use IWM practices in managing weeds on their farms, which is particularly important as the next generation of herbicide-tolerant cotton varieties become available to growers. These technologies, including Liberty Link® cotton and Roundup Ready FLEX® cotton, offer 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 the Australian Cotton Growers Research Association, assists in the development of robust crop management plans to assist growers to minimise resistance risks associated with these important technologies in managing their farming systems.

Fleabane is an increasing weed problem across a number of farming systems, including cotton. CRDC is investing in a new PhD project looking specifically at the ecology and management of this weed in cotton farming systems.

MEASURES OF SUCCESS

- Integrated Weed Management, based on the latest research findings, continues as the main weed control focus, with more than 90 per cent of growers using some or all IWM measures
- Increased adoption of Roundup Ready® and Roundup Ready FLEX® cotton in 2007–08 indicates a widespread recognition of the environmental and economic benefits this technology brings to weed management
- Further reductions in the overall quantities of residual herbicides applied to cotton farming systems in 2007–08 provided environmental benefits
- Growers had access to 89 weed sets in WEEDpak with information on the biology and ecology provided for all weeds
- The availability of Roundup Ready FLEX® technology is providing a wider window for glyphosate application, bringing greater flexibility in weed control options
- Limited commercial release of Liberty Link® cotton varieties, which will increase the range of broad leaf weed species that can be controlled, while minimising resistance risks.

Figure 9 Percentage of growers who follow Integrated Weed Management guidelines



Source: Cotton Consultants Australia 2006 survey

STRATEGY THREE

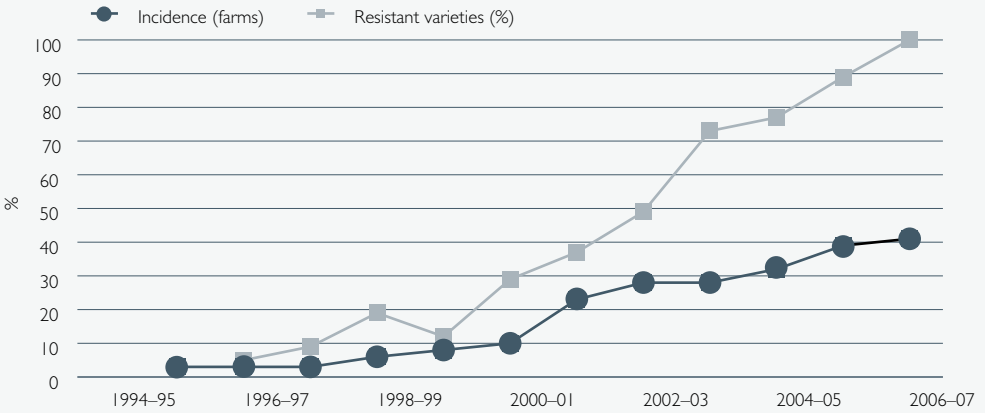
Develop practices and technologies that reduce the spread and impact of cotton diseases

Tobacco Streak Virus, which is endemic in parthenium weed, has been found in sunflowers, chickpeas and mung beans in central Queensland. Surveys undertaken in cotton in 2007–08 confirmed the presence of this virus, with plants in close proximity to parthenium weed exhibiting various levels of symptoms. Symptoms were mild in seedling cotton but quite severe in regrowth cotton. This virus has been found in cotton in other regions of the world and has had an economic impact on production in some regions. Cotton pathologists will continue to monitor crops in the central Queensland region to determine the likely impact of the disease in Australian production systems.

The soil-borne diseases Fusarium wilt and Black Root Rot were once again problematic in the 2007–08 season. Fusarium has spread further throughout cotton growing areas, although the rate of spread has been slowed. A new form of the disease has been identified and currently we are unsure as to the likely impact of this strain on production. Ongoing research at the molecular level, combined with an increased understanding of the biology and ecology of the pathogen, continue to deliver constant improvements in field management. Research in the 2007–08 year indicated that the severity of the disease was linked to specific soil factors, including the calcium/magnesium ratio of the soil. Further research will be undertaken in this area to determine whether manipulation of soil properties would enable growers to better manage Fusarium wilt.

An F-Rank (the measure of resistance to Fusarium wilt) of 200 equates to total Fusarium wilt immunity and a variety is not classified as Fusarium wilt-resistant unless its F-Rank is at least 100. All Australian-bred cotton varieties planted in 2006–07 had F-Ranks of 100 or more for the first time. In 2007–08, the average F-rank of planted varieties reached 128: a significant improvement in a single year.

Figure 10 Fusarium wilt of cotton in NSW



Source: Chris Anderson, NSW Department of Primary Industries

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 the 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 investments.

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 and makes it more sensitive to weed pressure. CRDC invested in research that 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, researchers at The University of New England, aided by investment by CRDC, 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
- The rate of spread of the major cotton disease is reducing, due to research-driven improved management and hygiene
- Improvements in germplasm with higher F ranks (a measure of resistance to Fusarium)are allowing growers to more confidently plant into fields known to have Fusarium.

STRATEGY FOUR

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

and

STRATEGY FIVE

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

CRDC invests in the crucial research areas of monitoring for resistance and developing an understanding of the mechanisms that lead to resistance in conventional insecticides and the *Bt* proteins. 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 2007–08 season is a measure of the importance of this technology to the 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; hence, preserving and maintaining the integrity of the technology is of prime concern to CRDC.

In 2004, CSIRO, with the aid of investments by CRDC, developed protocols for testing the frequency of resistance using a modified and shorter version of the standard F2 test. The F1 test assumes that the various types of resistance detected are of the same kind. These tests were immediately adopted by Monsanto Australia in their resistance-monitoring program. Once CSIRO had confirmed that the mechanisms conferring resistance to Cry 2Ab were indeed the same, Monsanto also adopted the F1 test as part of their screening program. Results from the F1 test indicated that the resistance frequency was at least six times higher than that determined in the F2 tests. The frequency of resistance alleles detected in the 2007–08 season was approximately three in 100 individuals. This was, and continues to be, a concern to industry as these results indicated a significant increase in the frequency of resistance compared with previous years, using the same test, which will present some challenges to the industry. In particular, it will be imperative for the industry to ensure that pest refuges are managed effectively and that pupae busting is conducted in a timely and efficient manner. Based on simulations from resistance models, it is expected that the longevity of the technology will be greatly reduced. Its continued efficacy will depend on

how the industry manages its refuges and implements other management options.

When the results of the monitoring program were known late in the 2007–08 season, CRDC sponsored a resistance roadshow through all of the major cotton producing valleys to update growers and consultants on the change in resistance status. The TIMS Committee oversees the stewardship of the technology for the industry, in conjunction with the technology providers, Monsanto Australia. TIMS and Monsanto will be looking jointly at a range of measures to ensure that resistance does not increase to unsustainable levels.

Bt cotton has underpinned the management of *Helicoverpa* spp. 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. A fundamental component is the judicious use of conventional insecticides; to ensure the continued effectiveness of these compounds, CRDC invests in a number or 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 was 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 Four

- An R&D-driven and highly effective resistance management strategy means that changes in the resistance status and frequency of resistance of *Helicoverpa armigera* to Cry 2Ab were detected sufficiently early to allow remedial actions to be put into place.
- The herbicide resistance strategy within the Australian cotton industry has been totally effective since the introduction of Roundup Ready® cotton varieties

Strategy Five

CRDC research investments 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 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 three in 100 individuals; however, no evidence of cross-resistance to Cry 1Ac has been 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 2007–08, making vigilance for resistance very important. CRDC has a resistance-monitoring program with the 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 2007–08:	22
Compared with 2006–07:	26
Expenditure in 2007–08:	$1.59 million
Compared with planned expenditure:	$1.89 million
Compared with 2006–07:	$2.10 million

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

Overview

Australian cotton growers face financial pressures from the ever-increasing costs of land, water, fertiliser, fuel, energy, machinery and labour, coupled with prevailing drought and low global cotton prices relative to alternative crops. CRDC investments have helped to maintain the viability of the industry by offsetting these pressures significantly through a combination of yield improvements delivered through new cotton varieties and improved management of the cotton farming system, underpinned by the adoption of research outputs and new technology.

Cotton yields over the five seasons covered in CRDC's just completed five-year Strategic Plan have averaged an estimated 1,850 kilograms of lint per hectare compared to an average of 1575 kilograms in the previous five years: a 17 per cent improvement, or 3.4 per cent on an annualised basis. In addition, CRDC has focused research investments in areas that will improve production input and resource use efficiency, particularly in the key areas of water, soils, nutrient, fuel and energy. Improved efficiency not only increases returns to growers, it reduces adverse environmental impacts such as greenhouse gas emissions through efficient use of water, nutrition, fuel and energy.

STRATEGY ONE

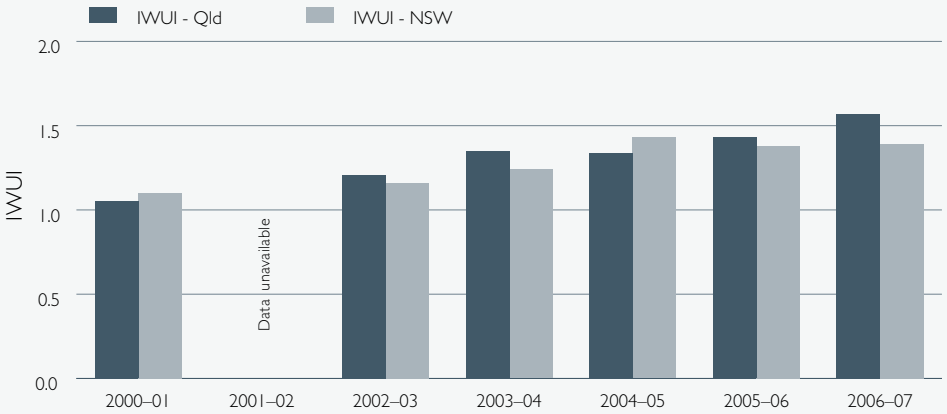
Improve water use efficiency on farms using new and existing infrastructure, new tools and technologies

Under this strategy CRDC invests in a broad range of water-related R&D with the key objective of improving on-farm water use efficiency:

- Identifying plant and soil factors that influence water use efficiency
- Developing better irrigation strategies when water supply is limited
- Optimising production and water use in cotton with high fruit retention
- Developing precision technology for monitoring plants and more accurately controlling large mobile irrigation systems
- Testing technology to monitor and measure water use on-farm as well as improve the knowledge and capacity of both growers and consultants through improved training and information resources on water management.

In 2007–08 CRDC became a partner in Phase 2 of the National Program for Sustainable Irrigation (NPSI), managed by Land and Water Australia. This investment encourages a collective consideration of irrigation research issues and needs across the national irrigation industry and contributes to a greater sharing of information and innovations

Figure 11 Estimated Irrigation Water Use Index (IWUI) for cotton in bales per megalitre of water used



Source: ABS and Australian Cottongrower Yearbooks

between partners and commodity industries involved in irrigated agriculture.

As indicated in the previous Annual Report, the capacity of CRDC to report more fully against the 2004 target of a 20 per cent improvement in water use efficiency (WUE) by 2008 is limited. Accurate measurement of the whole water balance on-farm is difficult and there is a general lack of access to, and consistency of, on-farm water use data. Regional variations in climate and soil types means it is only possible to use available industry-wide data on water use as a broad indicator of improvement.

The available data from the Australian Bureau of Statistics and the cotton industry in relation to irrigation water used for cotton production and related yield indicate that the Irrigation Water Use Index (IWUI, expressed in bales per megalitre of water applied) in both NSW and Queensland has been improving steadily since the year 2000. Figure 11 on page 56 indicates that the efficiency of irrigation water use by the cotton industry may have increased by up to 28 per cent over this period. Most of this improvement has been due to improved cotton yields, while water use has remained relatively steady in the range of 6.3 to 6.75 megalitres per hectare.

While these statistics are encouraging as indicators of industry-wide improvement, the application of indices like the IWUI at regional or even sub-catchment scale has been found to be impractical as a benchmark to encourage improvement at the individual farm scale. Consequently, CRDC has invested in projects focused on encouraging practice change linked to improved water use efficiency: in particular, to help build cotton growers' capacity and knowledge to better manage their available water and maximise their returns per megalitre, as well as encouraging improved on-farm water monitoring and measurement. As part of two collaborative projects involving CRDC, GRDC, NPSI, the Cotton Catchment Communities CRC, the CRC for Irrigation Futures, and several regional bodies and CMAs, a range of detailed case studies and new information resources have been completed to demonstrate how WUE improvements can be achieved at the individual farm level. For further information visit the Cotton and Grains Irrigation website www.cottonandgrains.irrigationfutures.org.au.

MEASURES OF SUCCESS

- New case studies and information resources developed and promoted are assisting on-farm water use efficiency, including:
  - improved pump efficiency
  - options for leaky water storages
  - new irrigated grain supplements for WATERpak
  - a range of grower trials to demonstrate the steps and outcomes from better measurement of surface, overhead and drip irrigation systems.

STRATEGY TWO

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

The need for ongoing research on salinity in current cotton production areas has diminished because of significant investments by CRDC and its R&D partners over many years. The limited number of areas where salinity poses a significant threat to production have been identified and growers in these areas have acted, or are planning to act, upon the risk maps, advice and technology developed by this research.

Sodicity is considered to be a more significant problem in many cotton growing areas due to the chemical composition of the soils; however, in most situations it is managed effectively with sound crop rotations, irrigation management and, if required, the addition of soil conditioners such as gypsum. More strongly sodic soils do occur in some regions and management of these soils with the addition of gypsum and/or lime is currently the focus of a PhD study.

Under this strategy, research on deep drainage (the loss of water beyond the plant's root zone) involves a network of lysimeters located on commercial cotton fields in southern Queensland and northern NSW. By measuring the deep drainage under a range of soil types, management systems and rainfall events, options for reducing water losses through deep drainage are being clarified. Research on catchment-related deep drainage is reported in Program Two.

Cotton growing on the Darling Downs has suffered in recent seasons from drought and lack of irrigation water, highlighting the need to optimise sustainable use of the available water. A summer scholarship project, conducted in collaboration with a major project on understanding soil water balance and deep drainage under irrigation through modelling, has provided detailed measurements of soil water, distribution of irrigation water and changes to the water balance in an irrigated cotton system, using electromagnetic induction (EM).

MEASURES OF SUCCESS

- Research on deep drainage on seven farms has been collated and provided in a comprehensive report to each collaborating grower. CRDC-supported research utilising evidence from 35 lysimeters has shown that farmers can reduce deep drainage by shortening furrow irrigation run times and by using lateral move overhead irrigation systems
- CRDC-supported research conducted under Strategy Three has identified crop rotations that can reduce the impact of sodicity and offer both improved environmental benefits and increased profitability.

STRATEGY THREE

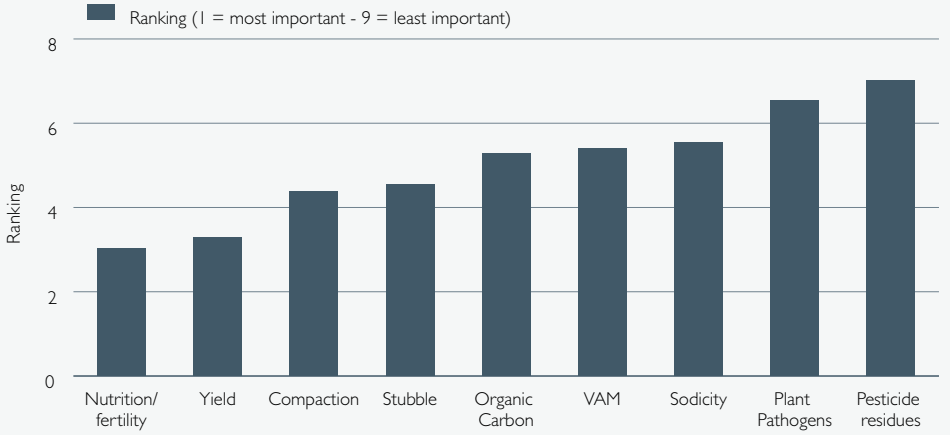
Strengthen our understanding of soil health and improve crop nutrition management

In a survey commissioned by CRDC in 2006 cotton growers were asked to list a number of factors they considered important for sustaining the health or quality of their soils. Figure 12, which summarises the results, shows nutrition and soil fertility, and crop yield performance to be the most important, with issues such as plant pathogens and pesticide residues of lesser importance. Growers were also asked whether they believed their soil health had improved over the last ten years. 67 per cent indicated it had improved, 28 per cent believed it had remained steady and only 5 per cent were unsure. These results demonstrate that growers are concerned about, and committed to, sustaining the productive capacity of their soils. These levels of improvement have been confirmed in the most recent survey, in June 2008, in which cotton consultants reported on the outcome of 238 growers. The survey found that 60 per cent of growers had achieved better soil health over the previous five years.

Because of this survey, CRDC was confident that its investment in the Healthy Soils for Sustainable Farms program, in collaboration with Land and Water Australia, the Cotton Catchment Communities CRC and a number of Catchment Management Authorities, would address an increasing demand from growers for information on soil health. To date the Healthy Soils for Sustainable Farms project has initiated 18 well-attended workshops in NSW and Queensland, run six demonstration sites and held eight focus group meetings. In addition, a range of publications and twelve case studies on soil health issues have been produced and are available on the Cotton Catchment Communities CRC website www.cottoncrc.org.au

The high importance growers place on crop nutrition and soil fertility for maintaining healthy, productive soil has been the focus of research on nitrogen use efficiency and crop rotation. Nitrogen use efficiency in relation to greenhouse gas emissions is covered in Program Two.

Figure 12 The importance of a range of issues to cotton growers in relation to the health of their soils



Source: Doyle, B and M Coleman. The 2006 Cotton Grower Survey Benchmarking/BMP Land and Water Report

In relation to crop rotation research, there is a strong indication that a new cotton farming system is evolving. Based on a five-year study, a rotation program involving cotton, wheat and the legume vetch promises high yields coupled with lower production costs in comparison to a range of traditional rotations such as cotton–cotton, cotton–fallow and cotton–cereal. Reduced irrigation frequency and lower nitrogen requirements, both key inputs in today's cotton farming system, are the primary benefits of the rotation. Reduced erosion and runoff, improved water infiltration with much lower pesticide and nutrient runoff, are among the positive environmental performance benefits.

Where irrigation water, rather than area of land, is the limiting resource on a farm, the study shows a cotton–wheat–vetch rotation system to be more profitable. These results also highlight the importance of assessing the whole rotation system when assessing profitability and crop selection, rather than just using individual crop gross margins analysis.

MEASURES OF SUCCESS

- Nitrogen use efficiency trials indicate that an average saving of 40 kilograms of nitrogen per hectare is possible without reducing yield but reducing the production of the greenhouse gas, nitrous oxide
- The results of a long-term crop rotation study show cotton–wheat–vetch rotation systems have both production and environmental advantages over more traditional rotations, particularly where water is a more limiting resource than land.

STRATEGY FOUR

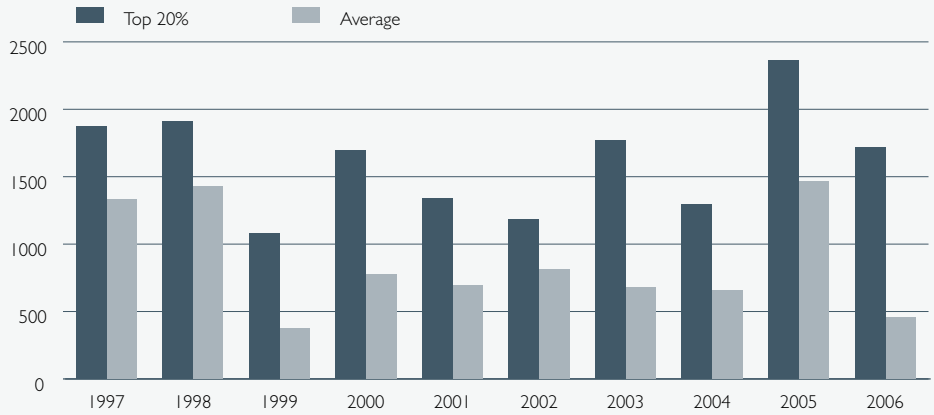
Increase profitability with better whole farm management strategies and innovative precision agricultural systems

In July 2007 the sixth collaborative Cotton Comparative Analysis was produced in association with BOYCE Chartered Accountants and the Cotton Catchment Communities CRC. The report covers the 2005–06 cotton growing season and provides growers with financial analysis using comparative statistics gathered from collaborating growers and BOYCE clients. The comparative analysis is a management tool to implement change and to identify where effort should be directed on a day-to-day basis. It helps growers identify relative strengths and weaknesses in their own operations, which they can then use to develop long term business plans to overcome weaknesses and build on strengths.

This report presented some key trends between 1997 and 2006:

- The net price per bale of cotton decreased from $460 to $440: a 4 per cent decrease

Figure 13 Difference between the top 20 per cent and average grower operating profit per hectare for the period 1997 to 2006



Source: Boyce Cotton Comparative Analysis 2006

- The yield of bales per hectare increased from 7.4 to 9.3 bales: a 26 per cent increase
- The average operating profit per hectare for the average grower is decreasing
- The operating profit per hectare for the top 20 per cent of growers is relatively flat; hence, the gap between the operating profit per hectare for the top 20 per cent and the average grower is widening.

While some of these trends are beyond the control of the grower, the industry and the influence of R&D outputs, they do show that well managed cotton farms can continue to return good profits and there is still scope for average growers to improve profit margins. Since this report was produced, the combined impacts of drought, relatively flat cotton price returns in Australian dollar terms and escalating input costs have continued to affect the profit margins for the cotton industry. Nevertheless, reports from many farms of exceptionally high cotton yields per hectare from the 2007–08 harvest indicate that the industry continues to benefit from the improvements to management that are underpinned by research.

In a post-2006–07 season survey on precision agriculture commissioned by CRDC, 54 per cent of growers indicated that they had used one or more of the precision agriculture elements listed in the survey, with over 90 per cent using navigation systems and yield monitoring and 55 per cent using electromagnetic surveys. At the same time, nearly 30 per cent of the respondents who used precision agriculture in their cotton production system indicated that there was insufficient information available on how to obtain the best results. From this feedback, CRDC has concluded that the private sector is able to provide cotton growers with good precision agriculture technology and adoption levels are high but there is a need for greater sharing of grower experiences with the technology in terms of positives, negatives, economics and innovations. CRDC will address these development and capacity gaps in its new strategic plan.

MEASURES OF SUCCESS

- The 2006 *Cotton Comparative Analysis* demonstrates that despite the cost price squeeze, yields continue to be vital to profitability and highlight the contributions that continue to be delivered through the adoption of research.

STRATEGY FIVE

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

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 research has investigated the significance of changing growth habits in relation to nutrient use and water use efficiency. In situations of low or no water stress, Bollgard II® cotton uses ten per cent less irrigation water than conventional cotton varieties because reduced pest damage means it retains a higher early boll load and therefore has a shorter growing season. Bollgard II® cotton, though, was less able to compensate for high water stress, producing lower yields than conventional cotton under these conditions. As well as having a potential impact on nutrient and water use efficiency, the changing growth habit of the *Bt* cotton plant may also affect the quality of the cotton fibre produced. When Bollgard II® cotton is water stressed at peak flowering time, the reduction in cotton fibre length is greater than with conventional cotton; thus, it is difficult to improve the management of Bollgard II® cotton in limited water situations without affecting both yield and quality.

MEASURES OF SUCCESS

- Beneficial crop physiology and agronomic research outcomes are widely disseminated to industry through CRDC, as well as in agricultural science journal articles and trade publication articles by researchers and CRDC staff.

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 2007–08:	9
Compared with 2006–07:	17
Expenditure in 2007–08:	$1.18 million
Compared with planned expenditure:	$0.98 million
Compared with 2006–07:	$1.30 million

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

Overview

During the last year, CRDC reviewed the strategic direction of its future investments in research and development, including plant breeding and biotechnology. In doing so CRDC recognised the significant changes that have occurred in the commercial environment for cotton plant breeding and concluded that market failure for investment no longer existed. This was evidenced in September 2007 when CSIRO Plant Industry and Cotton Seed Distributors Ltd (CSD) announced the formation of the Cotton Breeding Australia joint venture, which would fund future cotton breeding and targeted research.

CRDC is proud to have been the major investor on behalf of the cotton industry in this highly successful, multiple award-winning breeding program. CSIRO-bred cotton varieties currently represent over 90 per cent of the Australian market and are well represented around the world. The fact that this research program has reached a point where it can be funded by industry more directly without additional grower levy or government funding is also a measure of its success. CSD is a grower-based company and has worked with CSIRO Plant Industry since the 1980s to develop and deliver the varieties developed by the CRDC-supported research.

Under its new five-year plan, CRDC will continue with strategic investment in plant breeding and biotechnology research where it addresses market failure in quality improvements, climate change tolerance and input efficiency, stewardship of traits and biosecurity outcomes.

STRATEGY ONE

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

Although CRDC did not invest directly in the CSIRO breeding program in 2007–08, two new varieties commercially released in 2008 were products of previous CRDC investments. These new varieties incorporate key transgenic traits: one containing Bollgard II® and Roundup Ready FLEX® and the other containing Roundup Ready FLEX® technology alone.

MEASURES OF SUCCESS

- 90 per cent of 2007–08 plantings were CSIRO-developed varieties enabled by CRDC investments, comprising both GM and conventionally bred varieties.
- Averaged over the past five seasons, Bollgard II® crops have required less than 15 per cent of the insecticide required for conventionally bred crops.
- Initial results with Roundup Ready FLEX® varieties indicate that residual herbicide use, cultivation and weed chipping are reduced compared to conventionally bred and Roundup Ready® varieties.
- The performance of varieties with higher tolerance for Fusarium wilt continues to improve.

STRATEGY TWO

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

In 2007–08, CRDC continued to invest in biotechnology that targets yield and fibre quality, disease tolerance and agronomic performance such as tolerance to waterlogging; however, it is expected that key biotechnology research conducted by CSIRO will no longer require funding from CRDC. This does not mean that CRDC will no longer invest in breeding and biotechnology; instead, the Corporation will establish new priorities that focus on opportunities to develop traits that add value to Australian cotton fibre and cotton seed.

MEASURES OF SUCCESS

- CRDC investments in biotechnology have enabled new varieties with Bollgard II® and Roundup Ready FLEX® technology to reach the Australian cotton market ahead of most international competitors.

STRATEGY THREE

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 building on the existing capacity of the CSIRO cotton breeding team to generate commercial outcomes for the cotton industry. 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.

Cotton is a desert plant, so it does not tolerate waterlogging for any extended period and it is estimated that up to ten per cent of crop yield may be lost each year because of waterlogging from irrigation. This level of yield loss can increase significantly during a year where significant rainfall occurs immediately after irrigation. To help overcome this problem, genes that reduce the impact of waterlogging are being investigated within CottTech. A number of genes have been isolated and the first small plot field trial was conducted in 2008. Refining the technology will occur after assessment of the 2007–08 yield results.

A new short-term project under investigation through CottTech is to determine whether the genome for the Australian strains of Fusarium wilt fungus can be sequenced. Recent advances in genomics may allow the genome of this important disease to be mapped. Such information would provide significant advantages, not only in the development of new varieties or its control, but also in fundamental ecology and biology assessment of the disease and its interaction with cotton.

MEASURES OF SUCCESS

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

Figure 14 Yarn quality when Pima cotton is blended with roller and saw ginned Sicala 350B

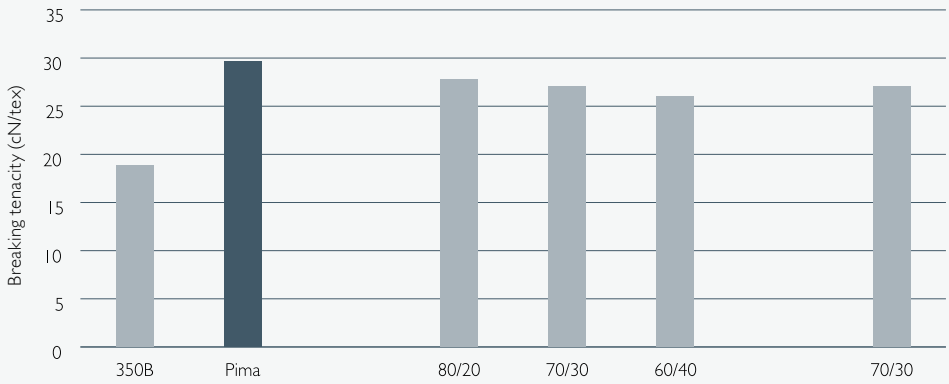
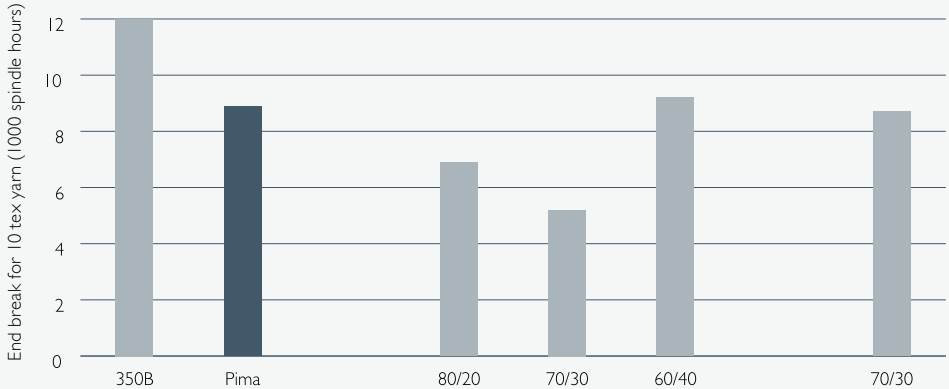


Figure 15 Number of end breaks as a measure of spinning efficiency



STRATEGY FOUR

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: that is, SJV cotton. Despite the severe impact of the drought on production in the 2007–08 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.

World competition in the cotton export market is ever increasing and it is important for Australia to develop strategies to continue to improve its advantage in the market place. International surveys conducted in collaboration with Cotton Australia and Australian Cotton Shippers Association (ACSA) indicate that world demand for premium cotton types will increase by some 20 per cent over the next five years. To understand this opportunity for Australian cotton, a project was commissioned to assess the capacity to blend Australian premium cotton types with Pima cotton.

The aim of the work was to determine what blend ratios could be achieved without effecting final yarn quality. Figure 14 on page 63 demonstrates how yarn qualities, as measured by the breaking tenacity, changes when blending Pima with roller and saw ginned Sicala 350B. The data indicated that a 70/30 blend could be used effectively.

While international spinners may use this knowledge to substitute Pima for less expensive premium upland varieties, the additional advantage is that spinning efficiency may also be maintained at rates that are achieved with pima cotton, as shown in Figure 15 on page 63.

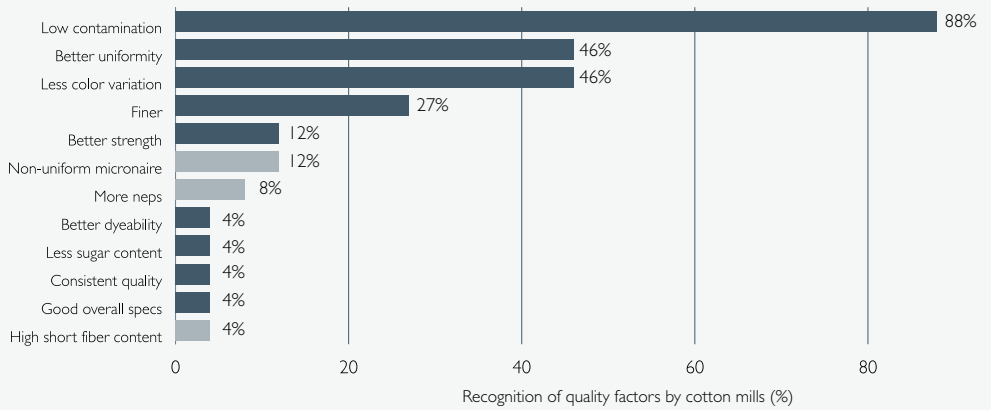
Following these small-scale trials, the objective over the next two to three years is to work with international spinners who specialise in the production of fine count yarns to determine the final value of any commercial advantage that can be achieved. This could provide an opportunity for higher premiums to be passed back to growers.

CRDC continues to support ACSA to monitor quality requirements of spinning mills 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. Figure16 demonstrates results from international surveys and clearly shows that mills have come to recognise that Australian cotton is relatively low in contamination. It is important that Australia's contamination level remain at acceptable levels.

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 2007–08, indicating the quality it has maintained despite drought conditions. It continued to perform well against the industry SJV (San Joaquin Valley) benchmark
- Trials conducted with CRDC investments have shown that opportunities may exist for blending of premium Australian upland cotton types with Pima cotton.

Figure 16 Quality perceptions of Australian cotton by spinning mills



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 2007–08:	8
Compared with 2006–07:	17
Expenditure in 2007–08:	$0.52 million
Compared with planned expenditure:	$0.44 million
Compared with 2006–07:	$0.83 million

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 with competitors. Demonstration of value added developments in Australia

Overview

Australian cotton continues to compete at the premium end of the world market. It has achieved and maintained this market advantage with the aid of CRDC investments in 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.

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

As reported under Program Five, the establishment of the new Cotton Breeding Australia joint venture meant that CRDC's investment in the CSIRO cotton plant breeding and biotechnology program declined significantly; nevertheless, the key aims of this strategy remain highly relevant to the Australian cotton industry.

During the course of 2007–08, CRDC considered its future role in value chain R&D thoroughly as it developed a new strategic plan for 2008–2013. As a consequence of the inquiry and consultation surrounding the development of the new plan, the concept of improving our understanding, and enhancing the competitive advantage, of Australia's cotton fibre and cottonseed products has emerged as a key driver for CRDC's value chain investment. During the 2007–08 year, this has mainly involved CRDC continuing to work with CSIRO to explore an effective commercial pathway for the genetically modified seed technology that contains a much higher ratio of healthier oleic acid to the saturated fatty acids, palmitic and cyclopropenoic.

To explore both domestic and international commercial opportunities and interest, a business case has been developed to identify market opportunities for introduction of a healthier cottonseed oil. CRDC is seeking a response from interested parties on the international commercial opportunities before committing scarce funds to further significant commercialisation.

MEASURES OF SUCCESS

- CRDC investments mean healthier cottonseed oil has been developed and a business case has identified commercial opportunities. Further work will depend on market interest.

STRATEGY 2

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

Although the EMS Fibre Pathways project was finalised in 2006–07, post-farm gate initiatives developed under this program have continued. In particular, the industry has been encouraged to consider establishing BMP guidelines for the ginning, classing, storage and handling sectors. During the year CRDC supported a voluntary program of auditing standards within the cotton classing sector and worked towards the development of ginning BMP guidelines. Industry is establishing BMPs for cotton bale storage, handling and shipping.

During the year the Field to Fabric cotton quality initiative was enhanced by improved integration of research on the impact of different management practices at the farm level on fibre quality, with research investigating cotton 'spinnability' and resulting yarn quality.

To assist in this research, a protocol for miniature spinning was successfully established to allow assessment of spinning efficiency and subsequent yarn properties using small-scale cotton samples.

Trials have successfully assessed the impact of harvest aid timing on fibre quality and textile performance. Yield was found to be significantly affected by early defoliation: that is, when less than 60 per cent of bolls were open. Micronaire and fibre linear density were significantly less if defoliation occurred at the 40 per cent open boll stage. Surprisingly, neps counts (tangles of immature fibres that result in processing inefficiency) were generally not affected by early defoliation; however, most of the cotton on the plants in these trials was mature at the time of defoliation. A higher neps count would be expected in a situation where a greater proportion of bolls contain immature fibres at harvest.

No significant differences between timing of harvest aid treatments were noted for the yarn performance attributes, yarn irregularities and strength for carded 20 tex ring spun yarns. There was, however, a significant relationship between fabric colour

intensity and time of harvest aid treatment, with the earlier treatments taking up less dye.

As reported in Program One, The *Cotton Field to Fabric Training Course: Managing for Quality through the Production Chain* was held at CSIRO Materials Science and Engineering in Geelong on two occasions in 2007–08, conducted within the Textile and Fibre Technology Program. (Note: until 30 June 2008, Textile and Fibre Technology was a separate CSIRO Division, as referenced in earlier CRDC annual reports, but now sits within CSIRO Materials Science and Engineering). 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 investments in research, development and extension work.

MEASURES OF SUCCESS

- The EMS Fibre Pathways project has helped to define how fibre quality can be maintained through the processing chain and led to development of post-farm gate BMPs
- Improved integration within the Cotton Field to Fabric initiative has allowed field trial to spun fabric results to be obtained more quickly
- A new mini-spinning protocol has been developed and achieves small scale spinning test results that are more comparable with results expected at the commercial scale.

50 people drawn from all sectors of industry completed the fully-booked *Cotton Field to Fabric Training Course* in 2007–08. Strong demand for the course reflects an industry-wide acceptance of the importance of maximising fibre quality right through the production chain

STRATEGY THREE

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

Ginning has a significant impact on fibre and subsequent yarn quality, as it can reduce fibre length and increase neps levels significantly. CRDC's investment in ginning research has continued to target the 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.

During the year, a scoping study was completed on current technologies and practices used to manage moisture throughout the processing and storage of cotton post-harvest and highlighted a number of priority areas for future investment. A key recommendation encourages the development of more effective techniques to measure moisture in the ginning process. With respect to individual fibre properties, the report recommended that assessing the period of fibre glass transition (that is, the relationship between temperature and moisture and the physical characteristics of a cotton fibre) may enable the development of new management strategies for cotton processing. CRDC will seek to investigate this new area of research in conjunction with the Cotton Catchment Communities CRC.

With the aim of improving the management of moisture throughout the ginning process, a prototype capacitance moisture sensor has been developed and an industrial scale sensor built and fitted to a commercial gin for further evaluation. New ginning point inserts that improve lint removal and, possibly, gin productivity and fibre quality and reduce seed damage have been successfully trialled in commercial gins.

The issue of neps may become more important as mills push for higher efficiency and the cotton industry strives to gain higher price premiums. While mechanical picking and the ginning process are recognised as key factors in the development of neps within the fibre, CRDC, in conjunction with the Cotton Catchment Communities CRC, is also investigating key agronomic factors that affect fibre quality and subsequent neps development. Initial research indicates that the link between fibre factors affecting neps development may be harder to assess than initially thought.

In order to understand the level of neps present in Australian cotton, CRDC invested in a general neps survey across the 2007–08 Australian cotton crop, which will provide an important benchmark assessment. The data will be linked to HVI data and this will provide the capacity to track individual bales back to its field and management strategies if required. This assessment has the potential to lead to new areas of R&D investment to determine how best to manage neps.

MEASURES OF SUCCESS

- New moisture measuring and ginning point insert modifications which should improve fibre management in the ginning process have been developed and are being tested in commercial gins
- A survey of neps levels in Australian cotton will allow traceability back to farms, fields and practices for the first time.

STRATEGY FOUR

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

Aided by CRDC investments, the Textile and Fibre Technology program in Geelong (part of CSIRO Materials Science and Engineering after 30 June 2008) has developed two instruments for improving the measurement of fibre maturity and fineness: attributes currently measured by a less reliable composite measure known as micronaire. Cotton growers are penalised for cotton with micronaire that is too high (that is, assumed to be coarse) or too low (that is, assumed to be immature). One of these instruments, SiroMat, utilises an automated polarised light microscopy to measure fibres as a test for fibre maturity. Its advantage 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 neps 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 a tool to aid cotton breeders to select improved varieties.

Following development of a business plan for SiroMat in 2007, the technology could be commercialised as early as 2009 if commercialisation partners can be found.

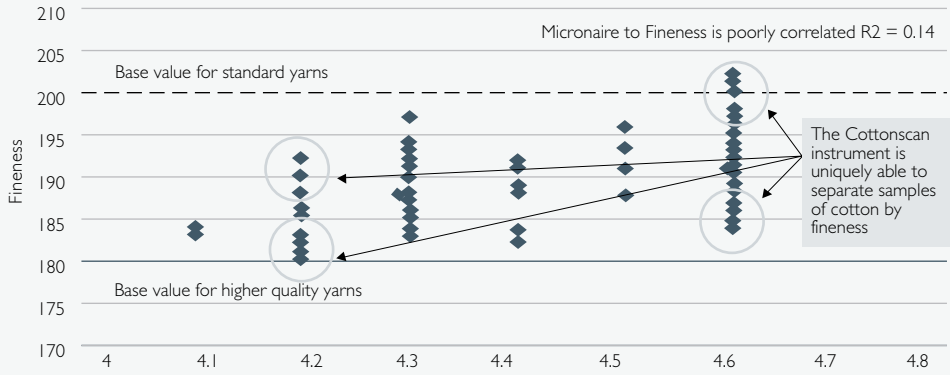
The second instrument, Cottonscan, is an innovative and fast instrument giving average maturity and fineness values. Extensive trials with the prototype instrument in Australia and the US have confirmed that it gives consistent and valid results.

Further development continued in 2007–08 to determine whether Cottonscan could be used to reliably determine average fibre linear density, or fineness. Cottonscan measurements have been shown to offer a significant improvement over traditional HVI measurements, which potentially allow spinners to more effectively differentiate fibre quality and improve efficiency. 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. Figure 17 on page 69 shows how Cottonscan may be used to segregate cotton that has the same micronaire but differs in fineness. This result may allow Australian cotton to be differentiated in the market place through improved objective description of fibre qualities. However, the industry believes that further investigation on how such information may best be used to the advantage of the Australian cotton grower is warranted and this will be pursued by CRDC in the coming year.

MEASURES OF SUCCESS

- Further development and testing of the SiroMat and Cottonscan instruments confirms that they offer more precise and useful measurement of cotton maturity and fineness than existing measures
- Business cases have been prepared for both instruments and opportunities for commercialisation are being investigated.

Figure 17 Defining the Commercial advantage of Fineness v Micronaire



Source: CSIRO Textile and Fibre Technology Program

STRATEGY FIVE

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

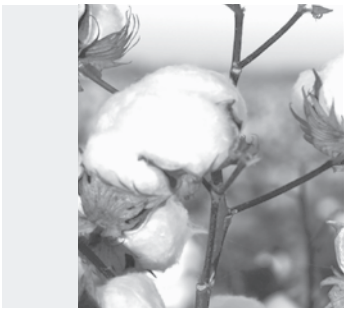
The EMS Fibre Pathways project encouraged the industry to investigate the opportunity to develop a brand based on fibre quality and then determine whether this could be further strengthened in sectors of the marketplace by linking it to adoption of environmental BMPs.

International surveys supported by CRDC in 2007 have shown that the term 'BMP' is not well recognised by the immediate consumers (the spinners) of Australian cotton. While 35 per cent and 29 per cent of those surveyed stated that the buyers of their processed yarn and fabrics do pay attention to 'eco-friendly' and 'ethical growing standards' practices, only six per cent stated that their buyers have knowledge of, or pay attention to, best management practices.

The EMS Pathways project also highlighted the need to develop an agreed set of indicators for environmental performance on cotton farms and better identify practices that are relevant to improving or sustaining those indicators and the specific benefits that accrue to the farm and the environment from their adoption. This recommendation was a key driver for CRDC to apply successfully for funding from the Australian Government through the Department of Agriculture, Fisheries and Forestry, in 2007–08 for a short-term project under the *EMS Pathways to Sustainable Agriculture* program. The resulting project on Environmental Performance Indicators for cotton, grains and beef is reported under Program Two, Strategy Two.

MEASURES OF SUCCESS

- Customers of Australian cotton on-sell to buyers that have a higher recognition of terms like eco-friendly than terms like BMP to describe cotton grown in an environmentally responsible manner. This feedback has identified the need to have a more recognisable environmental tag than BMP associated with a premium quality brand if the industry chooses to go down this path.



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. The purpose of this Act is to secure economic, environmental and social benefits for the Australian cotton industry and the community and to achieve sustainable use and management of natural resources while making 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.

CRDC is located in Narrabri in north-west NSW: one of Australia's major cotton-growing areas, centrally located in the Australian 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.

Arrangements with other companies

The Narrabri district is also home to a key industry research facility, the Australian Cotton Research Institute. The Institute is a collaborative research site and headquarters of the Cotton Catchment Communities Cooperative Research Centre, of which CRDC is a core participant. The activities of the Cotton Catchment Communities CRC for 2007–08 are reported in that organisation's Annual Report, accessible on its website, www.cottoncrc.org.au, and the activities associated with CRDC are also contained in this report in Report of Operation: Research and Development starting on page 32. CRDC has a third share in an unincorporated joint venture, CottTech, with the CSIRO and Cotton Seed Distributors Ltd.

The Board

Composition

The Corporation had an eight-member Board during 2007–08, with six members nominated by an independent Selection Committee established by legislation. The Minister nominates and appoints the Chair and the Board selects the Executive Director who becomes its eighth 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.

When the next selection round for directors takes place in October 2008, the Selection Committee may recommend the appointment of an additional director, bringing the number of directors back to nine.

Appointments

On 24 August 2007 the Parliamentary Secretary to the former Minister for Agriculture, Fisheries and Forestry, announced the appointment of Mr Mike Logan as the new Chair of the Corporation.

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

Induction and Training

Following appointment to the Board, each Director is provided with a Director's Manual, 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 the Chair and staff for a comprehensive overview of corporate activities and practices and a tour of 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, originally adopted in June 2005. An external review of Board operations in 2006–07, resulted in a revised Board Charter, which was implemented in 2007–08 and includes conduct and ethical standards provisions. An internal review of Board performance was conducted in 2007–08. The Board also periodically obtains an external review of its performance. The most recent external review was conducted in 2005–2006.

Board's functions:

- 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 2007–08

Chair

Mike Logan

Mr Logan, who was appointed Chair of CRDC on 24 August 2007, is a cotton farmer at Narrabri, New South Wales.

Mr Logan brings a wealth of practical industry experience and a strong vision to the position. He has long been a strong advocate of best practice use of natural resources in the Australian cotton industry. His cotton farm was the first in the world to gain ISO certification for compliance with world's-best-practice principles for environmental management.

Mr Logan also spent six years on the board of Land and Water where he played a leadership role in a number of key programs dealing with irrigation and climate variability. He was a Director of the Australian Rural Leadership Foundation, the CRC for Irrigation Futures and Cotton Australia (for four years).

Vice-Chair

Richard Browne

Dick Browne was reappointed to the Board in October 2005 and is Vice-Chair. He became Acting Chair on 1 January 2007 and remained in that position until 24 August 2007, when the Australian Government appointed Mr Mike Logan as Chair.

Mr Browne is Chair of the Remuneration Committee and a member of the Audit Committee and 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.

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 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 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 and past director of the Cotton Catchment Communities CRC, and is 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 Boully
BRuSc, DipBusStud

Leith Boully is a primary producer from Dirranbandi in Queensland and was appointed to the Board in October 2005. She is a member of the Audit Committee.

Ms Boully is an Adjunct Professor with 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, FarmBi$ Queensland and the Lower Balonne Water Resources Ministerial Advisory Council, a Board member of Murrumbidgee Irrigation Ltd and the Australian Rural Leadership Foundation, a member of the Wentworth Group of Concerned Scientists and the Australian Statistics Advisory Council. Ms Boully is a graduate of the Australian Rural Leadership Program.

David Conners

David Conners was appointed to the Board in October 2005. He is Chair of the Intellectual Property Committee and a member of the Audit Committee.

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 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 is a member of the Remuneration Committee.

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 is Chair of the Audit Committee.

Ms Wilson is an experienced Director and General Manager with more than 20 years experience as an agribusiness professional. She is CEO of Australian Dairy Farmers Limited, a Member of the Victorian Advisory Group for Landcare Australia Limited and a Member of the Albert Park Advisory Group for Parks Victoria. She was Deputy Chair of the Australian Rural Leadership Foundation and 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 2007–08:

Board Meetings

	Board Meeting	Location
2007/07	19 July 2007	Teleconference
2007/08	6 August 2007	Narrabri, New South Wales
2007/09	24 August 2007	Teleconference
2007/10	28 August 2007	Teleconference
2007/11	27 September 2007	Teleconference
2007/12	14 November 2007	Braddon, ACT
2007/13	4 December 2007	Teleconference
2008/01	15 February 2008	Moree, New South Wales
2008/02	26 March 2008	Narrabri, New South Wales
2008/03	14 & 15 May 2008	Canberra, ACT

Board Committees

During 2007–08 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.

Lisa Wilson continued as Chair of this committee and Leith Boully as a member. David Conners and Dick Browne were members from July to November 2007. In November 2007, Mike Logan became a member of the committee. The Executive Director, Bruce Finney, and General Manager – Business and Finance, David Coleman, attend the meetings as observers.

Directors' Attendance at Board Meetings

	2007/07	2007/08	2007/09	2007/10	2007/11	2007/12	2007/13	2008/01	2008/02	2008/03
Mike Logan	Not applicable	✔	✔	✔	✔	✔	✔	✔	✔	✔
Dick Browne	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
David Conners	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Glenn Fresser	✔	–	✔	✔	✔	✔	✔	✔	✔	✔
Leith Boully	✔	✔	–	✔	✔	✔	–	✔	✔	–
Bruce Finney	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
TJ Higgins	–	✔	–	✔	–	✔	–	✔	✔	✔
Lisa Wilson	✔	✔	–	✔	✔	✔	✔	–	✔	✔

The Audit Committee met four times during 2007–08:

Name	6 August 2007	13 November 2007	31 January 2008	12 May 2008
Lisa Wilson	✔	✔	✔	✔
Leith Boully	–	✔	✔	✔
Mike Logan	Not applicable		✔	✔
David Conners	✔	✔	Not applicable	
Dick Browne	✔	✔	Not applicable	

Intellectual Property Committee

The role of the Intellectual Property (IP) Committee is to assist the Corporation's Board in fulfilling its responsibilities and to 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 three times during 2007–08:

	10 July 2007	25 March 2008	14 May 2008
David Conners	✔	✔	✔
Dick Browne	✔	✔	✔
Glenn Fresser	✔	✔	✔

Remuneration Committee

The Remuneration Committee advises the Board on the Executive Director's remuneration and senior staff remuneration adjustments. In July and August 2007, the members were Dick Browne (Chair) and David Conners. From 24 August to November 2007 the members were Mike Logan (Chair), Dick Browne and David Conners. From November 2007 to June 2008, Mike Logan continued as chair and the other members were Dick Browne and TJ Higgins. Executive Director, Bruce Finney, attends as an observer.

The committee met once during 2007–08:

	10 July 2007
Dick Browne	✔
David Conners	✔

Conflicts of Interest

In accordance with Section 131 of the *Primary Industries and Energy Research and Development Act 1989*, Directors are appointed based on 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 or she may have a direct or indirect pecuniary or non-pecuniary interest in a matter to be discussed by the Board must disclose the existence and nature of the interest before the discussion. 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 enhanced further 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 professional indemnity 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.

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 five-year Strategic Plan, which concluded in 2007–08. The Strategic Plan for 2008–2013 closely reflects 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 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 were closely involved in development of the CRDC Strategic Plan 2008–2013.

- Preparing an Annual Operating 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 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 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 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 investor in 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 collaborates 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 through the Minister for Agriculture, Fisheries and Forestry. The Hon Peter McGauran MP was Minister for Agriculture, Fisheries and Forestry for the first part of 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 first part of the reporting year, having been appointed on 24 January 2006. Following the change of Australian Government, The Hon. Tony Burke MP was appointed Minister for Agriculture, Fisheries and Forestry on 3 December 2007.

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 2008, 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 years that are applicable to the Corporation are the Commonwealth Fraud Control Guidelines 2002, Australian Government Property Ownership Policy 2005 and Protective Security Manual 2005.

On 11 September 2007 the then Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, the Hon Sussan Ley MP, provided CRDC with an updated Statement of Expectations to take into account development since her previous statement on 1 Mar 2007. Ms Ley wrote to the Corporation on 11 October 2007, acknowledging the comprehensive response contained in CRDC's Statement of Intent. In her letter she directed that the issue of the cotton industry's adaptability and resilience feature prominently in planning the new Strategic Plan for 2008–2013. This direction coincided strongly with CRDC's own intentions and was integral to the Strategic Plan development process in 2007–08.

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 2007–08* marked the fifth and final 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.

Intellectual Property

In 2007–08, CRDC applied for a "Cotton Ready" trademark for communication purposes. This application is still pending. No other applications for patents or activities relating to patents were undertaken.

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 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 Protective Security Manual 2005 (the PSM) has applied 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, immediately prior to the reporting year.

The Board has instituted a policy of holding a focused and facilitated strategic review session in conjunction with Board meetings. 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 the following 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.
	Annual Occupational Health and Safety review	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.
	Annual IT audit (stage one conducted in March 2007)	2007–08 saw implementation of the review's recommendations, in line with the Corporation's objectives of continuous improvement and risk management strategy.
R&D Strategic Reviews	Development of the Corporation's Strategic Plan 2008–2013	An 18-month comprehensive, industry-wide process that reviewed all existing R&D programs and identified research priorities for the next five years.

Board Charter

A Board Charter assists Directors in carrying out their duties and setting out roles and responsibilities of Directors and staff. An external review of Board operations in 2006–07, resulted in a revised Board Charter, which was implemented in 2007–08.

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. Further information on the relationship between the Corporation and its industry stakeholder, the Australian Cotton Growers Research Association, can be found on page 22.

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 Strategic Plan 2008–2013 and the Annual Operating Plan 2008–09 to the Minister for Agriculture, Fisheries and Forestry, the Hon. Tony Burke MP, on 24 April 2008.

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 Board Charter for Directors and Statement of Principles for staff.

The Corporation's Audit Committee, Executive Director and General Manager – Business and Finance (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.

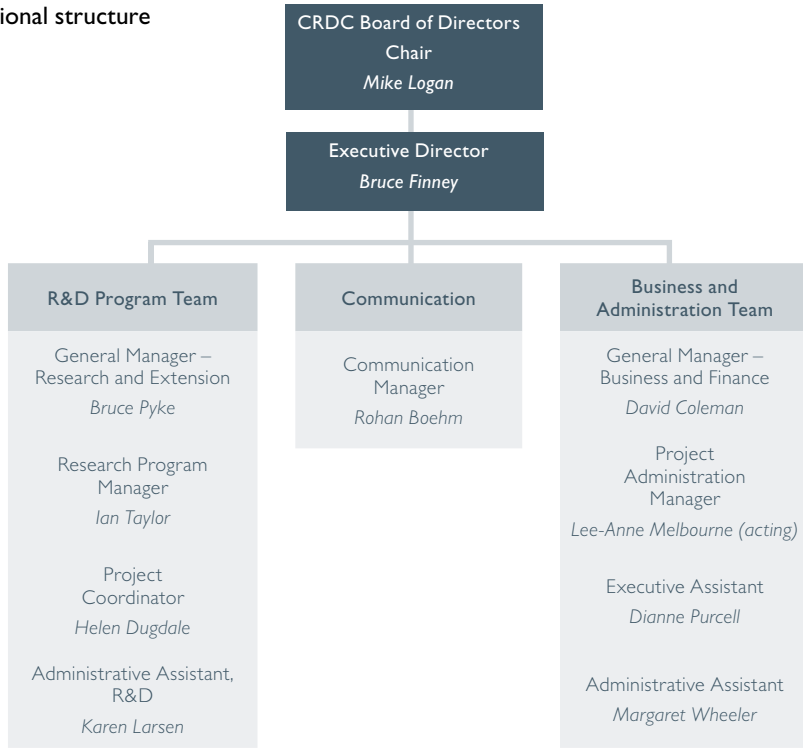
Service Charter

The Corporation does not provide services direct to the public and does not have a service charter; however, the Corporation has a Board Charter and a Statement of Principles. The Statement of Principles 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 eight full-time and two part-time employees as at 30 June 2008.

Organisational structure



Staff Changes during 2007–08

General Manager – Business and Finance, Robin Logan, left CRDC on 13 September 2007. Project Administration Manager (acting), Lee-Anne Melbourne commenced at CRDC on 26 November 2007, replacing Kara Taylor who took maternity leave. Assistant Accountant, Bernie Robertson, left CRDC on 4 January 2008 and this position will not continue. General Manager – Business and Finance, David Coleman, commenced at CRDC on 21 January 2008. Research Program Manager, Dallas Gibb, left CRDC on 8 February 2008. He continues to consult to CRDC on a part-time basis.

Appointments after the reporting year

No appointments have been made after the reporting year.

Training and Development

During the reporting year, the Corporation spent $24,477.00 on training and recruitment. Areas of direct training activities were:

- Molecular Transformation
- University Fees
- Australian Government Central Budget Management System
- Intellectual Property Management
- Field to Fabric Course
- OH&S external training for CRDC's OH&S Safety Officer
- Project management database training
- Australian Institute of Company Directors training course

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 the necessary skills and experience. During the reporting year the Corporation spent $236,975 to remunerate consultants and contractors. It is Corporation policy not to disclose amounts paid to individual consultants due to privacy and confidentiality arrangements.

Advance IT	IT Support
Artrac Consulting	Trade Marks register
B & C Druce	Cleaning
Brendon Fox Consulting	Scoping study
Bytes & PCs Narrabri	IT Support
Dallas Gibb	Research program management
Emergent Futures	Strategic Plan 2008–2013 development
Ian Plowman	Strategic Plan 2008–2013 development
Jeremedy Design	Design logos
Kim Morrison	Strategic Plan 2008–2013 development
Mary Ann Day	Publication content
Megan James	Publication Content
Melanie Jensen	Cotton Conference and publication content
Michael A. Carrigan & Co	Financial review
Natural Solutions	Development of Strategic Plan
Neil Deacon Art Director	Website design
PKF Chartered Accountants	LSL calculations
Pola Media	Publication content
Rossina Gall	Media distribution list support
Russell Muchow	Strategic Plan 2008–2013 development
TechMAC Pty Limited	Program management
Terri-Ann Crothers	Publication content
Triple Helix Consulting	Strategic Plan 2008–2013 development
Tristan Rossell	Publication content
Warbutons Chartered Accountants	LSL calculations
Weemalah Writeability	Publication writing and editing
Wordsworth Writing	Annual report indexing

Equal Employment Opportunity

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

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

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.

Training for 2007–08 included 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 2007–08, 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 that 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 principles 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 in the Strategic Plan 2003–2008 – 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 has funded 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. CRDC has ensured that any person with a disability could be properly accommodated and carry out all functions, as either a staff member or a visitor. Should a future staff member need more specialised disability assistance, CRDC will assess and meet these needs to the extent that it is possible.

CRDC's Equal Opportunity and Harassment Policy 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'. The Corporation provides regular briefings to the Minister for Agriculture, Fisheries and Forestry on its key issues and activities; however, CRDC had no significant events within the meaning of the Act during the reporting year.

Significant Changes in the State of Affairs

CRDC had no significant changes in its state of affairs in 2007–08.

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:

- Participation in development of the five year Strategic Plan. This ensures CRDC's strategic planning continues to address evolving industry R&D needs.
- A meeting to receive and discuss the CRDC annual report for the preceding year. This enables 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 CRDC and Cotton Catchment Communities CRC Farming Systems forums

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

In 2007–08 CRDC contributed a total of $10,881 to ACGRA for the following ACGRA activities:

- Review of CRDC research applications and reports
- Annual General Meeting expenses
- Participation in an R&D forum
- Attendance at CRDC Strategic Planning meetings.

Financial Statements

Australian National Audit Office

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 2008, which comprise: a Statement by Directors and Executive Director; Income Statement; Balance Sheet; Statement of Changes in Equity; Cash Flow Statement; Schedule of Commitments; Schedule of Contingencies; and Notes to and forming part of the Financial Statements, including a Summary of Significant Accounting Policies.

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*, including the Australian Accounting Standards (which include 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.

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

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

Independence

In conducting the audit, I have followed the independence requirements of the Australian National Audit Office, which incorporate the 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,* including the Australian Accounting Standards; 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 2008 and its financial performance and cash flows for the year then ended.

Australian National Audit Office

Ron Wah
Senior Director

Delegate of the Auditor-General

Canberra
28 August 2008

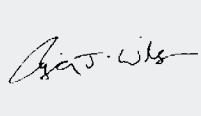
COTTON RESEARCH AND DEVELOPMENT CORPORATION

Statement by Directors and Executive Director

In our opinion, the attached financial statements for the year ended 30 June 2008 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 Authority 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



Lisa Wilson
Director

Bruce Finney
Executive Director

David Coleman
General Manager – Business and Finance

28 August 2008

COTTON RESEARCH AND DEVELOPMENT CORPORATION

Income Statement

for the period ended 30 June 2008

	Notes	2008 $	2007 $
Income			
Revenue			
Revenue from Government	3A	**3,127,710**	4,576,667
Industry levies	3B	**1,953,545**	4,168,402
Interest	3C	**1,105,098**	1,051,656
Other revenues	3D	**771,623**	1,712,320
Total revenue		**6,957,976**	11,509,045
Total Income		**6,957,976**	11,509,045
Expenses			
Employee benefits	4A	**1,299,207**	1,314,869
Suppliers	4B	**407,414**	410,306
Grants	4C	**8,704,419**	10,122,933
Depreciation and amortisation	4D	**52,661**	39,042
Write-down and impairment of assets	4E	**0**	0
Total Expenses		**10,463,701**	11,887,150
Surplus (Deficit)		**(3,505,725)**	(378,105)

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

COTTON RESEARCH AND DEVELOPMENT CORPORATION

Balance Sheet

as at 30 June 2008

	Notes	2008 $	2007 $
Assets			
Financial Assets			
Cash and cash equivalents	5A	**12,151,582**	13,331,471
Trade and other receivables	5B	**836,497**	2,429,500
Total financial assets		**12,988,079**	15,760,971
Non-financial Assets			
Land and buildings	6A,C	**488,316**	497,739
Plant and equipment	6B,C	**108,279**	95,230
Intangibles	6D	**80,014**	103,523
Other non-financial assets	6E	**25,538**	7,539
Total non-financial assets		**702,147**	704,031
Total Assets		**13,690,226**	16,465,002
Liabilities			
Payables			
Suppliers	7A	**60,944**	37,936
Grants	7B	**1,431,743**	732,791
Other	7C	**30,510**	36,877
Total payables		**1,523,197**	807,604
Provisions			
Employee provisions	8A	**215,481**	200,125
Total provisions		**215,481**	200,125
Total Liabilities		**1,738,678**	1,007,729
Net Assets		**11,951,548**	15,457,273
Equity			
Reserves		**135,592**	135,592
Retained surpluses		**11,815,956**	15,321,681
Total equity		**11,951,548**	15,457,273
Current Assets		**13,013,617**	15,768,510
Non-Current Assets		**676,609**	696,492
Current Liabilities		**1,679,131**	947,364
Non-Current Liabilities		**59,548**	60,365

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 2008

	Accumulated Results		Asset Revaluation Reserve		Total Equity	
	2008 $	2007 $	**2008** $	2007 $	**2008** $	2007 $
Opening balance						
Balance carried forward from previous period	**15,321,681**	15,699,786	**135,592**	135,592	**15,457,273**	15,835,378
Adjustment for errors	**0**	0	**0**	0	**0**	0
Adjustment for changes in accounting policies						
Adjusted opening balance	**15,321,681**	15,699,786	**135,592**	135,592	**15,457,273**	15,835,378
Income and expense						
Income and expenses recognised directly in equity	**0**	0	**0**	0	**0**	0
Sub-total income and expenses recognised directly in equity	**0**	0	**0**	0	**0**	0
Surplus (Deficit) for the period	**(3,505,725)**	(378,105)	**0**	0	**(3,505,725)**	(378,105)
Total income and expenses	**(3,505,725)**	(378,105)	**0**	0	**(3,505,725)**	(378,105)
Closing balance at 30 June	**11,815,956**	15,321,681	**135,592**	135,592	**11,951,548**	15,457,273

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 2008

	Notes	2008 $	2007 $
Operating Activities			
Cash received			
Commonwealth contributions		**3,093,651**	4,576,667
Industry levies		**2,388,887**	5,147,317
Interest		**1,229,776**	944,999
Other cash received		**1,913,385**	754,563
Total cash received		**8,625,699**	11,423,546
Cash used			
Employees		**1,307,292**	1,246,650
Suppliers		**331,656**	369,116
Grants		**8,035,825**	11,889,392
Net GST paid		**98,036**	194,615
Total cash used		**9,772,809**	13,699,774
Net cash from or (used by) operating activities	9	**(1,147,110)**	(2,276,228)
Investing Activities			
Cash used			
Purchase of property, plant and equipment		**32,779**	142,655
Purchase of intangibles			0
Total cash used		**32,779**	142,655
Net cash from or (used by) investing activities		**(32,779)**	(142,655)
Net increase or (decrease) in cash held		**(1,179,889)**	(2,418,883)
Cash at the beginning of the reporting period		**13,331,471**	15,750,354
Cash at the end of the reporting period	5A	**12,151,582**	13,331,471

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

COTTON RESEARCH AND DEVELOPMENT CORPORATION

Schedule of Commitments
as at 30 June 2008

	2008 $	2007 $
By Type		
Commitments Receivable		
Lease rental income	**8,250**	8,250
GST recoverable on commitments	**2,121,648**	2,090,189
Total commitments receivable	**2,129,898**	2,098,439
Commitments payable		
Operating leases (1)	**43,575**	112,106
Research grant commitments (2)	**23,338,123**	22,879,976
Total commitments payable	**23,381,698**	22,992,082
Net commitments by type	**21,251,800**	20,893,643
By Maturity		
Commitments Receivable		
One year or less	**668,396**	781,031
From one to five years	**1,461,502**	1,317,408
Total commitments receivable	**2,129,898**	2,098,439
Operating lease commitments		
One year or less	**37,350**	49,825
From one to five years	**6,225**	62,281
Total operating lease commitments	**43,575**	112,106
Research grant commitments		
One year or less	**7,261,602**	8,450,770
From one to five years	**16,076,521**	14,429,206
Total research grant commitments	**23,338,123**	22,879,976
Net commitments by maturity	**21,251,800**	20,893,643

NB: Commitments are GST inclusive where relevant.

1. Operating leases are effectively non-cancellable and comprise of agreements for the provision of motor vehicles for senior executives
2. Research grants 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 2008

The Corporation had no contingent assets or liabilities.

The above schedule 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 2008

Notes to and forming part of the financial statements
for the period ended 30 June 2008

Note 1: Summary of Significant Accounting Policies

1.1 Objectives of the Corporation

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 2007; and
- Australian Accounting Standards and Interpretations issued by the Australian Accounting Standards Board (AASB) that apply for the reporting period.

The Financial Statements have been prepared on an accrual basis and 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 Statements are presented in Australian dollars and values are rounded to the nearest dollar unless otherwise specified.

Unless an alternative treatment is specifically required by an Accounting Standard or the 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

Adoption of new Australian Accounting Standard requirements

No accounting standard has been adopted earlier than the application date as stated in the standard. The following new standard is applicable to the current reporting period:

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 previously required.. 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 affect the disclosure presented in future financial reports

The following new standards, amendments to standards or interpretations for the current financial year have no material financial impact on the Corporation.

- 2007-4 Amendments to Australian Accounting Standards arising from *ED 151* and Other Amendments and Erratum: Proportionate Consolidation
- 2007-7 Amendments to Australian Accounting Standards
- *UIG Interpretation 11 AASB 2 – Group and Treasury Share Transactions* and 2007-1 Amendments to Australian Accounting Standards arising from *AASB Interpretation 11*

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.

- *AASB Interpretation 12 Service Concession Arrangements* and 2007-2 Amendments to Australian Accounting Standards arising from *AASB Interpretation 12*
- *AASB 8 Operating Segments* and 2007-3 Amendments to Australian Accounting Standards arising from *AASB 8*
- 2007-6 Amendments to Australian Accounting Standards arising from *AASB 123*
- *AASB Interpretation 13 Customer Loyalty Programmes*
- *AASB Interpretation 14 AASB 119 – The Limit on a Defined Benefit Asset, Minimum Funding Requirements and their Interaction*

Other

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

AASB 1049 Whole of Government and General Government Sector Financial Reporting

AASB 1049 specifies the reporting requirements for the General Government Sector. The FMOs do not refer to this standard as it contains guidance applicable to the consolidated financial statements of the Australian Government, rather than financial reports of individual Agencies or Authorities.

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.*

Resources received free of charge

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

Contributions of assets at no cost of acquisition or for nominal consideration are recognised as gains at their fair value when the asset qualifies for recognition, unless received from another Government Agency or Authority as a consequence of a restructuring of administrative arrangements (Refer to Note 1.7).

Resources received free of charge are recorded as either revenue or gains depending on their nature.

Revenues from Government

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

1.5 Gains

Other resources received free of charge

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

Sale of assets

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

1.6 Transactions with the Government as owner

Restructuring of administrative arrangements

Net assets received from, or relinquished to, another Australian Government Agency or Authority under a restructuring of administrative arrangements are adjusted at their book value directly against contributed equity.

Other distributions to owners

The FMOs require that distributions to owners be debited to contributed equity unless in the nature of a dividend.

1.7 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 and statutory oncosts to the extent that the leave is likely to be taken during service rather than paid out on termination. The additional amount of leave provision this policy would have incurred in 2006–07 is $10,763.

The liability for long service leave has been determined by reference to the work of an actuary as at 30 June 2008. The estimate of the present value of the liability takes into account attrition rates,

remuneration increases through promotion and inflation, superannuation contribution rates and statutory oncosts. The inclusion of statutory oncosts added $7,353 to the provision in 2007-08.

Separation and redundancy

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

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 liability is reported by the Department of Finance and Deregulation as an administered item.

The Corporation makes employer contributions to the Employee Superannuation Scheme at rates determined by an actuary to be sufficient to meet the current 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.

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

1.8 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.

1.9 Borrowing costs

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

1.10 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.

1.11 Financial assets

The Corporation classifies its financial assets in the following categories:

- financial assets 'at fair value through profit or loss';
- held-to-maturity investments';
- 'available-for-sale' financial assets; and
- 'loans and receivables'.

The classification depends on the nature and purpose of the financial assets and is determined at the time of initial recognition.

Financial assets are recognised and derecognised upon 'trade date'.

Effective interest method

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

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

Financial assets at fair value through profit or loss

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

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

Assets in this category are classified as current assets.

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

Held-to-maturity investments

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

Available-for-sale financial assets

Available-for-sale financial assets are non-derivatives that are either designated in this category or not classified in any of the other categories. They are included in non-current assets unless management intends to dispose of the asset within 12 months of the balance sheet date.

Available-for-sale financial assets are recorded at fair value. Gains and losses arising from changes in fair value are recognised directly in the reserves (equity) with the exception of impairment losses. Interest is calculated using the effective interest method and foreign exchange gains and losses on monetary assets are recognised directly in profit or loss. Where the asset is disposed of or is determined to be impaired, part or all of the cumulative gain or loss previously recognised in the reserve is included in profit for the period. The Corporation does not have available-for-sale financial assets.

Where a reliable fair value cannot be established for unlisted investments in equity instruments, cost is used. The Corporation entity has no such instruments.

Loans and receivables

Trade receivables, loans and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as 'loans and receivables'. They are included in current assets, except for maturities greater than 12 months after the balance sheet date. These are classified as non-current assets. Loans and receivables are measured at amortised cost using the effective interest method less impairment. Interest is recognised by applying the effective interest rate.

Impairment of financial assets

Financial assets are assessed for impairment at 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.

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

1.12 Financial liabilities

Financial liabilities are classified as either financial liabilities 'at fair value through profit or loss' or other financial liabilities.

Financial liabilities are recognised and derecognised upon 'trade date'.

Financial liabilities at fair value through profit or loss

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

Other financial liabilities

Other financial liabilities, including borrowings, are initially measured at fair value, net of transaction costs.

Other financial liabilities are subsequently measured at amortised cost using the effective interest method, with interest expense recognised on an effective yield basis.

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

Supplier and other payables

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).

1.13 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.

1.14 Financial guarantee contracts

Financial guarantee contracts are accounted for in accordance with *AASB 139*. They are not treated as a contingent liability, as they are regarded as financial instruments outside the scope of *AASB 137*. The Corporation does not have financial guarantee contracts.

1.15 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.

1.16 Land, buildings, plant and equipment

Asset recognition threshold

Purchases of land, buildings, 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, land, buildings, 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 form 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 land, buildings, 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:

	2008	2007
Buildings on Freehold land	40 years	40 years
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 2008. 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.

1.17 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 2008. None were found to be impaired.

1.18 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.

	2008 $	2007 $
Note 3: Income		
Revenue		
Note 3A: Revenue from Government		
Revenues from Government		
Grant revenue from Related Entity	**3,127,710**	4,576,667
Total revenue from Government	**3,127,710**	4,576,667
Note 3B: Industry Contributions		
Industry Contributions	**1,953,545**	4,168,402
Total contributions revenue	**1,953,545**	4,168,402
Note 3C: Interest Revenue		
Interest on deposits	**1,105,098**	1,051,656
Total Interest Revenue	**1,105,098**	1,051,656
Note 3D: Other Revenues		
Royalties	**597,544**	1,285,634
Project refunds	**25,615**	76,697
Levy Penalties	**1,014**	0
Grants Revenue	**117,986**	311,203
Other Revenue	**29,464**	38,786
Total Other Revenues	**771,623**	1,712,320

	2008 $	2007 $
Note 4: Expenses		
Note 4A: Employee benefits		
Wages and salaries	**1,057,888**	1,150,057
Superannuation	**146,034**	129,212
Leave and other entitlements	**95,285**	35,600
Total employee benefits	**1,299,207**	1,314,869
Note 4B: Suppliers		
Provision of goods – external entities	**350,738**	350,632
Operating lease rentals	**54,418**	57,483
Workers compensation premiums	**2,258**	2,191
Total supplier expenses	**407,414**	410,306
Note 4C: Grants		
Non-profit institutions		
Commonwealth organisations	**2,217,985**	2,306,353
State Departments	**1,045,711**	1,566,465
Universities and colleges	**467,837**	345,048
Other research institutions	**4,157,016**	4,189,575
Corporate activities	**476,286**	537,710
	8,364,835	8,945,151
Other entities		
Commercial entities	**339,584**	1,177,782
Total grants expense	**8,704,419**	10,122,933
Note 4D: Depreciation and amortisation		
Depreciation		
Plant and equipment	**19,730**	15,842
Buildings	**9,423**	9,179
Total depreciation	**29,153**	25,021
Amortisation		
Intangibles:		
Computer software	**23,508**	14,021
Total amortisation	**23,508**	14,021
Total depreciation and amortisation	**52,661**	39,042
Note 4E: Write-down and impairment of assets		
Revaluation decrements – plant & equipment	**0**	0
Total write-down and impairment of assets	**0**	0
Note 5: Financial Assets		
Note 5A: Cash and cash equivalents		
Cash at bank	**139,325**	2,080,971
Cash on hand	**500**	500
Deposits on Call	**12,011,757**	11,250,000
Total Cash and cash equivalents	**12,151,582**	13,331,471

	2008 $	2007 $
Note 5B: Trade and other receivables		
Industry levies receivable	**322,194**	757,536
Interest receivable	**316,137**	440,815
Royalties receivable	**34,059**	1,150,446
GST receivable from ATO (Net)	**152,133**	54,097
Other receivables	**11,974**	26,606
Total trade and other receivables (gross)	**836,497**	2,429,500
Receivables are aged as follows:		
Overdue	**0**	
Not overdue	**836,497**	2,429,500
Receivables(net) are represented by:		
Current	**836,497**	2,429,500

Note 6: Non-Financial Assets

Note 6A: Land and buildings

Freehold land		
Freehold land (at fair value)	**130,000**	130,000
Total freehold land	**130,000**	130,000
Buildings on freehold land		
– Fair value	**376,917**	376,918
– Accumulated depreciation	**(18,601)**	(9,179)
Total buildings on freehold land	**358,316**	367,739
Total land and buildings (non-current)	**488,316**	497,739

No indicators of impairment were found for land and buildings

Note 6B: Plant and equipment

Office Equipment		
- Fair value	**40,971**	40,971
- Accumulated depreciation	**(8,165)**	(4,068)
Total office equipment	**32,806**	36,903
Computer Equipment		
– Fair value	**58,692**	27,392
– Accumulated depreciation	**(19,101)**	(7,751)
Total computer equipment	**39,591**	19,641
Fixture and Fittings		
- Fair value	**44,188**	42,709
- Accumulated depreciation	**(8,306)**	(4,023)
Total fixture and fittings	**35,882**	38,686
Total land, buildings, plant and equipment (non-current)	**108,279**	95,230

No indicators of impairment were found for plant and equipment

Note 6C: Analysis of Property, Plant & Equipment

Table A: Reconciliation of the opening and closing balances of property, plant and equipment (2007–08)

Item	Land	Buildings	Total Land and Buildings	Office Equipment	Computer Equipment	Fixtures & Fittings	Total Plant & Equipment	Total
	$	$	$	$	$	$	$	$
As at 1 July 2007								
Gross book value	130,000	376,918	506,918	40,971	27,392	42,709	111,072	**617,990**
Accumulated depreciation/ amortisation and impairment	0	(9,179)	(9,179)	(4,068)	(7,751)	(4,023)	(15,842)	**(25,021)**
Net book value 1 July 2007	130,000	367,739	497,739	36,903	19,641	38,686	95,230	**592,969**
Additions by purchase	0	(0)	(0)	(0)	31,300	1,479	32,779	**32,779**
Revaluations and impairment through equity	0	0	0	0	0	0	0	**0**
Depreciation/ amortisation expense	0	(9,423)	(9,423)	(4,097)	(11,350)	(4,283)	(19,730)	**(29,153)**
Disposals	0	0	0	0	0	0	0	**0**
Net book value 30 June 2008								
Net book value as of 30 June 2008 represented by:								
Gross book value	130,000	376,918	506,918	40,971	58,692	44,188	143,851	**650,769**
Accumulated depreciation/ amortisation and impairment	0	(18,602)	(18,602)	(8,165)	(19,101)	(8,306)	(35,572)	**(54,174)**
	130,000	**358,316**	**488,316**	**32,806**	**39,591**	**35,882**	**108,279**	**596,595**

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

Item	Land	Buildings	Total Land and Buildings	Office Equipment	Computer Equipment	Fixtures & Fittings	Total Plant & Equipment	Total
	$	$	$	$	$	$	$	$
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	0	0	0	0	0	0	0	**0**
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	0	51,918	51,918	**1,431**	**11,402**	**4,359**	17,192	**69,110**
Revaluations and impairment through equity	0	0	0	0	0	0	0	**0**
Depreciation/ amortisation expense	0	(9,179)	(9,179)	(4,068)	(7,751)	(4,023)	(15,842)	**(25,021)**
Disposals	0	0	0	0	0	0	0	**0**
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	0	(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**

	2008 $	2007 $
Note 6D: Intangibles		
Computer software valuation (2006 Fair Value):		
Internally developed – in progress	**117,545**	117,545
Accumulated Amortisation	**(37,530)**	(14,021)
Total intangibles (non-current)	**80,014**	103,523

	2008 $	2007 $
Table A – reconciliation of opening and closing balances of intangibles		
As at 1 July 2007		
Gross book value	**117,544**	44,000
Accumulated depreciation/amortisation and impairment	**(14,021)**	0
Net book value 1 July 2007	**103,523**	44,000
Additions:		
by purchase or internally developed	**(0)**	73,544
Depreciation/amortisation	**(23,509)**	(14,021)
Net revaluation decrement	**0**	0
Net book value 30 June 2008	**80,014**	103,523
Net book value as of 30 June 2008 represented by:		
Gross book value	**117,544**	117,544
Accumulated depreciation/amortisation and impairment	**(37,530)**	(14,021)
	80,014	103,523

No indicators of impairment were found for intangible assets

Note 6E: Other Non-Financial Assets		
Prepayments	**25,538**	7,539
Total other non-financial assets	**25,538**	7,539

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	**60,944**	37,936
Total supplier payables	**60,944**	37,936
Supplier payables are represented by:		
Current	**60,944**	37,936
Non-Current	**0**	0
Total supplier payables	**60,944**	37,936

	2008	2007
	$	$
Note 7B: Grants		
Commonwealth organisations	**292,645**	412,623
State Departments	**276,901**	216,736
Universities and colleges	**82,364**	29,333
Other research organisations	**779,833**	74,099
Total Grants Payable	**1,431,743**	732,791

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	**30,510**	36,877
Total Other Payables	**30,510**	36,877

Note 8: Provisions

Note 8A: Employee Provisions		
Salaries and wages	**6,731**	8,349
Leave	**207,504**	183,433
Superannuation	**1,246**	8,343
Total employee provisions	**215,481**	200,125
Employee provisions are represented by:		
Current	**155,933**	139,760
Non-current	**59,548**	60,365
Total employee provisions	**215,481**	200,125

Note 9: Cash flow reconciliation

Reconciliation of cash and cash equivalents as per Balance Sheet to Cash Flow Statement		
Report cash and cash equivalents as per:		
Cash Flow Statement	**12,151,582**	13,331,471
Balance Sheet	**12,151,582**	13,331,471
Difference	**(0)**	0
Reconciliation of operating result to net cash from operating activities:		
Operating result	**(3,505,725)**	(378,105)
Depreciation and amortisation	**52,661**	39,042
Net write down of non-current assets	**0**	0
(Increase)/decrease in net receivables	**1,593,003**	(172,532)
(Increase)/decrease in prepayments	**(17,999)**	22,391
Increase/(decrease) in supplier payables	**23,008**	(20,000)
Increase/(decrease) in other payables	**(6,367)**	5,883
Increase/(decrease) in employee provisions	**15,356**	47,867
Increase/(decrease) in grants payables	**698,952**	(1,820,774)
Net cash from/(used by) operating activities	**(1,147,110)**	(2,276,228)

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% of the amount that the Minister determines to be the gross value of production (GVP) for that financial year. In 2007-08 Commonwealth contributions were capped to a GVP of $3,127,710, leaving a remote contingent receivable of $0.395m. The probability of receiving this receivable is remote whilst cotton production and prices continue to remain low.

Note 11: Directors' Remuneration

	2008	2007
$Nil – $ 14,999	**1**	2
$15,000 – $ 29,999	**5**	5
$30,000 – $ 44,999	**1**	1
$195,000 – $209,999	**1**	1
Total number of directors of the Corporation	**8**	9
Total remuneration received, or due and receivable, by directors of the Corporation	**$322,116**	$329,853

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.

	2008	2007
	$	$
Grants to director related entities:		
Australian Rural Leadership Foundation	**28,750**	23,920
Cotton Catchment Communities CRC	**4,137,016**	4,189,575
CSIRO (Entomology, Plant Industry, Land & Water, Textile and Fibre Technology)	**2,084,235**	2,306,353
NSW Department of Primary Industries	**569,074**	1,027,971
QLD Department of Primary Industries and Fisheries	**469,237**	503,694
University of Queensland	**70,000**	84,000

Note 13: Executive Remuneration

The number of senior executives who received or were due to receive total remuneration of $115,000 or more:

	2008	2007
$ 115,000 to $ 129,999		2
$ 160,000 to $ 174,999	**1**	1
Total	**1**	3
The aggregate amount of the total remuneration of executives shown above.	**$170,550**	$407,331
The aggregate amount of separation and redundancy/termination benefit payments during the year to executives shown above.	Nil	Nil

	2008 $	2007 $
Note 14: Remuneration of Auditors		
Financial statement audit services are provided to the CRDC by the Auditor General.		
The fair value of the services provided to the Corporation was:	**8,750**	8,500
Note 15: Average Staffing Levels		
The average staffing levels for the Corporation during the year were:	**10**	12
Note 16: Financial Instruments		
Note 16A: Categories of financial instruments		
Financial assets		
Loans and receivables		
Cash and cash equivalents	**12,151,582**	13,331,471
Trade and other receivables	**362,170**	1,617,867
Carrying amount of financial assets	**12,988,079**	14,949,338
Financial liabilities		
Other financial liabilities		
Suppliers	**60,944**	37,936
Grants	**1,431,743**	732,791
Carrying amount of financial liabilities	**1,492,687**	770,727

	2008 $	2007 $
Note 16B: Net income and expense from financial assets		
Loans and receivables		
Interest revenue (see note 3C)	**1,105,098**	1,051,656
Net gain/(loss) from loans and receivables	**1,105,098**	1,051,656
Net gain/(loss) from financial assets	**1,105,098**	1,051,656
Note 16C: Net income and expense from financial liabilities		
Other financial liabilities		
	0	0
Net gain/(loss) from other financial liabilities	**0**	0
Net gain/(loss) from financial liabilities	**0**	0

Note 16D: Fair Values of Financial Assets and Liabilities

	Notes	2008 $		2007 $	
		Total carrying amount	**Aggregate fair value**	Total carrying amount	Aggregate fair value
Financial Assets					
Cash at bank	5A	**139,325**	**139,325**	2,080,971	2,080,971
Cash on hand	5A	**500**	**500**	500	500
Deposits at call	5A	**12,011,757**	**12,011,757**	11,250,000	11,250,000
Receivables	5B	**362,170**	**362,170**	1,617,867	1,617,867
Total Financial Assets		**12,513,752**	**12,513,752**	14,949,338	14,949,338
Financial Liabilities					
Trade creditors	7A	**60,944**	**60,944**	37,936	37,936
Grants payable	7B	**1,431,743**	**1,431,743**	732,791	732,791
Total Financial Liabilities		**1,492,687**	**1,492,687**	770,727	770,727

Note 16E: 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.

Credit risk of financial instruments not past due or individually determined as impaired

	Not Past due or impaired 2008 $	Not Past due or impaired 2007 $	Past due or impaired 2008 $	Past due or impaired 2007 $
Cash at bank	**12,151,582**	13,331,471	**0**	0
Receivables for goods and services	**362,170**	1,617,867	**0**	0
Total	**12,513,752**	14,949,338	**0**	0

Ageing of financial assets that are past due but not impaired for 2008

	0 to 30 days $	**31 to 60 days $**	**61 to 90 days $**	**90+ days $**	**Total $**
Receivables for goods and services	**362,170**	**0**	**0**	**0**	**362,170**
Total	**362,170**	**0**	**0**	**0**	**362,170**

Ageing of financial assets that are past due but not impaired for 2007

	0 to 30 days $	31 to 60 days $	61 to 90 days $	90+ days $	Total $
Receivables for goods and services	1,617,867	0	0	0	1,617,867
Total	1,617,867	0	0	0	1,617,867

Note 16F: Liquidity risk

The Corporation's financial liabilities are payables. The exposure to liquidity risk is based on the notion that the Corporation will encounter difficulty in meeting its obligations associated with financial liabilities. This is highly unlikely due to the internal policies and procedures put in place to ensure there are appropriate resources to meet its financial obligations.

The following tables illustrates the maturities for financial liabilities

	On demand 2008 $	**within 1 year 2008 $**	**1 to 5 years 2008 $**	**> 5 years 2008 $**	**Total 2008 $**
Trade creditors		**60,944**			**60,944**
Grants payable		**1,431,743**			**1,431,743**
Total	**0**	**1,492,687**	**0**	**0**	**1,492,687**

	On demand 2007 $	within 1 year 2007 $	1 to 5 years 2007 $	> 5 years 2007 $	Total 2007 $
Trade creditors		37,936			37,936
Grants payable		732,791			732,791
Total	0	770,727	0	0	770,727

16G Market risk

The Corporation holds basic financial instruments that do not expose the Authority to certain market risks. The Corporation is not exposed to 'currency risk' or 'other price risk'.

Interest Rate Risk

The only interest-bearing items on the balance sheet are the "Cash and cash equivalents'. All bear interest at a variable interest rate and will fluctuate due to changes in the market interest rate. The interest rate risk does not have any impact on the fair value of the Cash and cash equivalents.
The tables on the following page illustrates the maturities for financial assets and financial liabilities:

Note 16G Market Risk *(continued)*

The following tables illustrates the maturities for financial assets and financial liabilities:

	Note	Floating interest rate	Fixed interest maturing in			Non-interest bearing	Total	Weighted average effective interest rate
			1 year or less	1 to 5 years	> 5 years			
		2008	2008	2008	2008	2008	2008	2008
		$	$	$	$	$	$	%
Financial assets								
Cash at bank	5A	**139,325**					**139,325**	**6.00**
Cash on hand	5A					**500**	**500**	**0.00**
Deposits at call	5A		**12,011,757**				**12,011,757**	**6.00**
Receivables	5B					**362,170**	**362,170**	**0.00**
Total		**139,325**	**12,011,757**	**0**	**0**	**362,670**	**12,513,752**	
Total assets							**13,690,226**	
Financial liabilities								
Trade creditors	7A					**60,944**	**60,944**	**0.00**
Grants payable	7B					**1,431,743**	**1,431,743**	**0.00**
Total		**0**	**0**	**0**	**0**	**1,492,687**	**1,492,687**	
Total liabilities							**1,738,679**	

	Note	Floating interest rate	Fixed interest maturing in			Non-interest bearing	Total	Weighted average effective interest rate
			1 year or less	1 to 5 years	> 5 years			
		2007	2007	2007	2007	2007	2007	2007
		$	$	$	$	$	$	%
Financial assets								
Cash at bank	5A	2,080,971					2,080,971	6.00
Cash on hand	5A					500	500	0.00
Deposits at call	5A		11,250,000				11,250,000	6.00
Receivables	5B					1,617,867	1,617,867	0.00
Total		2,080,971	11,250,000	0	0	1,618,367	14,949,338	
Total assets							16,456,002	
Financial liabilities								
Trade creditors	7A					37,936	37,936	0.00
Grants payable	7B					732,791	732,791	0.00
Total		0	0	0	0	770,727	770,727	
Total liabilities							1,007,729	

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.'

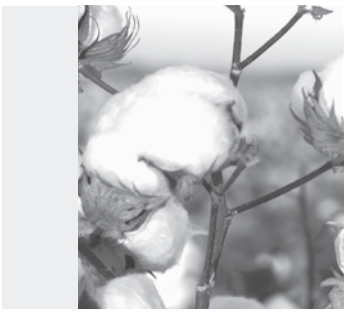
Output 1: Economic – Profitability and International Competitiveness
Output 2: Environmental – Ecologically Sustainable Development
Output 3: Social – People and Communities

Note 17B: Net Cost of Outcome Delivery

	Outcome	
	2008	2007
	$	$
Total Expenses	**10,463,702**	11,887,150
Funded by external revenues:		
Industry contributions	**1,953,545**	4,168,402
Interest	**1,105,098**	1,051,656
Other	**771,623**	1,712,320
Total other external revenues	**3,830,266**	6,932,378
Net cost/(contribution) of outcome	**6,633,435**	4,954,772

Note 17C: Corporation Revenues and Expenses by Output

	Output 1 Economic		Output 2 Environmental		Output 3 Social	
	2008	2007	2008	2007	2008	2007
Operating expenses	$	$	$	$	$	$
Employees	**597,635**	604,840	**415,746**	420,758	**285,825**	289,271
Suppliers	**187,411**	188,741	**130,373**	131,298	**89,631**	90,267
Grants	**4,004,033**	4,656,549	**2,785,414**	3,239,339	**1,914,972**	2,227,045
Depreciation	**24,224**	17,959	**16,852**	12,493	**11,586**	8,590
Total Expenses	**4,813,303**	5,468,089	**3,348,385**	3,803,888	**2,302,014**	2,615,173
Funded by:						
Revenue from Government	**1,438,747**	2,105,267	**1,000,867**	1,464,533	**688,096**	1,006,867
Industry contributions	**898,631**	1,917,465	**625,134**	1,333,889	**429,780**	917,048
Interest	**508,345**	483,762	**353,631**	336,530	**243,122**	231,365
Other Revenues	**354,947**	787,667	**246,919**	547,942	**169,757**	376,710
Total revenues	**3,200,669**	5,294,161	**2,226,552**	3,682,894	**1,530,755**	2,531,990



Appendix One
Selection Committee Report

Cotton Research and Development Corporation
Selection Committee

Prue McMichael
Presiding Member
CRDC Selection Committee
Scholefield Robinson
FULLARTON SA 5063

17 July 2008

The Hon. Tony Burke MP
Minister for Agriculture, Fisheries and Forestry
Parliament House
Canberra ACT 2600

Dear Minister

In accordance with the requirements of Section 141 of the Primary Industries Research and Development Act 1989 (PIERD Act), I write to inform you of the activities of the Selection Committee for this past year ending 30 June 2008.

The appointments made to the Cotton Research and Development Corporation Board by Senator the Hon. Richard Colbeck, former Parliamentary Secretary to the former Minister for Agriculture, Fisheries and Forestry, on 26 August 2005 were for a period of three years and were therefore still in effect throughout the 2007–08 financial year. There was no requirement for a Selection Committee to be authorised before June 30, 2008 and no costs have been incurred.

As you will be aware, the Selection Committee for the forthcoming term of the CRDC Board is currently being formed, with nominations for seven directors due to your office by August 31, 2008.

It was noted in the 2006–07 Annual Report of the CRDC that, *"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."* In line with this, the 2008 Selection Committee is instructed to select seven non-executive directors for the new term. The CRDC Chair, Mr Michael Logan was appointed by the previous Australian Government on 24 August 2007 and will continue in this role. The Board appoints the Executive Director of CRDC. The Selection Committee is therefore not involved with this nomination, nor is Ministerial approval required. It is confirmed therefore that a Board of nine members will be operational from October 1, 2008.

The directors will be selected and nominated to the Minister based on their expertise. The areas of expertise considered important to the industry and efficient functioning of the Board are commodity production, processing and marketing; conservation/management of natural resources; environmental and ecological matters; science and technology, and technology transfer; administration of research and development; economics; finance and business management; sociology and public administration.

The Selection Committee will report to the Minister on its deliberations, which will include specific consideration of the expertise, diversity and experience of the candidates, individually and as a nominated group.

Yours sincerely

Prue McMichael
Presiding Member

Appendix Two
Additional Activities

	2003–04	2004–05	2005–06	2006–07	2007–08
Cotton Crop Size (millions of bales)	1.5	2.8	2.6	1.2	**0.55**
			$ million		
Total Revenue	9.94	11.95	15.61	11.51	**6.96**
Industry levies	2.58	4.58	6.71	4.17	**1.95**
Australian Government contribution	4.77	4.32	4.91	4.58	**3.13**
Royalties	0.82	1.64	2.5	1.29	**0.59**
Interest	0.75	0.70	0.89	1.05	**1.10**
Other	1.02	0.71	0.6	0.43	**0.19**
Expenditure Total	**12.6**	**12.62**	**12.79**	**11.89**	**10.46**
Research and Extension Activities	11.34	11.11	11.14	10.12	**8.70**
Financial Assets	**13.45**	**14.3**	**18.00**	**15.76**	**11.95**
CRDC People					
Number of Employees: total	12	12	11	12	**10**
Number of Employees: full time equivalent	9.7	11	11.6	11.6	**9.7**
Operating Statistics					
Number of new R&D proposals received	78	52	100	48	**54**
Number of new R&D proposals approved	31	31	43	24	**51**
Number of continuing projects	111	70	55	72	**70**
Number of commissioned projects approved	12	21	32	9	**7**
Total number of R&D Projects managed	154	122	165	142	**121**
Total number of final reports received	41	11	60	55	**56**
These operating statistics include:					
Total number of scholarship applications received	9	12	15	9	**3**
Total number of new scholarships awarded	2	3	6	4	**3**
Total number of travel grant applications received	8	15	22	10	**23**
Total number of travel grants awarded	7	12	19	7	**22**

Appendix Three
Communication

CRDC investments in communication capacity and resources have two principal purposes: to facilitate, monitor and evaluate its efforts and the impacts arising from the outputs of its investments in research, development and extension, and to inform its industry and government stakeholders about the effectiveness and value for money of its corporate activities.

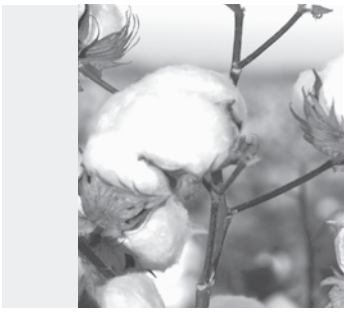
A shift in emphasis under the CRDC Strategic Plan 2008–2013 toward the post-farm-gate sector will result in new communication challenges to support adoption. Communication activities in 2007–08 have focused on arriving at a position of strength to meet these challenges. These include capacity building in communications, investment in new online resources and refocused publications designed to support adoption of R&D. *Spotlight* magazine is CRDC's principal communication vehicle to deliver corporate messages, backed by its five-year Strategic Plan, Annual Operating Plan and Annual Report, together with news-based delivery of best practice cotton production based on R&D investments. Strategic coverage of R&D outputs and adoptable knowledge supports a key phase in assisting adoption of R&D outputs. In addition, December 2007 saw publication of the first *Annual Report to Industry*. This new publication aimed to present outcomes and impacts of R&D investments across all CRDC activities and was broadly distributed to industry stakeholders.

In response to widespread feedback from industry participants, which detailed a desire for a more detailed knowledge of research activity and outputs within the industry, *Spotlight* magazine has undergone an extensive revamp since June 2007 and is now a substantial quarterly R&D-focused magazine distributed widely throughout the industry. All *Spotlight* articles since June 2007 are available online at www.cottonnews.com.au/spotlight.

Significant planning was undertaken to enable a progressive swing to an online knowledge environment of R&D knowledge via the CRDC website, www.crdc.com.au. Therefore, summaries of all completed CRDC projects are to become progressively available on the Corporation's website. All CRDC projects and publications are being prepared for a website presence. All research projects from 2000 to 2007 will be available on the website in 2008. In addition, the Cotton Catchment Communities CRC website, www.cottoncrc.org.au, is an important and complementary source of information about CRDC research investment outputs consisting of tools and resources developed for growers through CRDC investment support.

For the first time, CRDC's Communications Manager has played a key role in planning, managing, creating content, media liaison and distributing information presented at the research-based Australian Cotton Conference, held in August 2008, and this investment in CRDC time and resources was to ensure the Conference would support the event as a showcase for industry R&D knowledge.

In a further strategy to maximise whole-of-industry effectiveness and coordination, CRDC has devised an industry-wide literature system that identifies and differentiates the different stages of knowledge adoption from creation of research findings to eventual adoption on-farm. Knowledge arising from CRDC investments will be progressively branded as "Cotton Ready" and the use of a CRDC trademark to support this is designed to differentiate industry-based R&D knowledge from knowledge gained from other sources such as agribusiness and agricultural consultants. CRDC applied for the "Cotton Ready" trademark in 2007–08 and the application is still pending.



Appendix Four
R&D Investment Portfolio

R&D ORGANISATIONS

AFI	Australian Farm Institute
ANU	Australian National University
BGC	Bill Gordon Consulting
CLW	CSIRO Land and Water
COT	CSIRO Plant Industries and Cotton Seed Distributors (CottTech Unincorporated Joint Venture)
CRC	Cotton Catchment Communities Cooperative Research Centre (post July 2005)
CRDA	Cotton Research and Development Corporation (sponsored activities)
CRDC	Cotton Research and Development Corporation
CSE	CSIRO Entomology
CSP	CSIRO Plant Industries
CTFT	CSIRO Textile and Fibre Technology. This is now a program within the newly created division, CSIRO Materials Science and Engineering, in Geelong
DAN	New South Wales Department of Primary Industries
DAQ	Department of Primary Industries, Queensland
DNR	Department of Natural Resources and Mines, Queensland
LWA	Land and Water Resources Research and Development Corporation
MER	Merinomark Pty Ltd
NEC	National Centre for Engineering in Agriculture, University of Southern Queensland
QUT	Queensland University of Technology
RIR	Australian Rural Leadership Foundation
RIRDC	Rural Industries Research and Development Corporation
UA	University of Adelaide
UNE	University of New England
UQ	University of Queensland
US	The University of Sydney
USQ	University of Southern Queensland
UTS	University of Technology, Sydney
VDPI	Department of Primary Industries, Victoria

PROGRAM ONE People and Knowledge

Contracted Party	CRDC Project Number	Project Title	Researcher	Start Date	Cease Date
BGC	BGC001	Drift management extension strategy for the Northern Region	Gordon, Bill	1/7/06	30/06/09
CRC	CRC010	The 2006–07 Cotton Industry Evaluation Survey Series (Commissioned)	Dimond, Amber	1/7/07	30/06/08
CRC	CRC115	Accelerating adoption of integrated soil mgt practices in irrigated cotton and grain (LWA & CRC Commissioned Extension)	Roth, Guy	1/7/06	30/06/08
CRC	CRC142	Delivering Regional Extension in Queensland Farming Systems – Darling Downs & Border Rivers	Gordon, Rod & Charleston, Kate	1/2/07	30/06/09
CRC	CRC143	Delivering Regional Extension in NSW cotton Farming Systems	Hill, James & Morgan, Sally	25/6/07	30/06/10
CRC	CRC144	Delivering Regional Extension in St George/Dirranbandi cotton farming systems	King, Dallas	1/7/07	30/06/09
CRC	CRC147	Cotton Training Coordinator (formerly CRC68)	Hickman, Mark	1/7/05	30/06/08
CRC	CRC64	Cotton Industry Development Extension Officer – Central Queensland	Sands, Douglas	1/7/05	30/06/08
Cotton Consultants Australia	CRDA003	Chris Lehmann Trust	Dimond, Amber	1/9/06	30/06/09
Cleave Rogan	CRDC005	Travel: Cleave Rogan, 4th World Cotton Conference, USA, September 07	Rogan, Cleave	9/10/07	15/9/07
Damian Erbacher	CRDC007	Travel: Damien Erbacher – Cotton leaf curl virus study tour, Pakistan July 07	Kauter, Greg	21/7/07	31/7/07
Firestarter Communications	CRDC008	Sponsorship of 07 NSW Youth River Health Conference, Inverell November 07	CRDC	1/7/07	30/3/08
CRDC	CRDC009	Travel support for participants of the 07 Future Cotton Leaders Program	CRDC	1/7/07	30/6/08
Greg Parle	CRDC010	Travel Greg Parle ACIC 66th Plenary meeting Turkey October 07	Parle, Greg	20/10/07	25/10/07
Hugh Ball	CRDC011	Travel Hugh Ball Rabobank Farm Managers Program New Zealand October 07	Ball, Hugh	8/10/07	12/10/07
LWA	CRDC012	Contribution to National Climate Change Research Strategy for Primary Industries	Finney, Bruce	1/9/07	31/03/08
Cotton Consultants Australia	CRDC013	Improved egg collecting for the Cotton Industry resistance monitoring programs (Commissioned)	Dimond, Amber	1/10/07	30/04/08
Jemima Maslen	CRDC014	08 Cotton Production Course Scholarship	CRDC	1/3/08	30/11/09
Greg Parle	CRDC015	Travel: Gregory Parle, CSITC & Bremen Conference 08	Parle, Greg	1/2/08	5/04/08
Greg Hutchinsom	CRDC016	Memphis Cotton Classing School Grant	Hutchinson, Greg	25/5/08	17/07/08
Rene Van der Sluijs	CRDC017	Travel: attend 29th International Cotton Conference and CSITC meeting	van der Sluijs, Renee	29/3/08	11/04/08

Sharon Downes	CRDC018	Travel: Sharon Downes – ICE 08, Durban, South Africa	Downes, Sharon	7/4/08	30/9/08
CSIRO	CRDC020	08 Field to Fabric Course	Dugdale, Helen	11/6/08	25/07/08
Firestarter Communications	CRDC022	Sponsorship of Schools to attend NSW Youth River Health Conference	Dugdale Helen	7/1/08	31/12/08
Workplace Training Advisory	CRDC21	Regional Women's Conference	Helen Dugdale	1/6/08	31/10/08
Simon McInnes	CRDC302	Support for the Cotton Australia Leadership Program	McInnes, Simon	1/6/07	30/6/08
CRDC	CRDC311	Field to Fabric Course, July 07	CRDC	1/7/07	31/07/07
ACGRA	CRDC313	Sponsorship and support for ACSA Biannual Conference, 6 September 07	Geitz, Tony	1/5/07	30/9/07
RIR	RIR001	Australian Rural Leadership Program – Course 15	Patrick, Rob	1/11/07	1/02/09
UA	UA003	Bonus payment	Lightfoot, Damien	1/7/07	30/6/08
VDPI	VDPI001	Support of the Australian Agricultural and Natural Resources Online (AANRO) Database	Jones, Phillip	1/7/05	30/09/10
				Total Expenditure Program 1:	$912,645

PROGRAM TWO Integrated Natural Resource Management

Contracted Party	CRDC Project Number	Project Title	Researcher	Start Date	Cease Date
Australian Farm Institute	AFI001	Implications of Agriculture for Greenhouse Policies	Keogh, Mick	1/2/08	30/09/08
ANU	ANU10	Roll-out of the WADss: Scoping project	Letcher, Rebecca	18/6/07	18/12/07
CRC	CRC011	Postgraduate: Mitchell Burns – Catchment scale risk assessment for agrochemicals	Burns, Mitchell	1/1/08	31/12/10
CRC	CRC101	Capturing our understanding of soil water balance and deep drainage under irrigation in models – a basis of design of efficient farming and for assessing impacts on catchments	Silburn, Mark	1/1/07	31/12/08
CRC	CRC105	Pesticide remediation: Assessing application and integration with on-farm storage systems	Crossan, Angus	1/7/05	30/06/08
CRC	CRC106	Advancing environmental values in cotton catchments using risk assessment	Crossan, Angus	1/7/05	30/06/08
CRC	CRC110	Postgraduate: Rhiannon Smith – Benefits of establishing and managing native vegetation on cotton farms in the Namoi Catchment	Smith, Rhiannon	1/4/06	1/04/09
CRC	CRC125	Quantifying deep drainage in an irrigated cotton landscape	Ringrose-Voase, Anthony	1/7/06	30/06/09
CRC	CRC133	Supporting the adoption of BMP in the Cotton Industry in the Namoi Catchment (In-kind support)	Donaldson, Sheila Adcock, Louise	1/9/06	30/08/09
CRC	CRC134	Promoting cotton BMP adoption – General Manager	Adcock, Louise	1/9/07	31/08/09
CRC	CRC70	Postgraduate: Susan Lutton – Aquatic biodiversity and the ecological value of ring-tank water storages on cotton farms	Lutton, Susan	11/10/04	11/05/08

CRC	CRC84	Postgraduate: Lisa Lee – Environmental and Economic Impact of Water Scarcity and Market Reform on the Mooki Basin	Lee, Lisa	1/1/05	30/09/07
CRC	CRC99	Surface water groundwater interconnectivity investigation – Upper Namoi, NSW	Acworth, Ian	1/7/05	30/06/08
CRDC	CRDC297	Enhancing the uptake and implementation of BMP – eBMP	Hickey, Dan	1/4/07	31/10/07
National Heritage Trust	CRDC306	Cotton, grains & beef: One farm, multiple enterprises, common indicators (EMS Pathways funding)	Gibb, Dallas	1/7/07	30/06/08
National Heritage Trust	CRDC306A	Implementing the "Delivery of Uptake" component of the EMS Pathways project	Natural Solution Env Consultants	1/7/07	30/06/08
QUT	QUT2	Benchmarking and reducing greenhouse gas emissions and improving resource use efficiency	Grace, Peter	1/1/07	31/12/09
RIRDC	RIRDC001	Standardising LCA	Winter, Simon	1/7/07	30/06/10
				Total Expenditure Program 2:	**$570,589**

PROGRAM THREE Crop Protection

Contracted Party	CRDC Project Number	Project Title	Researcher	Start Date	Cease Date
CRC	CRC005	Diseases of Cotton IX (formerly DAN003)	Nehl, David	1/7/07	30/06/10
CRC	CRC006	Postdoc: Joelle Coumons – Linking cotton-pathogen molecular interactions and black root rot management (formerly UNE003)	Coumons, Joelle	1/7/07	30/06/10
CRC	CRC111	Postgraduate: James Hereward – Is the source of mirids in cotton derived from local dispersal or long distance migration?	Hereward, James	1/3/06	28/02/09
CRC	CRC126	Development of weed control thresholds in management of herbicide damage in cotton	Charles, Graham	1/7/06	30/06/09
CRC	CRC135	Maximising the efficiency of *Bt* refuge crop (formerly CSE115)	Tann, Colin	1/9/07	30/06/09
CRC	CRC138	Postgraduate: Todd Bennett – Ecology of Fleabane (*Conyza* spp)	Sindel, Brian	1/1/07	31/12/09
CRC	CRC74	Mirid Predation	Whitehouse, Mary	1/7/05	30/06/08
CRC	CRC77	Improving management of summer weeds in dryland cropping systems with cotton	Werth, Jeff	1/7/05	30/06/08
CRC	CRC78	Postgraduate: Jason Moulynox – Survival of the soil-borne fungal pathogen *Thielaviopsis* basicola in association with cotton and other plants	Moulynox, Jason	1/8/05	31/07/08
CRC	CRC88	Integrated Cotton Farming Systems for CQ	Sequeira, Richard & Grundy, Paul	1/7/05	30/06/08
CRC	CRC89	Supporting IPM for future cotton systems	Wilson, Lewis	1/7/05	30/06/08
CRC	CRC94	Mortality of *Helicoverpa* in Bollgard II cotton fields and implications for *Bt* resistance management	Downes, Sharon	1/7/05	30/06/08
CRDC	CRDC019	TIMS Roadshow: Air charter for researchers	Taylor, Ian	12/5/08	30/06/08
CSE	CSE005	Implications of *Bt* resistance in *H. armigera*	Mahon, Rod	1/7/07	30/06/10

CSE	CSE009	Sponsorship of Speakers to attend Climate Change & IPM Workshop in Brisbane November 07(Contingency)	Fitt, Gary	11/11/07	14/11/07
CSE	CSE010	Capital Item: Extension to CSIRO Moth Room in Insectary 1 (Commissioned)	Downes, Sharon	1/11/07	30/06/08
CSE	CSE112	Monitoring for resistance to transgenic cotton	Downes, Sharon	1/7/05	30/06/08
CSP	CSP003	Emerging Pests: Developing Knowledge for GVB and Aphids	Wilson, Lewis	1/7/07	30/06/10
CSP	CSP012	Soil impacts on the incidence and evolution of Fusarium wilt (Commissioned)	Wang, Bo	1/7/07	30/06/10
DAN	DAN001	IPM in Bollgard cotton – New tools and strategies II: A Farming Systems approach (formerly CRC004)	Mensah, Robert	1/7/07	30/06/10
DAN	DAN184	Resistance management of aphids and mites in cotton	Herron, Grant	1/7/05	30/06/08
DAN	DAN188	Severity factors in black root rot of cotton and new control measures	Driessen, Susanna	1/7/05	30/06/08
DAN	DAN190	Survival and reproduction of the Fusarium Wilt fungus	Anderson, Chris	1/7/06	30/06/09
DAN	DAN193	*Helicoverpa spp. Insecticide Resistance: Monitoring mechanisms and management*	Rossiter, Louise	20/3/07	30/6/08
DAQ	DAQ003	Cotton Fusarium wilt management	Smith, Linda	1/7/07	30/06/10
DAQ	DAQ005	Tobacco streak virus in cotton – a scoping study (Contingency)	Sharman, Murray	1/8/07	31/07/08
DAQ	DAQ006	Silverleaf whitefly insecticide resistance monitoring 2007–2010 (Commissioned)	Murray, Dave	1/7/07	30/06/10
DAQ	DAQ131	Improved understanding of the damage, ecology and management of mirids and stinkbugs in Bollgard II	Khan, Moazzem	1/7/04	30/06/08
DAQ	DAQ134	Postgraduate: Jamie Hopkinson – Managing cotton aphids with parasitoids	Hopkinson, Jamie	1/7/05	31/12/08
UA	UA002	Significance, mechanism and new management strategies of inducible tolerance	Schmidt, Otto	1/11/07	31/12/07
UNE	UNE39	Postgraduate: Subhadip Ghosh – Effect of organic amendments on soil quality and profitability in cotton farming systems bonus for timely reporting	Ghosh, Subhadip	1/7/07	30/01/08
UQ	UQ36	Postgraduate: Joy Conroy – Investigating the roles of toxins and pathogenicity factors of Fusarium oxysporum f.sp. vasinfectum	Conroy, Joy	14/2/05	13/8/08
UQ	UQ37	Postgraduate: Jennifer Whan – Investigation of the effects of Silicon application on the resistance of cotton to *Fusarium oxysporum* f.sp. *vasinfectum*	Whan, Jennifer	1/7/05	30/06/08
				Total Expenditure Program 3:	$3,280,741

PROGRAM FOUR Farming Systems

Contracted Party	CRDC Project Number	Project Title	Researcher	Start Date	Cease Date
CRC	CRC008	Improving cotton nutrition diagnosis and N fertiliser use-efficiency (formerly CSP006 – linked to CRC007)	Rochester, Ian	1/7/07	30/06/10
CRC	CRC112	Postgraduate: Alison Devereux – Quantifying effects of maize rotation on soil quality and nutrient availability on cotton growth and yield	Devereux, Alison	1/7/06	30/06/09
CRC	CRC113	Postgraduate: Juan Wang – Subsoil nutrient management and stratification in cotton/grain rotations	Wang, Juan	1/1/06	31/12/08
CRC	CRC127	Optimal production and water use of high retention cotton and other new technologies	Yeates, Steve	1/7/06	30/06/09
CRC	CRC128	Plant and soil factors optimising water use efficiency	Neilsen, James	1/7/06	30/06/09
CRC	CRC129	Assessing Limited Water Management Strategies in Cotton Farming Systems	Payero, Jose	1/4/07	31/03/10
CRC	CRC136	Management of cotton rhizosphere-microbe interactions for sustainable/ improved cotton	Knox, Oliver	1/7/06	30/6/09
CRC	CRC137	Postgraduate: Sam Alomari – Molecular analysis of proteobacterial communities in soil under cotton	Alomari, Sam	1/7/06	30/07/09
CRC	CRC139	Postgraduate: Meredith Errington – Nutrient redistribution within cotton plants	Errington, Meredith	1/10/07	30/09/10
CRC	CRC140	Postgraduate: John Bennett – Getting the best out of gypsum and lime to combat sodicity in the Macquarie and Lachlan valleys	Bennett, John	5/3/07	5/03/10
CRC	CRC71	Microbial biodiversity for soil health	Midgley, David	1/1/06	30/09/07
CRC	CRC85	Postgraduate: Nicola Cottee – Development of a method to determine thermotolerance in cotton cultivars	Cottee, Nicola	14/3/05	14/03/08
CRC	CRC86	Maintaining profitability and soil quality in cotton farming systems II	Hulugalle, Nilantha	1/7/05	30/06/08
CRC	CRC87	Advancing water management in the cotton industry	Parr, Eddie	1/7/05	30/06/08
CRC	CRC90	Postdoc: Rose Roche – Physiological basis for cotton yields - plant configuration	Roche, Rose	1/1/05	30/06/08
CRC	CRC96	Deep Drainage Under Irrigated Cotton – Surface & Groundwater Implications	Des McGarry	1/7/05	30/06/08
LWA	LWA001	NPSI Phase 2 (Commissioned)	Roth, Guy	1/7/07	30/06/10
NEC	NEC11	Postdoc: Simon White – Optimised irrigation scheduling with the use of continuous 'real time' plant monitoring sensors (PMS)	White, Simon	1/9/05	30/08/08
NEC	NEC13	Desktop review of the use of polyacrylamide (PAM) in the Austrlian Cotton industry (Contingency)	Hood, Sarah	21/5/07	17/9/07
NEC	NEC14	Energy in Cotton	Baillie, Craig	11/6/07	31/10/07
NEC	NEC15	Energy Study Cotton Ginning	Chen, Guangnan	1/6/08	30/09/09
USQ	USQ9	Postgraduate: Alison McCarthy – Optimal irrigation of cotton via real-time, adaptive control of large mobile irrigation machines	McCarthy, Alison	5/3/07	5/03/10
				Total Expenditure Program 4:	$1,588,658

PROGRAM FIVE Plant Breeding and Biotechnology

Contracted Party	CRDC Project Number	Project Title	Researcher	Start Date	Cease Date
ANU	ANU9	Testing transgenic cotton carrying the I-2 resistance gene for resistance to Fusarium wilt	Jones, David	1/10/06	30/09/08
COT	COT002	Improving waterlogging responses in cotton	Wilson, Iain	2/9/05	1/09/08
COT	COT003	New routes to resistance to Fusarium Wilt	Ellis, Jeff	2/12/05	1/12/08
CSE	CSE008	Gene silencing technologies to control *H. armigera*	Mahon, Rod	1/7/07	30/06/08
CSP	CSP009	Cotton biotechnology: innovative genetic solutions to enhance cotton productivity (Contingency)	Llewellyn, Danny	1/7/07	30/06/08
CSP	CSP010	Manipulating cotton fibre development to increase yield	Dennis, Elizabeth	1/7/07	30/06/08
CSP	CSP177	Postdoc: Adriane Machado – Cotton fibre improvement by silencing fuzz fibre development	Machado, Adriane	1/10/05	30/06/08
MER	MER001	Premium Cotton Initiative		1/1/08	30/6/08
UA	UA17	Analysis and optimisation of cotton fibre –specific gene promoters	Liu, Yinghong	1/7/06	30/06/09
				Total Expenditure Program 5:	$1,178,907

PROGRAM SIX Value Chain

Contracted Party	CRDC Project Number	Project Title	Researcher	Start Date	Cease Date
CRC	CRC009	Support and Extension of SiroMat (Generation I)	Gordon, Stuart	1/7/07	30/06/09
CRC	CRC130	Linking Farming Systems to Fibre Quality and Textile Performance	Bange, Michael	1/7/06	30/06/09
CRC	CRC131	New Ginning Technology for Australian Cotton: Part I Modified Lint Cleaner	Gordon, Stuart	1/7/06	30/06/09
CRC	CRC132	New Ginning Technology for Australian Cotton: Part II Moisture & Contamination	Gordon, Stuart	1/7/06	30/06/09
CRDC	CRDC001	CSITC Provision of Fifth Fibre Sample	Parle, Gregory	26/5/08	30/06/08
CTFT	CTFT002	Commercialisation of Cottonscan	Naylor, Geoff	1/7/07	30/06/08
CTFT	CTFT16	Improving the Nep Levels in Australian Cotton	van der Sluijs, Rene	1/7/06	30/06/09
CTFT	CTFT17	International inter-laboratory trials to develop reference cottons for fibre maturity and fineness	Higgerson, Graham	1/7/06	30/06/08
				Total Expenditure Program 6:	$524,392

TOTAL R&D INVESTMENT PORTFOLIO: $8,055,932

Appendix Five
Acronyms, Abbreviations and Terminology

ABARE	Australian Bureau of Agricultural and Resource Economics
ACEC	Australian Cotton Exhibition Centre
ACGRA	Australian Cotton Growers' Research Association
ACIC	Australian Cotton Industry Council
ACIPA	Australian Centre for Intellectual Property in Agriculture
Cotton CRC	Cotton Catchment Communities Cooperative Research Centre
ACGRA	Australian Cotton Growers Research Association
ACRI	Australian Cotton Research Institute
ACSA	Australian Cotton Shippers Association
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
AWM	Area Wide Management
Bollgard II®	Cotton varieties contain two genes resistant to *Helicoverpa* spp.
BMP	Best Management Practices program
BRS	Bureau of Rural Sciences
Bt	*Bacillus thuringiensis* (crystal protein gene expressed in INGARD® and Bollgard II® cotton varieties
CA	Cotton Australia
CAC Act	*Commonwealth Authorities and Companies Act 1997*
CCA	Cotton Consultants Australia Inc.
CCRSPI	National Climate Change Research Strategy for Primary Industries
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
CSIRO TFT	CSIRO Textile and Fibre Technology (formerly a CSIRO Division but now a program within CSIRO Materials Science and Engineering)

CVCB	Cooperative Venture for Capacity Building
DAFF	Australian Government Department of Agriculture, Fisheries and Forestry
DOFA	Australian Government Department of Finance and Administration
EIQ	Environmental Impact Quotient
EM	Electromagnetic conductivity
EPI	Environmental Performance Indicator
ESD	Ecologically Sustainable Development
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
FH&SJV	Farm Health & Safety Joint Venture
F Rank	Measure of Fusarium wilt resistance
FRDC	Fisheries Research and Development Corporation
GM	Genetically modified
GMAC	Genetic Manipulation Advisory Committee
GOA	Groundrig Operators Association
GRDC	Grains Research and Development Corporation
ha.	Hectare
Helicoverpa spp.	Cotton's major insect pests (*H. armigera* and *H. punctigera*)
Heliothis	Insect pest, more properly known as *Helicoverpa* spp. (*see above*)
HVI	High Volume Instrument
IBP	Industry Biosecurity Plan
ICAC	International Cotton Advisory Committee
INGARD®	Cotton varieties containing one *Bt* gene resistant to *Helicoverpa* spp. (superseded by Bollgard II® species with two genes of resistance)
IP	Intellectual Property
IDM	Integrated Disease Management
IPM	Integrated Pest Management
IRMS	Insecticide Resistance Management Strategy
IWM	Integrated Weed Management
IWUI	Irrigation Water Use Index
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	*Primary Industries and Energy Research and Development Act 1989*
Pima cotton	*Gossypium barbardense*. 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
RDCs	Rural Research and Development Corporations
RIRDC	Rural Industries Research and Development Corporation
RRDCC	Rural Research and Development Chairs' Committee
SJV	San Joaquin Valley (California) – the industry benchmark in the international marketplace
TIMS Committee	Transgenic and Insect Management Strategy Committee
TRC	Technology Resource Centre (at the Australian Cotton Research Institute)
'Upland' cotton	*Gossypium hirsutum*. Comprises the vast majority of the Australian cotton crop, with Pima cotton (see *above*) comprising the remainder
VAM	Vesicular Arbuscular Mycorrhiza
WINCOTT	Women's Industry Network – Cotton
WUE	Water use efficiency
YARN	Young Australian Rural Network

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Legislative Compliance Index

Commonwealth Authorities and Companies Act 1997, section 9

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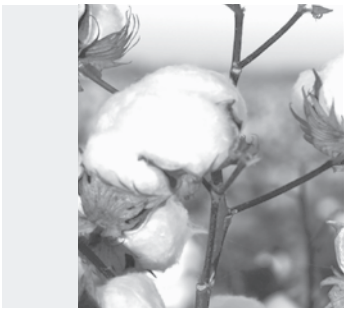

Appendix Seven
Subject Index

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