



Australian Government
Cotton Research and
Development Corporation

Cotton Research and Development Corporation
Annual Report 2009–2010

"Fashioning the Future"



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Australian Government

**Cotton Research and
Development Corporation**



Cotton Research and
Development Corporation

Annual Report

2009–2010

CRDC

Vision

A globally competitive and responsible cotton industry

Mission

The quest for sustainable competitive advantage

Purpose

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

Outcome

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

Who we are

One of 15 Rural R&D Corporations, CRDC is based in Narrabri, NSW – the heart of one of Australia's major cotton growing regions and home to the Australian Cotton Research Institute. 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 benefit to cotton industry participants, regional communities and the Australian people.

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

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

CRDC researchers are actively involved in the dissemination of research results, working through a range of mechanisms, including the CRDC-supported National Cotton Extension Team.

CRDC became the Managing Agent for the National Program of Sustainable Irrigation (NPSI) in 2009-10. As Managing Agent and a program partner, CRDC supports collaboration in research for improving the environmental and productive performance of irrigated agriculture and horticulture in Australia.

Key research partners

Cotton growers
Rural Research and Development Corporations
CSIRO
Universities
Cotton Catchment Communities CRC
Cotton Australia
Other Cooperative Research Centres
Industry and Investment NSW
Queensland Department of Employment, Economic Development and Innovation
Other State Government Departments
Crop Consultants Australia
Agribusinesses



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CRDC Statement of Principles

CRDC Directors and staff members are required to:

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

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LETTER OF TRANSMITTAL



Australian Government
Cotton Research and
Development Corporation

1 October 2010

Senator the Hon Joe Ludwig
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 2009–10, 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*, CRDC Directors 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 9 August 2010.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Mike Logan'.

Mike Logan
Chair



Executive Summary

CHAIR AND EXECUTIVE DIRECTOR

"Fashioning the Future"

The 2009–2010 year commenced with the ongoing presence of the longest drought on record impacting rural Australia and the cotton industry. The good news is that, on the back of above average winter rainfall and higher commodity prices, the reporting year has ended with a much improved outlook for 2010–11 and a welcome challenge in meeting the R&D needs of a resurgent industry with a mix of new, returning and continuing participants.

Strategic direction

For CRDC, the reporting year was the second directed by the Strategic R&D Plan 2008–2013 in the quest for sustainable competitive advantage for the Australian cotton industry. In keeping with this quest, a major achievement for industry was the development of an industry vision. With CRDC support, leaders in the Australian cotton industry recognised the

potential for improving industry performance, organisational collaboration and capacity through development of a shared view of the future. A 20-year time frame was chosen in order to stretch thinking beyond the short-medium term and ensure a longer-term strategic focus. The shared vision is facilitating greater awareness of possible future challenges, critical uncertainties, and opportunities for the cotton industry and most importantly is enabling alignment of thinking, planning and actions. In achieving the vision of 'Australian cotton, carefully grown, naturally world's best' the industry can position itself to deal proactively with foreseeable emerging challenges such as peak oil, competitiveness with food crops, bio-identical cotton substitutes and new yet to be identified issues.

At the same time, CRDC's portfolio of R&D investment during 2009–10 made progress with



CRDC Board of Directors. Back row: Kerry Adby, Bruce Finney (Executive Director), Mary Corbett, Glenn Fresser and Lisa Wilson. Front row: Leith Bouilly (Vice-Chair), Peter Hayes, Juanita Hamparsum and Mike Logan (Chair)

the strategic goals to add value to the Australian cotton industry with premium products in improved routes to market, engender highly productive farming systems with improved environmental performance and for an industry that has the human capacity to apply and adopt the technologies and knowledge in which it invests.

Value Chain

CRDC investment in value chain R&D has facilitated new industry connections and improved market intelligence about the opportunities for cotton mills, brand owners and consumers to achieve greater value from Australian cotton. This potential was successfully demonstrated through collaborative pilot projects with local brand owners to launch 100 per cent Australian cotton business shirts and towels showcasing the Australian cotton industry world's best production practices and its unique fibre qualities, with the cotton traceable back to certified industry best management practice (BMP) growers, ginners and classers.

Farming Systems

R&D investments within farming systems have successfully targeted ongoing improvement in productivity growth, environmental performance and biosecurity. Cotton farming systems continued to become significantly more complex in response to new operating conditions such as climate change, water availability and competitiveness with other crops. Evaluations highlighted the importance of industry R&D assistance in this response through yield and water use efficiency gains, as well as better measures of the industry's environmental footprint.

Human Capacity

In 2009–10 the industry, with CRDC leadership, commenced the transformation of its approach to supporting the adoption of the technologies, practices and knowledge produced by R&D. A demand driven and commercial-like model is now in place, underpinned by the industry's BMP program, which has been redeveloped into an online environment, myBMP, powered by the latest R&D.

CRDC invested in industry participation in skills-related processes, particularly by young people, women and cotton communities, including indigenous members of those communities. Skills development is an important element of a strategy that seeks to result in attraction, retention and development of the best and brightest for our agricultural sector and, in particular, cotton production.

Outcomes

The CRDC is pleased to report on the results of the second year of the plan, 2009–10. The report highlights the outcomes of the Corporation's investments in research, development and its application to enhancing the performance of the Australian cotton industry and community.



Mike Logan
Chair



Bruce Finney
Executive Director

THE YEAR'S HIGHLIGHTS

CORPORATE HIGHLIGHTS

CRDC takes on new NPSI role

With support from industry, the Department of Agriculture, Fisheries and Forestry (DAFF) and the partners in the National Program for Sustainable Irrigation (NPSI), CRDC took on the role of NPSI Managing Agent on 1 July 2009. Beyond the important research being undertaken, the program developed a vision for the future of irrigation R&D that is now informing a number of national reviews. Find more information on [page 26](#).

Minister launches new irrigation publication

CRDC and Cotton Australia were pleased to provide the Minister for Agriculture, Fisheries and Forestry, the Hon Tony Burke MP, with a first hand view of a thriving and innovative cotton enterprise, 'Keytah', near Moree, when he launched the National Program for Sustainable Irrigation publication *Irrigation Essentials* in 2009.

Recognition of CRDC support for indigenous traineeships

The Aboriginal Employment Strategy (AES) recognised support by CRDC and R&D Implementation Manager, Helen Dugdale, of its school-based trainee program for indigenous



Chloe Pokarier-Baker, who undertook the AES traineeship at CRDC as part of her Higher School Certificate studies at Narrabri High School, is now working in a full time government position.

senior high school students at a national partnerships awards ceremony in Sydney in May, 2010.

Chloe Pokarier-Baker completed 800 hours of one day a week paid employment over two years at CRDC in 2009, as part of her traineeship, with Helen Dugdale on hand to represent



CRDC Executive Director Bruce Finney, NPSI Program Coordinator Guy Roth and NPSI Management Committee member Andrew Parkes with the Minister for Agriculture, Fisheries and Forestry in 2009–10, the Hon Tony Burke MP (second from left) at the launch of *Irrigation Essentials* at 'Keytah', near Moree in 2009

CRDC at her 2009 graduation ceremony in Newcastle. Erika Anderson has now commenced her traineeship at CRDC. *Find more information on [page 88](#).*

Productivity Commission Visit

In February 2010 the Australian Government announced a Productivity Commission Inquiry into the Australian Government Research and Development Corporations Model. The Productivity Commission accepted an invitation from CRDC and Cotton Australia to visit the industry in Narrabri during April 2010. The itinerary included visits to family farms, a tour and presentations from researchers at the Australian Cotton Research Institute, as well as attendance at a CRDC and Cotton Catchment Communities Cooperative Research Centre (Cotton CRC) co-organised Sustainable Rural Communities Conference. The visit was an opportunity to demonstrate the impact of R&D on productivity and environmental performance as well as the connections between CRDC, researchers, growers and the community.

Review of Back Office Collaboration

As part of a general review on possible collaboration, CRDC and GRDC revisited the examination of shared back office functions in 2010. CRDC concluded that possible savings do not outweigh the benefit of having committed and available capability integrated within the business, with knowledge of the business, its stakeholders and suppliers. On the other hand the review has resulted in ongoing collaboration with GRDC on best practices and innovation in information technology, finance and administration.

Appointment of General Manager, Business and Finance

Graeme Tolson commenced in June 2010 in the role of General Manager for Business and Finance. Graeme holds a commerce degree and is a member of CPA Australia. He has a strong interest and capability in IT systems. His career has seen him working in accounting, finance and administrative roles in a variety of commercial businesses across Australia.



Newly appointed General Manager Business and Finance Graeme Tolson with CRDC administrative staff Margaret Wheeler, Elizabeth Eather and Dianne Purcell

Cotton and carbon trading

CRDC General Manager R&D Investment, Bruce Pyke was part of the Australian delegation to the International Cotton Advisory Committee 68th Plenary Meeting in Cape Town in late 2009. Bruce was a panellist during a breakout session on The Impacts of Carbon Trading on the Cotton Industry, which found that greater R&D investment in nitrogen management, crop rotations and soil sequestration are key parts of the same carbon measurement dilemma facing cotton globally. He told the session that the worldwide cotton industry needs to – and can – step up its capacity to measure carbon emissions but that this requires standardised measurement methodologies. Research undertaken with CRDC investments places Australia in a good position to tackle these issues.

R&D HIGHLIGHTS

Human Capacity initiatives

Australian Cotton Industry Vision

In 2009 leaders in the Australian cotton industry recognised the potential for improving industry performance, organisational collaboration and capacity through development of a shared 20-year vision for the future. In August 2009, CRDC engaged the consulting group Emergent Futures to facilitate development of *Cotton*

Industry Vision 2029, launched at the 2010 Australian Cotton Conference. Key elements of the Preferred Future for 2029 envisage an industry that represents ‘Australian cotton, carefully grown, naturally world’s best’: an industry that is differentiated, responsible, tough, successful, respected and capable.

Find more information on [page 12](#).

Moving best practice forward with myBMP

The Best Management Practices program, which has brought environmental credibility to the Australian cotton industry over more than a decade, has undergone a complete metamorphosis. *myBMP* is the result of industry-wide consultation with growers, researchers and industry bodies, taking into account the requirements of the cotton industry now and into the future.

A clear message from growers was that any new BMP system must be flexible to allow for the many and varied farming operations across the industry. The result is an innovative, flexible, web-based system, structured to offer cotton growers extensive access to cutting edge research and management tools while allowing them to choose how they wish to incorporate *myBMP* into their farming operations. The structure is completely new, the knowledge is up to date and the process is more streamlined.

Find more information on [page 81](#).



The Sustaining Rural Communities Conference brought together speakers with in-depth knowledge of the rural and remote issues, challenges and social structures that influence the health of these communities – physically, socially and economically.



Host of the 2010 Big Day Out in Cotton, Jamie Grant

Innovative knowledge delivery

Over the past decade, the Australian cotton industry has benefited from a unique industry-wide extension network, the Cotton Catchment Communities CRC-coordinated Australian Cotton Extension Team, supported by extensive CRDC investments and involvement. In 2009–10 industry consolidation and investigation of new approaches by CRDC to supporting R&D adoption led to the formulation of and transition to a new demand driven and ‘commercial-like’ model, to be executed by an industry-wide Development and Delivery team. The new model recognises the importance of supporting adoption of R&D through multiple delivery pathways, underpinned by the redevelopment of the BMP program into myBMP. *Find more information on [page 86](#).*

Sustaining Rural Communities

CRDC and the Cotton Catchment Communities CRC collaborated to hold a three-day Sustaining Rural Communities Conference in Narrabri in April 2010 to learn more about how the cotton industry can best invest in supporting its regional communities.

The organising committee offered ten individual \$1000 bursaries to delegates willing to undertake a project to help sustain or rejuvenate their local communities. The bursary holders will share their outcomes at the second Sustaining Rural Communities Conference, to be held in March 2011. Presentations from the conference are available for download at www.cottoncrc.org.au. *Find more information on [page 91](#) and in the Winter 2010 edition of Spotlight (at www.crdc.com.au).*

Farming systems innovation

Each year CRDC and the Cotton Catchment Communities CRC organise a Big Day Out in Cotton field day at the farming enterprise that won the previous year’s Australian cotton industry Innovative Cotton Grower of the Year award as an opportunity to extend these innovative farming methods throughout the industry.

Jamie and Susie Grant of ‘Kielli’ Jimbour, in Queensland, hosted the 2010 field day, the Big Day Out in Cotton to demonstrate their ‘low risk agriculture’ strategy and the keys to its success. Dryland cotton production is now an important part of the cotton industry, with prospects of greater dryland production in the 2010–11 season. Jamie and Susie have been keen collaborators in trial work with private consultants, state agriculture departments, CSIRO and many commercial agribusinesses.

Approximately 140 irrigation and dryland farmers from the northern to southern-most cotton growing regions attended and received a range of presentations in diverse areas such as soil health, rotation crops, row spacing in dryland systems, integrated weed management and growing quality cotton. They were able to inspect the Grants’ very uniform cotton crop,

grown using zero tillage, in combination with careful glyphosate resistance management. *Find more information on [page 90](#).*

Harvesting cotton safely

Picking cotton is the most labour intensive part of the industry and each year involves a number of inexperienced employees. In an effort to reduce the risk of injury during this busy time, CRDC produced a Harvest Safety DVD in time for the 2009–10 season. CRDC has encouraged growers and contractors to help train their people at harvest time using this succinct induction to the dangers at harvest and the strategies needed to avoid accidents. The video is comprehensive, covering worker site inductions, communication, powerlines, maintenance, night work, fire hazards, transport, machinery and equipment.

Development of the DVD involved broad industry collaboration, aided by a widespread awareness within the industry of the onus on employers to provide proper training and a safe workplace.

Ensuring leadership and research capacity

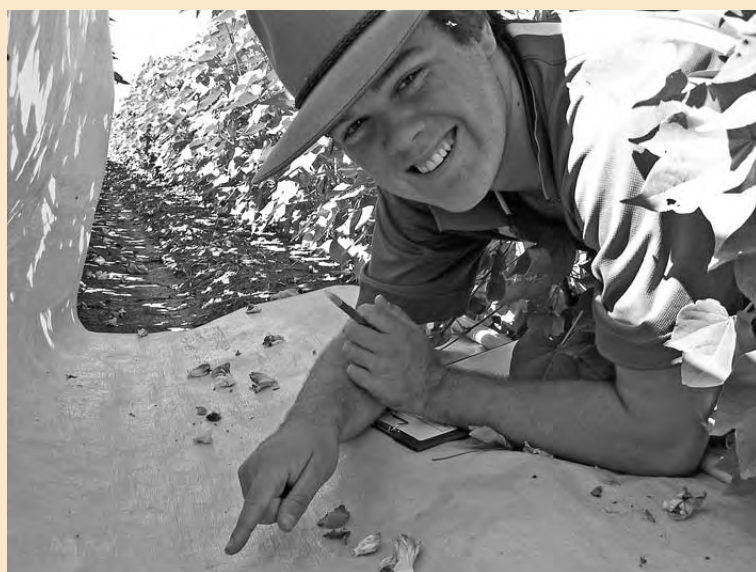
CRDC continued its endeavours to increase leadership capacity within the cotton industry and wider agricultural sector with support

for the Future Cotton Leaders Program. Five women and five men, who won competitive entry to the program, completed the course in mid-2010.

Barb Grey and Arthur Spellson received CRDC support to participate in the Australian Rural Leadership Program, with Barb finishing the course in 2010 and Arthur to finish in 2011.

Participation in the Aboriginal Employment schools-based traineeships program (see above) is a first step by the cotton industry to increase capacity in local indigenous communities and provide a bright future for the trainees, with one trainee based at CRDC and two at the Cotton Catchment Communities CRC. *Find more information on [page 88](#).*

A study of national trends shows that the number of students studying science and agriculture at school and university is declining. To help reverse this trend, CRDC and the Cotton Catchment Communities CRC have a joint investment over three years with the Primary Industry Centre for Science Education (PICSE), an initiative hosted by the University of Tasmania. PICSE directly encourages students to continue with school science and move to university science. As a result of the PICSE



High school student James Kirk from Moree is participating in the PICSE Student Industry Placement program. James has his own *Bt* resistance project to research and develop with the assistance of researchers at the Australian Cotton Research Institute near Narrabri.



initiative, both The University of New England and University of Southern Queensland had a surge in enrolments in agricultural science in 2010.

Farming Systems initiatives

Cotton Life Cycle Assessment

The final report in late 2009 on a CRDC-commissioned Life Cycle Assessment (LCA) of a 100 per cent cotton t-shirt confirmed preliminary findings that its production has a significantly lower carbon footprint than polyester and that – as most consumers intuitively presumed – cotton is much more environmentally friendly and less prone to collecting odours and stains. The LCA looked at the relative impacts on climate change, ozone layer depletion, mineral resources depletion and fossil fuel depletion and found that cotton has a lower footprint in each category.

Cotton and greenhouse gases

Research into nitrous oxide and greenhouse gas emissions indicates that emissions from soils and fuel/electricity use in cotton production appear to be equal and therefore need equal attention. CRDC is seeking to undertake further work on soil carbon, energy use efficiency and greenhouse gas emissions.

CRDC organised a climate change workshop in Sydney in July 2009, funded by the Climate

Change Research Strategy for Primary Industries (CCRSPI) initiative. The workshop looked at R&D coordination, gaps, opportunities and priorities. Outcomes from the workshop were presented at an industry forum on climate change in Narrabri the following month. *Find more information on [page 66](#).*

Spraydrift campaign

The area of cotton damaged by spray drift in the 2009–10 season was less than half that of the previous year, aided by new CRDC-supported initiatives. A new, holistic project established in 2009–10 delivered workshops on best practice spray application, tailored to the specific needs of growers in local areas. CRDC's investment works in a complementary manner with an investment by GRDC that covers grain growers. The project also collaborates with the Vocational Education Training sector to increase the technical competence of trainers delivering spray application workshops across the agricultural sector.

As a means of informing neighbours of where nearby cotton crops are located, CRDC, GRDC, Nufarm and Cotton Australia launched an industry-wide CottonMap in time for the 2009–10 season. The CottonMap website services enable cotton growers to mark their cotton fields on a regional map, which can then be printed and distributed to neighbours. In its first year, over 85 per cent of cotton acreage was mapped and maps were widely distributed by agribusinesses, crop agronomists and growers themselves. *Find more information at www.cottonmap.com.au and on [page 76](#).*

Assessment of herbicide resistance risks

2009–10 saw the launch of a web-based herbicide resistance risk assessment tool for growers and their advisors, collaboratively funded by CRDC, Queensland Department of Employment, Economic Development and Innovation, the Grains R&D Corporation and Monsanto. The tool can be used to quantify the risk of glyphosate resistance developing in any field, on any farm and in any cotton growing region and has relevance to the full range of cotton and grains farming systems in

Queensland and NSW. The creation of the tool draws upon knowledge gained from CRDC-supported PhD studies and research projects during the past eight years. It can be found at www.dpi.qld.gov.au.

Stopping mealybug in its tracks

The presence of the *Solenopsis mealybug*, *Phenacoccus solenopsis*, was confirmed for the first time in Australia in January 2010 in cotton crops in the Emerald region. There are no registered insecticides for control of mealybugs on cotton in Australia. However, within a month CRDC, Cotton CRC and Cotton Australia brought together a working group of all interested parties to coordinate a local and industry-wide response. As a result of open and effective communication, monitoring protocols and hygiene measures to prevent the spread of infestations, severe crop infestation was confined to 88 hectares within one area of the Emerald growing region.

Understanding diseases: an important part of biosecurity

Understanding the prevalence and spread of diseases is an important part of protecting the industry, and the nation, against invasive pests. Supported by CRDC investments, cotton pathologists from Industry and Investment NSW (I&I NSW) and the Queensland Department of Employment, Economic Development and Innovation (DEEDI) surveyed endemic disease problems across all cotton growing regions in the early and late stages of the growing season. Survey results show 2009–10 to have been a mixed season. Some diseases such as boll rots

caused higher production losses than average; however, the outcome was primarily due to unusual seasonal conditions.

Despite positive signs from this season's survey, soil borne fungal diseases are some of the most recalcitrant problems facing the cotton industry in Australia. This has driven new investment with I&I NSW, which aims to generate greater understanding of the ecology of these pathogens within cotton farming systems, to form the basis of improved management practices. In its first season, the project team has gathered information about the diversity of spore production and survival of spores under differing soil conditions, investigated capacity of repetitive spore germination events and evaluated the effects of different winter crops on pathogen survival in field conditions.

Grains and cotton collaboration

While many grain growers do not grow cotton, almost all cotton growers grow grains. This presents potential R&D synergies and 2009–10 saw a range of activities arising from a formal investigation by CRDC and GRDC of collaborative opportunities. Joint investments during the year included a program to map the location of farms where cotton is grown to help prevent spray drift damage, spray application management training workshops, resistance monitoring in *Helicoverpa* to a range of pesticides commonly used in cotton and grains, soil nutrition in cotton and grains in Northern NSW and Queensland, Silverleaf whitefly control (as part of the National Invertebrate Pest Initiative) and a weed management program in southern Queensland.



Australian Weaving Mills is marketing a range of towels under the Koala Blue label, using Australian premium BMP cotton

Value Chain Initiatives

Post-farm gate forum

The second forum in CRDC's Value Chain series, the Post-Farm Gate Forum, held at the Cotton Collective in Narrabri in August 2009, was attended by merchants, ginners, warehousemen, classers and trucking company representatives, along with leading Value Chain researchers. Discussion of a range of research initiatives affecting the post-farm gate sector and issues potentially requiring further work and investigation helped in the process of forging a new vision for preserving fibre quality through the various post-farm gate processes.

As Cotton Ginners Association chairman Jeff Ballentine pointed out, this was the first opportunity for all members of the sector to sit together and gain an understanding of the industry activities and pressure points throughout the value chain.

Domestic brand owners on board

CRDC has established links with a number of local brand owners to promote Australian cotton and BMP cotton to consumers. The Australian brand owner, Fletcher Jones, and manufacturer, Australian Weaving Mills, have launched products in 2010 under a new premium Australian cotton/BMP brand. Labels developed by the industry will be the first major promotion of BMP to consumers in Australia. Building on the success of these partnerships, the industry will work with further brand owners in other non-competing market segments. *Find more information on [page 55](#).*

International spinning mills survey

In 2009–10, activities conducted by CRDC, Cotton Australia and the Australian Cotton Shippers Association (ACSA) have shown that a number of new premium market opportunities exist for Australian cotton as a whole and for Best Management Practice (BMP) cotton.

These opportunities were identified through surveys conducted at two levels of cotton use, the initial mill processing stage and the final brand owner stage, to identify some of the building blocks required for a cohesive industry

strategy for value-added placement of Australian cotton in suitable textile markets. Among the messages delivered through the survey was a clear trend toward more casual wear. *Find more information on [page 54](#).*

Wool and cotton collaboration

CRDC and Australian Wool Innovation (AWI) are collaborating to make the most of the natural advantages of both wool and cotton by investing in the development of new fabrics combining the two fibres. Leading international cotton shirt producer, Esquel, has already produced samples of an 80 per cent cotton and 20 per cent wool thermal shirt for cold climates, which is gaining interest from retailers in the USA, Europe and Japan. Australian cotton grown under the Best Management Practice program and wool grown under the Verification of Australian Merino program offer consumers quality assurance to support the natural fibre story.



The new Fletcher Jones range of clothing manufactured using premium Australian cotton

VISION 2029



Australian Cotton • Carefully Grown • Naturally World's Best

Background

In 2009, leaders of the Australian cotton industry resolved to develop a vision for the future of their industry that encompassed improved industry performance, collaboration and capacity, using a twenty-year time frame to ensure a longer term strategic focus.

CRDC, Cotton Australia and the Australian Cotton Industry Council collaborated on Vision 2029, which canvassed the whole of the Australian cotton industry from input suppliers through to marketers. It builds on the immense improvements that have been made in recent years in producing an excellent product in an environmentally responsible manner: improvements that have been sustained and built on in the face of prolonged drought, issues of water security, a labour force attracted by jobs in the mining industry and the emerging challenges of climate change and variability.

In September 2009, CRDC engaged the consulting group, Emergent Futures, to facilitate Vision 2029, which was finalised in March 2010, ready for its launch at the Australian Cotton Conference in August 2010. Vision 2029 has established an online blog centre at <http://cotton2029.ning.com> to facilitate industry discussion.

The destination in 2029

“An industry that is differentiated, responsible, tough, successful, respected and capable”

Differentiated

Unique varieties adapted to Australian conditions meeting 'brand Australia' requirements.

Committed to best management practices, underpinned by improved productivity and returns. People with the knowledge and skills to achieve and maintain these standards.

New traceability technology helping ensure product integrity and transform supply chain logistics.

A viable small onshore manufacturing capacity supporting a 100 per cent Australian natural fibre product niche.

New partnerships with leading global and Australian brand owners in developing and marketing new textile products.

Australian cotton readily recognised by international consumers as an elite brand.

Personal success and recognition have reignited a sense of belonging, identity and passion for a cotton industry that can pull together to achieve stretching goals and weather hard times.

Responsible

Once perceived from outside the industry as an environmental vandal and water waster, Australian cotton is now valued for its credentials as the most environmentally friendly cotton production system on the globe, with the lowest water use, carbon footprint and chemical use of any cotton producing region.

The world's first cotton producer and first Australian agricultural section to achieve international recognition for carbon neutrality. Australia is now the highest rating cotton producer on the international Corporate Social Responsibility Index.

Environmentally friendly, easy care Australian cotton products are increasing their share of apparel sales worldwide.

The best health and safety record of any agricultural industry.

Working conditions that surpass all other cotton producing nations.

A reputation as a responsible water use, based on continuous improvements in efficiency and responsibility in using water.

Tough

The industry has a capacity for strategic awareness and is responsive to emerging challenges and opportunities.

The production sector has developed business and financial management practices that make it resilient to the impacts of water scarcity, with risk management systems utilising a range of strategies.

Production risk is accurately measures and is part of financial institutions' requirements for funding agricultural activities.

Plant breeding has continued to deliver varieties with high quality and uyeild, adapted to changing environments.

Improved farming systems, especially those delivering higher water use efficiencies and increasing the resilience of farming operations to climate volatility .

The industry continues to invest in improving its productivity and market performance.

Respected

The Australian cotton industry has gained recognition from government and community for the quality of its products, sustainable practices and contribution to the fibre and food needs of the world.

There are significant spillover benefits to the production of food crops from the knowledge, practices and technology developed through cotton R&D.

Australian consumers can now purchase and are proud to wear Australian garments and textiles, confident in the 'good story' of their production.

People recognise the long term value of the industry's contribution to the community, in terms of social emotional and financial wellbeing.

Successful

Improved profitability through success positioning in a high value market segment.

High returns and improved productivity of elite cotton ensure production is competitive with food production.

Australian cotton is a leader in energy and water saving technology, soil bio-enhancement, varietal improvement and supply chain efficiency.

Innovation and new technology enable vastly increased water efficiency, even in the face of variable water availability.

New low and no water washing technology contributing to the overall lifecycle efficiency of cotton, giving the lowest environmental footprint of all fibres, ease of recycling and natural, wearable characteristics that become its key selling points and help to maintain competitiveness with synthetic fibres.

Capable

The industry continues to recognise the importance of people and their capacity to its future success.

Cotton is an attractive industry to be a part of, as it is progressive, profitable and ethical.

The values and achievements of the industry and the available resources bring interest from new entrants, researchers and environmentalists.

The industry's mindset of forward thinking and nurturing people has paid off, with cotton being a most attractive employer in the rural and research sectors, attracting talent from Australia and overseas.

This is reflected in the industry's adoption of best human resources practices and career development programs, including scholarships.

The industry is renowned for its culture of innovation and responsiveness to change.

EFFICIENCY AND EFFECTIVENESS

The Corporation is committed to continuous improvement in the efficiency of its expenditure, whilst maintaining or improving the effectiveness of its R&D investments. In doing so, CRDC takes a holistic business approach that recognises not only the costs but also the risks and returns in delivering outcomes from the 85 to 90 per cent of CRDC expenditure invested in R&D. Having skilled and experienced people who can scan, scope and manage portfolios of R&D investment proactively through to adoption for strategic outcomes is an important element of capacity, which supports the effectiveness of the rural R&D system as a whole.

In response to the ongoing reduction in revenue as a result of the drought the CRDC has taken a number of steps to improve the efficiency and effectiveness of its operations.

Total staffing levels have been reduced by 25 per cent, with R&D management experience and capacity increased within a smaller team of personnel. The need for administrative assistance is less, given downsizing of the business activity, better IT systems and personnel taking responsibility for their own clerical needs.

CRDC continued to work with the Council of Rural R&D Corporations' Chairs to investigate administrative efficiency gains within the rural R&D Corporations (RDCs) and the rural R&D system as a whole. This includes standardisation of agreements and intellectual property policy.

The results of an investigation in 2008–09 of collaboration options with the Grains R&D Corporation (GRDC) are being implemented through joint R&D management processes to deliver integration of investment in R&D and its adoption, targeting shared productivity, natural resource management and biosecurity outcomes. In 2010, CRDC and GRDC revisited the examination of shared back office functions. CRDC concluded that whilst it is possible to outsource administrative functions from GRDC, the savings do not outweigh the benefit of having committed capability integrated within the business, which is immediately available and understands the business, its stakeholders

and suppliers. Importantly, responsibility and authority are aligned appropriately and, from a risk management perspective, deal appropriately with authorisation procedures, business continuity and succession planning. The examination has resulted in ongoing collaboration with GRDC on best practices and innovation in IT, finance and administration.

DELIVERING RETURN ON INVESTMENT

One of the Corporation's formal Principles of Operation is to strive to maximise return on investment of industry and public funds invested through our Corporation.

With significant taxpayer dollars invested in industry R&D through the 15 RDCs, the Council of Rural Research and Development Corporations' Chairs developed a rigorous external process in 2006 to determine the value of these R&D investments to the industries involved and to the Australian taxpayers.

In 2009, CRDC submitted three randomly selected sub-programs from the previous Strategic R&D Plan for 2003–2008 for analysis under this process. These were:

The People and Knowledge Program, Strategy 1: Support and coordinate a highly trained, efficient and effective Cotton Extension Team.

The evaluation considered that most of the benefits of the extension services provided are associated with the acceleration of uptake of technologies across the cotton industry and as such a number have already been considered in the evaluation of specific technologies already conducted by CRDC. To avoid double counting, the assessment conducted in 2009 was limited to the value of the information provided to growers, consultants and the broader community by the extension team. The evaluation indicated that in terms of the value of time saved by growers in accessing the information provided by the industry's extension services the costs (\$1.15 million) outweighed the benefits (\$652,000) and that the break-even saving per farm would need to be \$2,000.

When the benefits to all stakeholders, including growers, consultants, researchers and the wider community, were considered, a modest benefit cost ratio of 2.07:1 was achieved.

The results of this analysis were valuable to CRDC and the industry as a whole in formulating and implementing industry-wide changes to the deployment of industry extension services to support best practice through a new Development and Delivery Team. *Find more information in Program Three: Value Chain, on [page 86](#).*

The Farming Systems Program, Strategy 1: Improve water use efficiency on farms using existing and new infrastructure, new tools and technologies.

Investments in this sub program were quite broad, covering knowledge (53 per cent), extension (37 per cent), technology (seven per cent), post-doctoral support and travel (three per cent). Benefit assessment was limited to the achievement of modest gains related to the uptake of Centre Pivot and Lateral Move irrigation systems to replace furrow irrigation. A positive return was anticipated for this investment showing a benefit cost ratio, for CRDC's investment, of 3.85:1 after five years and 11.57:1 after 20 years.

The Value Chain Program, Strategy 2: Promote agronomic and management practices, including the Best Management Practices (BMP) program, which preserve and protect optimal fibre quality characteristics.

Derivation of benefit cost analysis criteria was not undertaken for this sub-program because the benefits from the investments were largely defined as capacity building for the cotton industry. Sub-program outcomes are likely to manifest themselves by better placing the Australian cotton industry to increase its resource security and maintain market access in the face of growing consumer awareness of the need for environmental sustainability in production and processing.

COLLABORATION AND COOPERATION

CRDC sought to extend collaborative links and partnerships in 2009–10, where these are likely to maximise investment outcomes or where there is a need to respond to a broader issue or challenge facing agriculture or the cropping sector.

Collaboration with other RDCs at both strategic and conceptual levels is an important means by which CRDC leverages higher returns from its investments. CRDC participates in activities that include joint national strategic R&D planning with the Primary Industries Standing Committee (PISC), communication and impact evaluation. A great deal of collaboration and cooperation takes place through the Council of Rural Research and 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.

This collaboration extends well beyond co-investment: cooperation, coordination and communication are equally important to avoiding duplication in research and maximising the impact of research outcomes. The scale of this collaboration extends from large national research programs to small local projects and administration, to bring a national focus in dealing with climate change, soil health, irrigation, crop protection, farm safety and human capacity. CRDC has participated in joint activities that include national strategic R&D planning with PISC, impact evaluation and communication. A broad outline of CRDC's joint activities with other RDCs can be found in the table on the following page.

In 2009–10, CRDC and GRDC continued to develop a closer relationship at the program management level with the CRDC Program Management team and the GRDC Practices Program team meeting in October 2009 and April 2010. These meetings have helped to identify a range of collaboration opportunities, particularly in farming systems areas such as

nutrition, pest management, irrigation efficiency and spray management, as well as opportunities for joint communication and human capacity development activities.

As in the previous year, CRDC's largest financial collaborative investment in 2009–10 was through the Cotton Catchment Communities CRC. CRDC invested approximately \$3.6 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. At the local level, community collaboration in 2009–10 included continuation of an Aboriginal school-based traineeship program, developed by CRDC with assistance from the Aboriginal Employment Strategy and a Sustaining Rural Communities conference held jointly with the Cotton CRC.

Below is a table summarising CRDC collaboration with other RDCs. Many of these initiatives are covered more fully in Report of Operations – Research and Development, beginning on [page 53](#).

Collaboration with Rural R&D Corporations 2009–10

Theme, Program or Project	Nature of Collaboration
Council of Rural RDC Chairs	Communication, coordination and collaboration between RDCs at the broadest level. Development of a common R&D Evaluation Framework.
Communication Managers	Using cross-RDCs communication opportunities to promote our rural industries and R&D achievements.
Business managers	<p>Cooperation with all RDCs to improve administration, contracts, program management systems and IP management in alignment with the Council of RDCs harmonisation project.</p> <p>CRDC and GRDC continued to cooperate on best practices and innovation in IT, finance and administration. CRDC and RIRDC continue co-hosting arrangements for Clarity program managements systems.</p>
Climate Change	<p>The National Climate Change Research Strategy for Primary Industries (CCRSPI) involves all RDCs, PISC agencies, CSIRO and affiliations with several universities. CCRSPI has played an important role in identifying cross industry issues in relation to climate change that require further R&D investment.</p> <p>CCRSPI has also played an important role in coordinating the establishment of successful broad R&D collaborative programs and projects dealing with carbon emission and adaptation to climate change funded under the Australian Government Department of Agriculture, Fisheries and Forestry's Climate Change Research Program.</p> <p>During 2009–10, CRDC strongly supported the continuation of CCRSPI under the new administration provided by the University of Melbourne. CRDC was invited by the Department of Agriculture, Fisheries and Forestry to join the steering committee for the Nitrous Oxide Research Program, which is convened by GRDC as the major industry co-investor with the Department. It is anticipated that new CRDC investments in 2010–11 will make a direct contribution to this program.</p>

Theme, Program or Project	Nature of Collaboration
National Program for Sustainable Irrigation (NPSI)	<p>During the year, CRDC successfully took over the role of managing agency for the NPSI program. We greatly appreciate the understanding and support of the program partners during the transition period.</p> <p>NPSI involves GRDC, Horticulture Australia Ltd (HAL), the Sugar R&D Corporation (SRDC) and 12 other public and private sector partners and has allowed the establishment of cross-industry investment opportunities for irrigated agriculture. CRDC has benefited directly from investments in training and improved capacity to measure and manage water efficiently. The partnership has allowed targeted co-investment with GRDC in particular.</p> <p>During the year CRDC has sought to achieve some efficiencies in managing the program and this has contributed to the recommendation from the Program Management Committee to partners that NPSI be extended for a further 12 months to June 2011 without the need for additional investment.</p>
Collaborative Partnership for Farming and Fishing Health and Safety	<p>CRDC continued this co-investment with the Rural Industries, Grains, Sugar and Fisheries RDCs and the Australian Government Department of Health and Ageing in this program which began in 2007–08, replacing the joint venture Farm Health and Safety R&D Program, which focused on cropping-based industries only. The Partnership invests in R&D to improve the physical and mental health of farming and fishing workers and their families and the safety of the environment and work practices in these industries.</p>
Value Chain	<p>CRDC and Australian Wool Innovations (AWI) have continued to develop a product innovation collaboration using Australian wool and cotton.</p>
Collaboration and R&D investment opportunities for cotton and grain	<p>During the year CRDC and GRDC program management teams met twice to discuss collaboration opportunities and initiate joint investments or identify new areas for improved joint communication and collaboration.</p>
Spray Drift Minimisation	<p>As the areas under conservation farming practices and GM herbicide-tolerant crop technology increase in cotton/grain producing regions, so too does the potential for spray drift damage to susceptible crops. During the year CRDC and GRDC continued to co-invest in a program to map the location of farms where cotton is grown and in delivering spray application management training workshops to growers and agronomic advisors. Spray drift damage to cotton crops in 2009–10 was significantly less than previous seasons demonstrating that the excellent cooperation between the cotton and grains industries has started to achieve results.</p>

Theme, Program or Project	Nature of Collaboration
Crop Nutrition	A new collaborative project on phosphorus and potassium nutrition in cotton and grains in northern NSW and Queensland was established in 2009–10. CRDC investment is provided directly to GRDC as project manager to reduce administrative costs for the research provider.
Insecticide Resistance Monitoring and Management	During the year CRDC and GRDC continued to co-invest in R&D to monitor resistance in <i>Helicoverpa armigera</i> and <i>Helicoverpa punctigera</i> to a range of pesticides commonly used on both crops.
Shared Insect management issues	During the year, GRDC invited CRDC and HAL to join the National Invertebrate Pest Initiative (NIPI). In response, CRDC has identified two of its new investments in 2010–11 involving the serious cross-commodity pest, Silverleaf whitefly, as potentially a good fit for this program. Discussions are underway to include these projects as contributions to NIPI.
Shared weed management issues	CRDC is collaborating with GRDC on a weed management project in southern Queensland. In particular, close interaction continues within this project, and directly with GRDC, on the important issue of glyphosate resistance management.
Education	<p>CRDC is collaborating broadly with rural RDCs and universities through the National Primary Industry Centre for Science Education (PICSE). This program is building on a decade of success in attracting high school students into science education and, beyond that, to careers in science that support agriculture. Other rural RDCs co-investing in PICSE are GRDC, FRDC, Dairy Australia, RIRDC and HAL. The universities involved are the University of Tasmania, University of Western Australia, The University of New England, University of Southern Queensland, University of the Sunshine Coast and Flinders University.</p> <p>During the year CRDC joined a partnership with six other RDCs (RIRDC, Grains, HAL, Grape and Wine, APL, AECL) to establish an undergraduate scholarship program. The program is managed by RIRDC and has selected the first group of undergraduates (see the Program Three report for information on the CRDC scholarship winner).</p>

CLIMATE CHANGE AND COTTON

Responding to the challenges of lower water availability and reliability while remaining profitable are the key drivers for change on Australian cotton farms. Successfully responding to these drivers will give cotton growers the best chance to adapt to climate change and reduce greenhouse gas emissions as a consequence. A SWOT (strengths/weaknesses/opportunities/threats) analysis in relation to climate change showed that the industry has a sound track record of addressing environmental impacts through the adoption of Best Management Practices, on-farm first and then through the rest of value chain, which should provide a head start for working to meet the Australian Government's goal to reduce national emissions.

In July 2009, a workshop co-convened by CRDC and the Climate Change Research Strategy for Primary Industries (CCRSPI) enabled the cotton industry to discuss the possible implications

of climate change and identify research, development, extension and communication priorities. The workshop was made possible with funding from the Australian Government Department of Agriculture, Fisheries and Forestry, delivered through CCRSPI, and the in-kind support of numerous cotton industry and researcher representatives. The focus was on R&D issues related to climate change, particularly on-farm impacts. Following a series of invited presentations, a workshop session allowed participants to consider R&D coordination, gaps, opportunities and priorities. A summary of the outcomes from the workshop was made available to a broader cotton industry audience at a forum on climate change held in Narrabri in August 2009.

The following table lists the priorities that emerged from the workshop, along with current CRDC actions or investments that address each priority and future actions planned to address them.

Industry Priority	Actions/Activities Addressing Priority in 2009–10	Future or Planned Actions to Address Priority
Productivity related priorities		
Nitrogen Use Efficiency – seed nitrogen testing	A Cotton Catchment Communities CRC project funded by CRDC has identified that: on average, Australian cotton growers are oversupplying their crops with nitrogen (N) fertiliser testing the N content in cottonseed can be used to estimate whether crop N use was undersupplied, oversupplied or optimal. Oversupply of N is associated with higher costs and nitrous oxide emissions (a potent greenhouse gas) and undersupply with lower yield.	Development of a commercial service to test the N content of cottonseed is under consideration. If established, this would provide cotton growers with a simple monitoring tool to estimate the N use efficiency of their previous crop, down to field or even sub-field level. This knowledge could then be used to improve N fertiliser planning for the next crop. Over one or more subsequent seasons growers would be able to optimise their N use to a level that suited the risk management profile of their business. The overall result would be a decline in the oversupply of N to the national cotton crop with a resulting reduction in nitrous oxide emissions.

Industry Priority	Actions/Activities Addressing Priority in 2009–10	Future or Planned Actions to Address Priority
De-nitrification inhibitors	No current research is taking place.	Research on de-nitrification inhibitors is being addressed in grain and livestock systems under the Nitrous Oxide Research Program. The outcomes are expected to inform the potential for using inhibitors in cotton systems.
Resource use efficiency (nitrogen, energy, water): relationship to carbon	<p>(See above for Nitrogen Use Efficiency)</p> <p>Water Use Efficiency (WUE)</p> <p>A joint project with the Grains R&D Corporation (GRDC), funded through the National Program for Sustainable Irrigation (NPSI), has been benchmarking water use on irrigated cotton and grain farms. For cotton, the project has demonstrated a 40 per cent improvement in WUE over the last decade. Improved WUE reduces unnecessary water pumping and energy use.</p>	Benchmarking WUE on irrigated cotton and grain farms is continuing.
	<p>Energy Use Efficiency</p> <p>In 2007, CRDC funded the development of EnergyCalc, a tool to assist in monitoring and auditing on-farm energy use. Case studies on cotton farms associated with this study indicated that average greenhouse gas emissions from fuel and electricity use were 0.71 t CO_{2-e} per hectare. The average annual greenhouse gas emissions estimate from soils for cotton in the National Greenhouse Gas Inventory is 0.67 t CO_{2-e} per hectare. Consequently, CRDC has concluded that in order to reduce the industry's carbon footprint effectively, addressing energy use efficiency is of equal importance to nitrogen use efficiency.</p>	A new project to further assess energy use on cotton farms will commence with the National Centre for Engineering in Agriculture in 2010-11. The project is expected to develop the capacity to assess energy use on farms and integrate tools, information and services with the cotton industry's new <i>myBMP</i> system.

Industry Priority	Actions/Activities Addressing Priority in 2009–10	Future or Planned Actions to Address Priority
Life Cycle Assessment (LCA)	The final report for the first Australian cotton LCA, <i>Life cycle assessment of a 100% Australian cotton T-Shirt</i> , was completed in November 2009. Results from this study have been used to compare greenhouse emissions from Australian cotton production with several of the world's largest cotton producing countries. It showed that Australian on-farm production has a much lower footprint per kg of cotton than all major producers.	Preliminary discussions with CRDC's counterpart in the USA, Cotton Incorporated, has highlighted further development of LCA for cotton as an area of common interest. Collaboration of future studies is possible in 2010–11. In 2009–10, collaborations with cotton mills through the Premium Cotton Initiative has shown that these mills are very keen to address environmental impacts such as water use and greenhouse gas emissions and are also keen to work with cotton suppliers like Australia to demonstrate improvements in this area.
Comparisons of gross margins and future supply chain modelling	The completion of the first LCA for Australian cotton has introduced an understanding of the impacts of inputs, production practices and processing on greenhouse emissions. Further work is required to utilise this for benchmarking and modelling more widely by the industry.	This priority will be addressed in part by a new project to be established in 2010–11 which will develop a social, economic, environmental performance information repository aimed at improving data gathering, access and reporting for the cotton industry
Plant physiology under changed climate scenarios	There is no current CRDC-supported research on cotton in this area. Prior CRDC-supported research investigated cotton's heat tolerance.	A new post-graduate project will be established in 2010–11 to address this information gap. It will measure the response of cotton to changes in temperature, moisture and vapour pressure deficit. The outputs will be used to improve the CSIRO's cotton model, OZCOT.
Better Integrated Pest Management (IPM) of pests such as Silverleaf whitefly	Current research capacity has enabled the industry to respond to changing pest problems; however, pests that prefer hotter, drier conditions could further expand their territory under projected climate change scenarios.	A new project is proposed in 2010–11 to focus on IPM of key pests such as Silverleaf whitefly, which has expanded its impact from the northern to the central cotton growing regions in Australia in recent seasons.
New diseases/pests: new species and movement of existing pests	See the priority above for insect management. For diseases, CRDC supports projects in both NSW and Queensland, which conduct extensive surveys of commercial cotton crops in all districts to monitor the presence on existing diseases and to provide surveillance for potential new disease threats.	It is proposed to continue annual disease surveys in NSW and Queensland.

Industry Priority	Actions/Activities Addressing Priority in 2009–10	Future or Planned Actions to Address Priority
Market place: Australia v global situation (eg. A scoping study of climate change and policy in other cotton producing countries)	No study of this kind has been conducted, however, the development of collaborative assessments of Australian cotton with mills under the Premium Cotton Initiative (PCI) is starting to provide helpful insights into the policy and commercial drivers for these mills in addressing future climate change, water and energy consumption.	Ongoing work through the PCI is expected to lead to closer alignment of environmental credentials of Australian cotton with the needs of the mills seeking to meet consumer demand and expectation.
Social/Capacity and Communication related priorities		
LCA (needs to include water) Communication to public (eg GHG emissions lower for cotton and polyester)	The cotton Life Cycle Assessment (LCA) completed in 2009 considered global impacts including greenhouse gas emissions, ozone layer depletion, mineral and fossil fuel resource depletion. Impacts on water resources were not considered in this study. Results of the study were presented in the Summer 2009 Edition of CRDC's <i>Spotlight</i> magazine, which can be found at www.crdc.com.au .	Cotton Incorporated in the USA has indicated to CRDC that they plan further development of an LCA covering water in a range of cotton producing countries. CRDC may have an opportunity to join or contribute to this study subject to further discussions with Cotton Inc.
Government policy impacts on community	The Cotton CRC has commissioned socio-economic case studies of eight communities in the Murray-Darling Basin. These were peer reviewed and released in July 2010. It is anticipated that these case studies will be of value to those communities, irrigation and other industries and policy makers in helping to understand the impact of policy responses to water resources and climate change.	CRDC will monitor the need for further socio-economic research in association with the Cotton Catchment Communities CRC and Cotton Australia.

Industry Priority	Actions/Activities Addressing Priority in 2009–10	Future or Planned Actions to Address Priority
Benefit of downscaling of climate models (to what level do we need to drill down?)	CRDC has not had the capacity to invest in the development of climatic models downscaled to provide better predictability of the impact of climate change scenarios at regional or local catchment scales. Instead, CRDC has concentrated on supporting research that will improve the responsiveness and accuracy of the cotton crop simulation model, OZCOT. If OZCOT is able to perform accurately under the current range of cotton production climatic conditions, it is reasoned that it can be used to forecast responses to future changes in climatic conditions.	CRDC will continue to monitor developments through the Bureau of Meteorology and the possible new phase of the Managing Climate Variability Program proposed by GRDC for opportunities to invest in research that will benefit cotton growers. A new post-graduate project will be established in 2010–11 to measure the response of cotton to changes in temperature, moisture and vapour pressure deficit. The outputs will be used to improve the CSIRO's cotton model OZCOT.
Training on energy use efficiency	CRDC has previously contributed to projects that have led to training courses on water use efficiency. Courses on pump efficiency and the correct setup for overhead irrigation systems have been particularly popular amongst growers. Demand for these courses is expected to continue as the cost of energy increases. CRDC supported the development of the on-farm energy monitoring and assessment tool, EnergyCalc, as a first step in providing the foundation for training in energy use efficiency.	A new project to further assess energy use on cotton farms will commence with the National Centre for Engineering in Agriculture in 2010–11. The project is expected to develop the capacity to assess energy use on farms and integrate tools, information and services with the cotton industry's new <i>myBMP</i> system. Development of training programs is a component of the project.
Need for a "Carbon pack" – linked to <i>myBMP</i> Highlight on-farm benefits of adapting to climate change – Win/win situation (NUE, energy savings) Benchmarking 'hot topics'	The incorporation of a new module on Energy and Input Efficiency in the revised BMP system, <i>myBMP</i> , has been done with an expectation that it will heighten the demand for information and training on energy use efficiency over time as more growers use the system in their business.	The new <i>myBMP</i> system is expected to become fully operational in 2010–11. <i>myBMP</i> will not only assist cotton growers to access relevant and up to date research information in accordance with their particular needs, but will also help the industry to identify demand for new information and training.

Industry Priority	Actions/Activities Addressing Priority in 2009–10	Future or Planned Actions to Address Priority
<p>Collaboration across industries</p>	<p>CRDC has a representative on the Steering Committee of the Department of Agriculture, Fisheries and Forestry/GRDC Nitrous Oxide Research Program.</p> <p>CRDC and GRDC program managers meet six monthly to discuss opportunities for collaboration, particularly on cotton/grain farming systems issues.</p> <p>In terms of greenhouse gas emission research, cotton is included as a crop rotation in the irrigated farming systems research funded by GRDC at Kingsthorpe on the Darling Downs. Grain crops are included in the two long-term irrigated farming systems experimental sites at ACRI, Narrabri.</p>	<p>In June 2010, CRDC commissioned the construction of a new set of automatic greenhouse gas measuring chambers to be installed at ACRI. It is proposed that a new project will be established in 2010-11 that will use these chambers to measure greenhouse emissions in the ACRI long term experiments.</p> <p>Even though this research is funded outside of the DAFF Nitrous Oxide Research Program, CRDC intends for the data from these sites to be a contribution to this National program.</p>
<p>Adoption strategies – collaboration</p>	<p>At their six-monthly meetings, CRDC and GRDC program managers discuss opportunities to improve communication of information to cotton and grain growers.</p> <p>CRDC has worked closely with the Cotton CRC and Cotton Australia in 2009–10 to restructure the extension team into a Development and Delivery team, with a clearer focus on implementation of R&D outputs and knowledge and integration with <i>myBMP</i></p>	<p>CRDC and GRDC will maintain the six monthly meeting schedule for their program managers in 2010-11.</p> <p>The Cotton Development and Delivery team has developed its plans for 2010–11. Key priority areas include nitrogen and water use efficiency, Integrated Pest Management (IPM) and farm hygiene, (protecting biosecurity).</p>

Industry Priority	Actions/Activities Addressing Priority in 2009–10	Future or Planned Actions to Address Priority
Biophysical related priorities		
<p>Soil carbon-nitrogen interaction (need more locations, soil types over time)</p> <p>Soil C-H₂O interaction (WUE- more location specific needs)</p>	<p>A CRDC funded research project which concluded in 2009–10 has identified farming systems practices which can build soil carbon levels and that, in some soils, carbon can increase more rapidly below the 30 centimetre depth than above it.</p> <p>See under “Resource use efficiency” for comments on WUE.</p>	<p>CRDC will invest in a new project commencing in 2010–11 to more fully research the opportunities to increase soil carbon and how this interacts with nitrogen use and management.</p> <p>Opportunities to expand the number of sites and soil types covered by R&D on carbon and nitrogen will be investigated.</p>
<p>Better measurement eg technical equipment for GHG measurements (quick, accurate, cheap for farmers as well as researchers)</p> <p>Whole farming systems – effects on GHG emissions</p>	<p>See under “Collaboration with other industries” on page 16.</p>	<p>See under “Collaboration with other industries” for improved capacity for research to measure GHG emissions.</p> <p>CRDC believes that the drivers for growers to measure greenhouse emissions have yet to be resolved: for example, the form of a future carbon tax and the opportunities for farmers to obtain carbon credits. As a result, the best option for the short to medium term appears to be to provide researchers with the resources to accurately measure emissions to improve our understanding of the practices that maintain productivity and reduce emissions.</p>

NATIONAL PROGRAM FOR SUSTAINABLE IRRIGATION

Background

Following the closure of Land and Water Australia in 2009, CRDC became Managing Agent for the National Program for Sustainable Irrigation (NPSI). As this occurred post-submission and approval of CRDC's 2009–10 Annual Operating Plan, NPSI is reported separate to the Report of Operations – Research and Development, which comprises the three programs formulated under the Strategic Plan 2008–2013 and included in the 2009–10 plan. For accounting purposes, CRDC has managed NPSI as a new Program Four.

Since 2002 NPSI has attracted \$18 million in investment aimed at improving the environmental and productive performance of irrigated agriculture and horticulture in Australia.

The Phase 2 Strategic Plan (2008–10), which can be found at www.npsi.gov.au, builds on a decade of collaborative research in this field, initially through the National Program for Irrigation Research and Development and then through Phase 1 of NPSI (2004–2007). Thus, the program remains one of the longest running national cross-commodity R&D collaborations.

Under Phase 2, NPSI's vision has been for Australian irrigation to be valued for its environmental, economic and social contribution by investing in research, development and its adoption to improve the productivity and sustainability of irrigation in Australia. Phase 2 focused on four key outcome areas: improved irrigation efficiency, sustainable future, improved industry capacity and R&D leadership. NPSI commissioned projects and undertook program-level activities to achieve these outcomes.

Many of the initial projects under Phase 2 are now completed or nearing completion in line with contractual agreements, with a small number of projects contracted to finish in 2011. NPSI Phase 2 has been extended for twelve months to allow for completion of these projects. Total planned expenditure for Phase 2 is \$7.2 million.

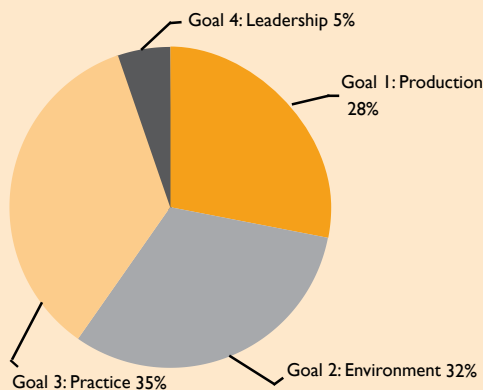
NPSI Partners

- Australian Government Department of Environment, Water, Heritage and the Arts
- Cotton Research and Development Corporation
- Gascoyne Water Cooperative and Gascoyne Water Asset Mutual Corporation
- Goulburn-Murray Rural Water Corporation
- Grains Research and Development Corporation
- Harvey Water
- Horticulture Australia Limited
- Lower Murray Water
- Ord Irrigation Cooperative and Ord Irrigation Asset Mutual Cooperative
- South Australian Research and Development Institute
- Sugar Research and Development Corporation
- SunWater
- Western Australia Department of Water

NPSI expenditure 2009–10

Total expenditure in 2009–10 was \$2,053,703, which includes both R&D grant liabilities and administration costs. As shown in the grant payments graph, investment in the four goals was evenly balanced for the three main programs.

NPSI Grant Payments 2009–10



Highlights 2009–10

- The launch of *Irrigation Essentials* by the Minister for Agriculture, Forestry and Fisheries, the Hon Tony Burke MP. *Irrigation Essentials* is a snapshot of some of the latest NPSI research and development that is leading to improved technology and enabling the sharing of knowledge and practice change across all agricultural commodities and horticultural industries. It provides case studies that demonstrate how research and good ideas may be adopted and provides sources of additional information on key topics. The publication covers irrigation enterprise establishment and management, irrigation methods, business management, creating a water budget, scheduling and monitoring, agronomy and soil considerations, and other topics. *Essential Irrigation* can be downloaded at www.npsi.gov.au.
- Development of a Future Vision for Irrigation Research, Development and Extension, in partnership with Irrigation Australia, released in May 2010. The aim of the vision is to aid forward planning of research, development and extension delivery for all irrigation-based industries.
- A new initiative in Phase 2 that has supported eight undergraduate student scholarships to assist in promoting and attracting people into irrigation R&D and to build future human capacity. NPSI has also supported four industry scholarships, in partnership with Irrigation Australia, to provide an opportunity to travel overseas and study irrigation R&D. These investigations have covered water catchment management, reuse/recycling, energy and precision irrigation.
- NPSI has provided input to many water-related R&D reviews currently underway, including the Productivity Commission



The Minister for Agriculture, Fisheries and Forestry, the Hon Tony Burke MP (second from left) launched the significant new NPSI publication *Irrigation Essentials* during a visit to 'Keytah' near Moree in early 2010. With the Minister are CRDC Executive Director Bruce Finney, NPSI Program Manager Guy Roth and Keytah manager and NPSI committee member Andrew Parkes

inquiry into Rural R&D, the Council of Australian Governments' water research and knowledge strategy, and the Primary Industries Standing Committee Water Use in Agriculture Strategy.

- NPSI has initiated or supported other significant forums bringing together industry stakeholders to address sustainable production in a water scarce environment, including the Irrigation Australia/CRC for Irrigation Futures National Conference (June 2010) and Irrigation Australia Regional Conference in Swan Hill (October 2009), an international workshop on evaporation science, an irrigation essentials workshop held at Horticulture Australia Limited and the NPSI partners' forum in Brisbane July 2009.
- Successful transfer of the management and operations of the NPSI program and projects to the Cotton Research and Development Corporation as a result of the closure of Land and Water Australia.
- A range of new publications during the year targeted at industry. Researchers produced 12 scientific journal/ conference papers. The NPSI website had a major upgrade in the last 12 months and an eNewsletter was initiated during the year.
- Key Decision Support Tools to date include: Prototype EC Sensor; Ready Reckoner Farm Dam Calculator; Irrigation Optimiser; Fertigation decision support tool; Water Storage management model; Economic model of open hydroponics compared to conventional fertigation; Prototype of oxygation system; Oxygation calculator; Prototype of a streambed temperature array ; Tools for measuring and monitoring root zone drainage, salt and nutrients (e.g. SoluSAMPLER).



Alison McCarthy with NPSI Program Manager, Guy Roth. Alison holds the National Program for Sustainable Irrigation 2010 travelling fellowship. Her particular interest is spatial sensing for precision application of water via lateral move and centre pivot machines.

Examples of Phase 2 impacts to date

Practice change

Irrigators auditing centre pivot systems with a view to improving water use efficiency by 25 per cent; irrigators in citrus and almond industries benefited from cost calculators and information packs; the Queensland Government-owned water industry company, SunWater, acted on the strategy of capacity sharing in new regions.

Capacity gains

83 farmers, consultants and R&D staff trained in reducing evaporation from farm dams, 32 citrus growers trained in tools to reduce fertiliser costs, 40 participants in master class modules on solute management, 113 participants of water smart cotton and grains workshops, eight university students undertaken summer scholarships, four industry travel fellowships awarded.

Addressing planned Phase 2 outcomes in 2009–10

Phase 2 NPSI outcome sought	2009–10 activities
Improved irrigation water use efficiency and enhanced ability to respond to changing levels of resource availability over time.	<ul style="list-style-type: none"> • Develop technology improvements and management options to maximise water-use efficiency at the farm and delivery system scale. • Develop techniques that will reduce evaporation and provide tools for farmers. • Enhance technologies and sensors for irrigation scheduling and nutrient management. • Improve benchmarking of water use on farms.
Reduced environmental impacts, more sustainable ecosystems and more prosperous communities.	<ul style="list-style-type: none"> • Increase understanding of the environmental consequences of implementing more efficient technology, changes to delivery systems and management practices. • Reduce salinity impacts. • Reduce nutrient leaching. • Improve understanding of surface and groundwater interaction.
Improved skills, knowledge and decision making of end users which leads to practice change, and more efficient and sustainable use and management of water	<ul style="list-style-type: none"> • Build understanding of barriers and drivers of practice change and adoption by the irrigation industry. • Improve current irrigation management practices and systems. • Improve accessibility of knowledge, tools and practices to end users. • Assist irrigators adapt to reduced and increasing variability in water supplies. • Harvest knowledge of best management irrigation practices from the previous decade of R&D completed and accessible to government policy and programs. • Provide training for irrigators in a range of industries.
A national approach to irrigation related R&D in Australia, which includes a strong focus on a skilled human resource base and enhanced R&D capacity and collaboration.	<ul style="list-style-type: none"> • A future vision for national irrigation R&D investment plan completed. • Scoping study on precision irrigation. • Review of sub surface drip irrigation. • IAL/NPSI Travel fellowships funded. • NPSI Student Research Projects funded. • Sponsorship of Irrigation Australia Conferences and other conferences and workshops.

FINANCIAL PERFORMANCE

Revenue 2009–10

Total revenue for 2009–10 was \$11.736 million, comprising of \$9.682 million in cotton industry revenue and \$2.054 million in NPSI revenue. Cotton industry revenue was \$0.468 million (5.0 per cent) above budget of \$9.214 million.

2009–10 was a mixed season, with some cotton areas achieving record yields while others incurred floods and pest damage and some remained in drought. The drought continued to restrict revenue including Australian Government contributions, which are currently capped at 0.5 per cent of the three year average gross value of production.

The ABARE, June quarter 2010 forecast lint production of 389,000 tonnes (1.7 million bales: 0.3 million bales lower than the CRDC 2009–10 budget of 2.0 million bales.

Interest, project refunds and grant revenue were all above budget.

Total revenue of \$11.736 million for 2009–10 comprised:

- industry levy revenue of \$3.433 million, which includes \$1.618 million (49.2 per cent) of the 2008–09 crop and \$1.815 million (47.3 per cent) of the 2009–10 crop.
- Australian Government contribution of \$2.997 million. Australian Government matching of expenditure was capped at 0.5 per cent of the gross value of production of the cotton industry.
- \$1.897 million in royalties from the sale of CRDC-funded CSIRO seed varieties, which was 20 per cent below budget.
- interest revenue of \$0.568 million: 108 per cent above budget, due to higher than expected interest rates on investments and additional funds under CRDC management for the NPSI program. Interest on NPSI investments was \$0.068m.
- novation of the National Program for Sustainable Irrigation (NPSI) program from Land and Water Australia to CRDC in 2009–10, which provided additional revenue of \$1.985 million that was not in the budget for 2009–10.
- other revenue of \$0.856 million, which includes project refunds and external grant revenue.

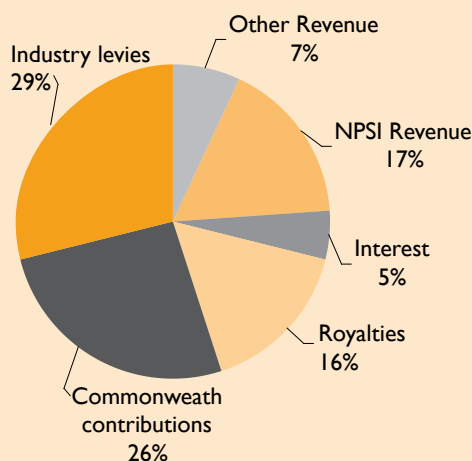
Revenue sources

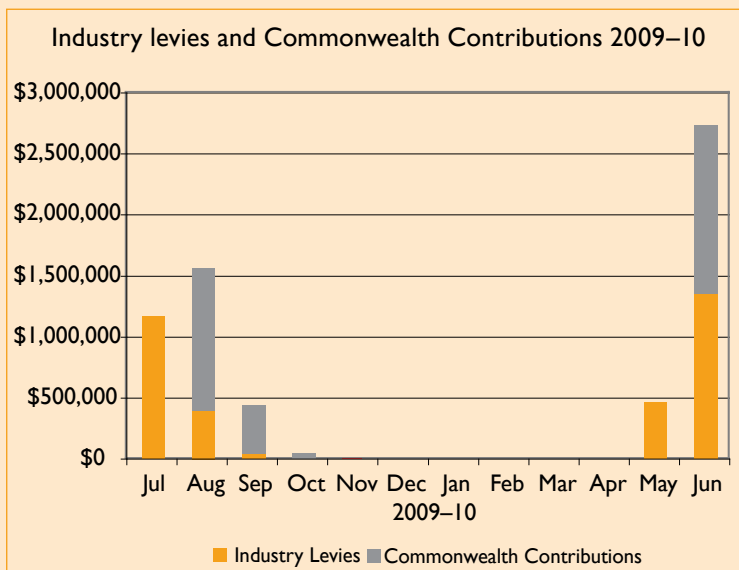
CRDC's revenue is drawn from two main sources:

- Cotton farmers pay a levy of \$2.25 for each 227 kilogram bale of cotton. Cotton levy revenue is collected at the point of ginning, that is, when cotton has been picked and delivered to cotton gins which then separate the cotton lint from the seed. This occurs from March to September of each calendar year, so cotton levy revenue in any financial year is drawn from two consecutive cotton crops.
- The Australian Government matches expenditure of levies on eligible R&D, capped at 0.5 per cent of the three-year average gross value of production or the cumulative levy receipts, whichever is the lesser. The setting and collection of the industry levy is enabled by the *Cotton Levy Act 1982* and the *Primary Industries Levied and Collections Act 1991*.

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

Revenue by Source





Expenditure 2009–10

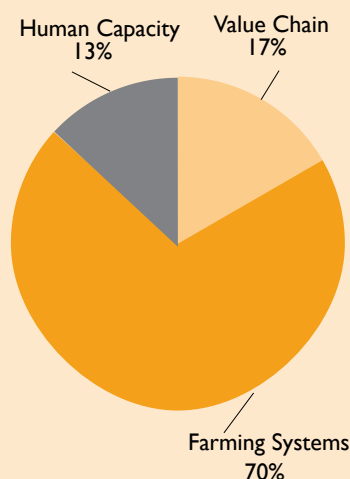
Total expenditure for 2009–10 was \$11.501 million, comprising \$9.447 million in cotton industry expenditure and \$2.054 million in NPSI expenditure. Cotton industry expenditure was \$0.797 million (7.8 per cent) below budget of \$10.244 million. Research expenditure in CRDC’s three strategic research programs and research-related corporate activities (excluding NPSI expenditure) was \$7.855 million, \$0.716 million below budget. Other areas of expenditure for the Corporation included employees and operational expenditure.

Financial position 2009–10

CRDC reported a net surplus of \$0.235 million for 2009–10 against a budgeted deficit of \$1.030 million. This is a reflection of the combined effect of CRDC’s management response to the effect of drought on forecast revenue, with fewer research applications funded, and a higher than expected project refunds from underspent research grants.

Cash reserves managed by CRDC have increased from \$9.376 million at 30 June 2009 to \$11.282 million at 30 June 2010. The novation of the NPSI agreement generated a net increase in cash reserves of \$2.726 million at the 30 June 2010.

Expenditure by R&D Program



The Corporation’s total equity position of \$10.530 million at 30 June 2010 is an increase of \$0.235 million from the previous year. The expenditure to equity ratio for 2009–10 was 109 per cent, which includes NPSI expenditure, while NPSI had no effect on equity. The cotton industry expenditure to equity ratio was 90 per cent compared to 92 per cent in 2008–09, which is within the guidelines of the Corporation’s policy to maintain reserves at a sustainable level.

R&D Program Breakdown*

	Value Chain	Farming Systems	Human Capacity	Total
Number of projects	20	54	33	107
Program expenditure	\$1.185m	\$4.976m	\$0.951m	\$7.112m

*Excludes NPSI, untied grants and corporate research activities supporting R&D planning and adoption.

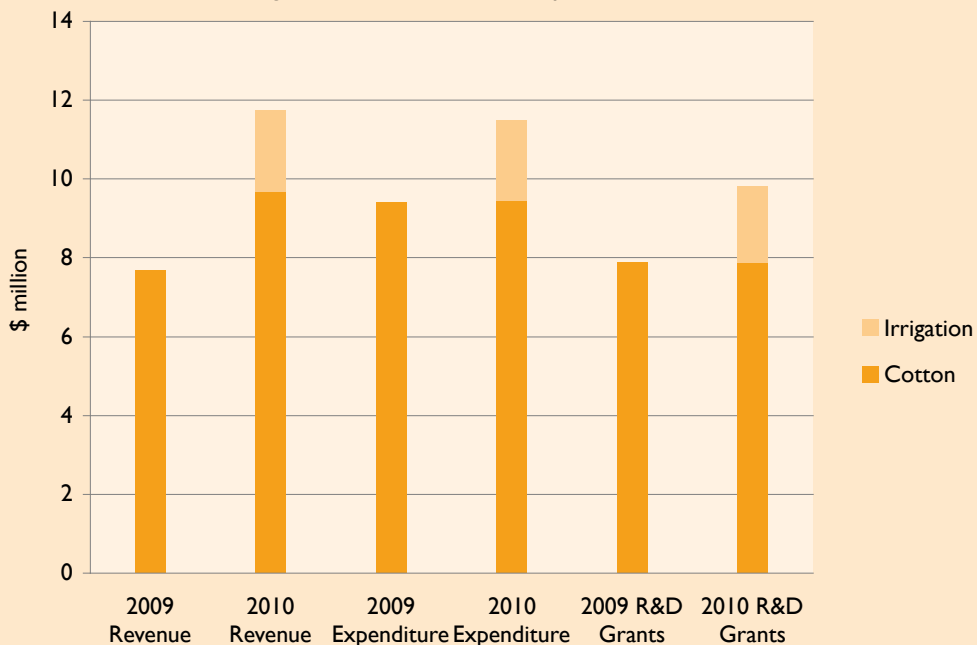
Outcome 2009–10

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

Total Budgeted Revenue:	\$11,434,327
Total Actual Revenue:	\$11,736,192
Total Budgeted Cost of Outputs:	\$12,464,364
Total Actual Costs of Outputs*:	\$11,501,354

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

Strategic Plan 2008–13 financial performance to date



The Coming Year

Revenue

Water availability will continue to be a constraint on irrigated cotton production, whereas increased world cotton prices and lower grain prices have increased the potential for dryland cotton production. ABARE, June quarter 2010 report has forecast for 2010–11, an increase in area harvested to 328,000 hectares and lint production of 518,000 tonnes (2.28 million bales). This is a significant increase over the Corporation's earlier forecast of 1.75 million bales.

The Corporation has forecast a \$nil operating surplus for 2010–11. This reflects cotton industry revenue and expenditure of \$9.676 million and NPSI revenue and expenditure of \$1.311 million. Industry levy revenue and Commonwealth contributions will continue to be drawn from two crop seasons, 2009–10 and 2010–11.

The size of levy and Government contributions is heavily reliant upon crop production, which is budgeted to be 1.75 million bales for 2010–11. The recent estimates of 2.28 million bales for 2010–11 will increase industry levies and Commonwealth contributions. The Corporation expects that the previous years of low Gross Value of Production will trigger the PIERD Act of 0.5 per cent of GVP, continuing to limit 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 had been reduced, but stabilised in 2009–10. Forecast expenditure for the coming year for cotton industry expenditure is \$9.676 million and NPSI expenditure of \$1.311 million. Cotton research expenditure for 2010–11 is forecast at \$8.063 million, compared to actual expenditure for 2009–10 of \$7.904 million.

CRDC STRATEGIC ELEMENTS 2008–2013

Accountabilities	Planning Instruments	R&D Program Objectives
<p>PRINCIPAL LEGISLATION</p> <p><i>Primary Industries and Energy Research and Development (PIERD) Act 1989</i></p> <p><i>Commonwealth Authorities and Companies (CAC) Act 1997</i></p>	<p>FIVE YEAR STRATEGIC R&D PLAN</p> <p>ANNUAL OPERATING PLAN</p> <p>PORTFOLIO BUDGET STATEMENT</p>	<p>PROGRAM ONE Value Chain</p> <p>Goal</p> <p>Add value to the Australian cotton industry with premium products in improved routes to market</p> <p>Planned Outputs</p> <ul style="list-style-type: none"> • Markets, risks and opportunities for Australian cotton products are clearly defined and understood within the industry • New partnerships between industry, researchers and end-users • Post-farmgate best management practices are developed and adopted • New and improved products, processes and measurements • Assessments of the competitive advantage of the Australian cotton industry <p>Planned Outcome</p> <p>High quality consumer-preferred Australian cotton products in the world marketplace</p>
<p>GOVERNMENT STAKEHOLDER</p> <p>Objects of the PIERD Act</p> <p>Australian Government National Research Priorities and Rural Research and Development Priorities</p> <p>Ministerial guidance and directives</p>		<p>PROGRAM TWO Farming Systems</p> <p>Goal</p> <p>Cotton in a highly productive farming system with improved environmental performance</p> <p>Planned Outputs</p> <ul style="list-style-type: none"> • Climate and natural resource management risks and opportunities for Australian cotton producers are defined and understood • Climate and natural resource policy implications are interpreted • Collaborations and partnerships within and between rural industries delivering innovation, capacity and knowledge for farming systems • Benchmarking, assessing and reporting on productivity and environmental performance of cotton farming systems • An industry capable of managing its biosecurity responsibilities <p>Planned Outcome</p> <p>A more resilient, profitable and competitive cotton farming system</p>
<p>INDUSTRY STAKEHOLDER</p> <p>Cotton Australia R&D Priorities</p>		<p>PROGRAM THREE Human Capacity</p> <p>Goal</p> <p>A culture of innovation and learning</p> <p>Planned Outputs</p> <ul style="list-style-type: none"> • Industry and R&D capacity needs identified and gaps being addressed • An industry with the capacity to deliver our future R&D innovation needs and their adoption • The adoption of a shared vision for the cotton industry's future • Assessments of industry capacity to innovate, lead and adapt <p>Planned Outcome</p> <p>Innovative people in the cotton industry and community, creating a sustainable industry and viable regional communities</p>

Triple Bottom Line Outputs	R&D Outcome
<p data-bbox="172 725 310 753">ECONOMIC</p> <p data-bbox="95 769 387 830">Profitability and International Competitiveness</p> <p data-bbox="142 1020 340 1049">ENVIRONMENTAL</p> <p data-bbox="84 1064 397 1125">Sustainable Production Systems and Catchments</p> <p data-bbox="196 1271 286 1300">SOCIAL</p> <p data-bbox="122 1315 357 1376">Empowered People and Communities</p>	<p data-bbox="431 845 749 1138">A more sustainable, profitable and competitive cotton industry providing increased environmental, economic and social benefits to regional communities and the nation.</p>

CONTEXT

THE AUSTRALIAN COTTON INDUSTRY

Cotton is the most widely produced natural fibre in the world, representing about 40 per cent of the world textile market. The Australian cotton industry is relatively small, with between 700 and 880 cotton enterprises currently producing the crop. The capacity of experienced cotton growers not currently growing cotton is substantial and a return to favourable seasons and higher per-bale returns should result in growers entering or re-entering the industry.

Historically, 70 per cent of Australia's cotton has been grown in NSW, with the majority of the remainder grown in Queensland. The average Australian cotton farm is 4630 hectares in size, with 362 hectares planted to cotton and 2840 hectares used for dryland cropping or grazing. Cotton production is highly mechanised, capital intensive, technologically sophisticated and requires high levels of management expertise. National production averages 2.5 million bales, with the average cotton farm producing 2840 bales at 7.84 bales per hectare from 362 hectares of cotton planted.

The average yield for irrigated cotton in Australia is 1800 kilograms per hectare – the highest in the world (Source: Cotton Australia, 2005). These yields can be attributed almost entirely to improved cotton breeding and better crop management systems, which have been achieved with a reduced impact on the environment.

Cotton producers also engage in other agricultural enterprises, which typically include other summer crops such as sorghum and sunflowers, and summer legumes such as soybean, while winter crops include legume crops such as faba beans and chickpeas and cereal crops such as wheat and barley. Livestock are often another key element of a diverse farm where cotton is grown. This adds up to cotton as a major crop in an integrated farming system designed to make the best use of natural rainfall, soil fertility and irrigation.

The economic and environmental health of the cotton industry can largely be attributed to high quality collaborative research and development, much of it coordinated and funded by CRDC. This culture of innovation and continuous improvement with practical implementation and willingness by growers to adopt new ideas results in an industry that is very quick to pick up and act upon new research outcomes.

Despite its relatively small size, the Australian cotton industry makes an important contribution to the national economy, in terms of both exports and employment. On a global scale, Australia is not a large cotton producer, growing only around three per cent of the global crop. Nevertheless, because over 95 per cent of the national crop is exported, Australia is one of the major cotton exporting countries.

The cotton industry directly employs an estimated 10,000 people under normal seasonal and market conditions (prior to recent and current drought-affected conditions).

Because almost all the Australian cotton crop is exported, the industry operates in an environment of intense global competition and therefore must continually improve operational efficiency, environmental sustainability and quality of the product to remain competitive.

That is why the continued R&D effort of the Corporation, in conjunction with its government and industry stakeholders, remains of paramount importance to the industry and an essential linkage in the maintenance of a viable industry and rural communities.

The 2009–10 Harvest

The area planted to cotton in Australia in 2009–10 was bolstered by increases to both irrigated and dryland production. The yield and quality results were much better than first thought, given concerns about the effects of flooding and rain prior to harvesting of cotton crops in Queensland. Some crops achieved yields in excess of 14 bales per hectare, which is more than four times the world average yield and approaching the theoretical maximum yield for cotton. The Australian Bureau of Agricultural

and Resource Economics' (ABARE) most recent estimate of Australian cotton production for the 2009–10 season is 389,000 tonnes (1,713,656 bales), an increase of 18 per cent over 2008–09 production of 329,000 tonnes (1,449,339 bales). The estimated area planted for 2009–10 was 211,000 hectares, with lint yield estimated to be 1.84 tonnes per hectare.

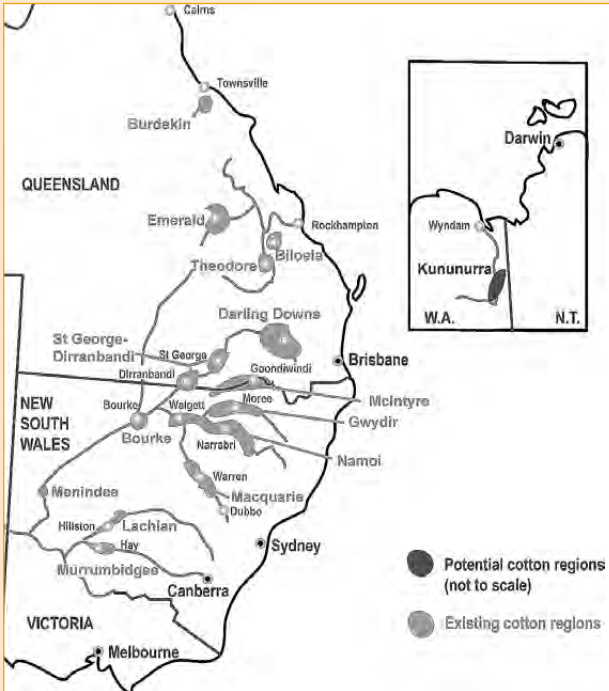
The Australian Cotton Shippers Associated have reported that the quality of the 2009–10 crop is very good and continues the trend for improvements in length, strength and micronaire. From classing of 1.0 million bales to mid June, greater than 60 per cent of the crop was graded 38 (1" 3/16th) for length; 16 per cent achieved better than 34 strength and greater than 80 per cent was in the premium micronaire range. By comparison, only 27 per cent of SJV (California) and 8 per cent of the Texas cotton crop achieved a 38 length.

Despite an increase in the cotton crop in 2009–10, many areas remained drought declared with the crop size well below the historical average.

The coming season

The availability of irrigation water in the major cotton growing regions is likely to be much better than for 2009–10. Australian cotton plantings in 2010–11 are forecast by ABARE to be significantly higher than for last year, at 328,000 hectares. Around 80,000 hectares are forecast to use dryland (non-irrigated) production, giving improved competitiveness with grain crops. Cotton lint production in 2010–11 is forecast to be 518,000 tonnes (2,281,938 bales). Industry discussion indicates significant potential for increases beyond this current forecast given that the Bureau of Meteorology three-month seasonal outlook is for average or better rainfall in most cotton catchments. It is possible that dryland production could equal the previous largest area of 130,000 hectares in 1998. Of interest, the Australian Cotton Ginners Association predicts that 0.8 to 1.1 million bales will be picked using the new round module form during the next harvest.

Australian cotton regions



CRDC STAKEHOLDERS

COTTON AUSTRALIA

The 2009–10 year marked the first full year of Cotton Australia's role as the Corporation's industry representative organisation under the *Primary Industries and Energy Research And Development Act 1989*.

Cotton Australia was originally established in 1972 as the Australian Cotton Foundation. As the peak industry representative body, its membership comprises all Cotton Grower Associations, cotton processors and some service industry members. It is funded through a voluntary grower levy of \$2.25 on each bale of cotton produced. Its head office is located in Sydney, with regional hubs in Narrabri, Brisbane and Toowoomba. A Board of 10 elected Cotton Australia Directors, who are growers and/or ginners, sets policy and strategic direction. Ms Joanne Grainger, a cotton grower from Mungindi in north west NSW, chaired Cotton Australia in 2009–10.

Board and staff members are represented on a wide range of working groups, boards, committees, reference groups and Grower Associations, as well as the Australian Cotton Industry Council, the International Cotton Advisory Committee, the National Farmers' Federation and Queensland Farmers' Federation, and NSW and Queensland Irrigator Councils. Cotton Australia supports levy paying cotton growers in cotton production and marketing, represents and advances the interests of cotton growers and the Australian cotton industry and promotes the Australian cotton industry to the community. It works with State Governments and the Australian Government in an effort to drive the cotton industry's environmental performance, while supporting the interests of growers. It is responsible for implementation of the industry's environmental management system, Best Management Practices (BMP), developed by CRDC.

Cotton Australia provides executive officer services and administrative support to the Australian Cotton Industry Council (ACIC).

Further information about Cotton Australia can be found at www.cottonaustralia.com.au.

The R&D role

Cotton Australia provides advice to CRDC on research funding submissions received by CRDC each year, after canvassing the views of its grower representative organisations on the relevance of the submissions to their needs.

Cotton Australia advisory panels reflect the R&D programs established under the CRDC Strategic Plan 2008–2013 – Value Chain, Farming Systems and Human Capacity – and address each of the CRDC Strategic Research Priorities under those programs.

Members' representatives are asked to nominate specific areas of research interest and are then allocated to the appropriate advisory panel. These panels consider relevant research applications in detail and report their views to the organisation as a whole at the annual research review meeting. These views are conveyed to CRDC staff, who also attend the annual meeting.

In addition to its role as CRDC's industry representative body, Cotton Australia is formally responsible for liaising on research issues generally for the cotton industry and advises the Cotton Catchment Communities CRC on its R&D program.

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

Other Cotton Australia roles

TIMS Committee

The Transgenic and Insect Management Strategy Committee (TIMS) is a sub-committee of Cotton Australia, which provides the Chair and up to five grower members of the committee.

TIMS also includes representatives from CSIRO, CRDC, Industry and Investment NSW and the Queensland Department of Employment, Economic Development and Innovation, the Cotton Catchment Communities CRC and Crop Consultants Australia. It is responsible for developing, in close consultation with the relevant scientific experts and technology providers, the resistance management strategies for conventional insecticides, herbicides and transgenic cotton.

Industry Biosecurity Group

Cotton Australia convenes the Industry Biosecurity Group. This group oversees implementation of the Cotton Industry Biosecurity Plan, which was developed in 2006 and addresses key exotic pest threats and mitigation and contingency plans in the event of an emergency pest incursion.

NORCOM

NORCOM – industry development in Northern Australia – is an industry-based stewardship

committee now convened by Cotton Australia. It 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, it is represented on this committee. NORCOM provides advice to CRDC's major collaborative partner, the Cotton Catchment Communities CRC.

Australian Cotton Conference

After 14 highly successful and well-attended biennial conferences organised, financed and administered by the Australian Cotton Growers Research Association (ACGRA), Cotton Australia has taken over ACGRA's role for the 15th conference in August 2010, featuring the theme Fashioning the Future. Since 2008, the Australian Cotton Conference has been held jointly with the Australian Cotton Shippers Association (ACSA) to formalise the R&D focus on the entire production chain. CRDC is a foundation sponsor of the conference.



CRDC Executive Director Bruce Finney with Cotton Australia's Chair Joanne Grainger and NSW Policy Officer Greg Kauter at the Cotton Australia Annual General Meeting in Moree

THE AUSTRALIAN GOVERNMENT

Australian Government National Research Priorities and Rural Research and Development Priorities were essential planning instruments in development and execution of the Corporation's Annual Operating Plan 2009–10.

National Research Priorities

Four National Research Priorities were issued by the Australian Government in 2002, and enhanced and refined in 2003:

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

Rural Research and Development Priorities

The Australian Government issued five revised rural research and development priorities in 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.

Supporting the Rural Research and Development Priorities

1. Improve the skills to undertake research and apply its findings
2. Promote the development of new and existing technologies.

Minister's Priorities

On 9 February 2010, the Minister for Agriculture, Fisheries and Forestry, the Hon Tony Burke MP, notified the Corporation of priorities which he wished to be addressed in 2010–11. The Minister's priorities relate to:

1. Productivity improvement
2. Climate change
3. Sustainable environmental resource management
4. Maintaining and improving international market access opportunities
5. Value chain effectiveness and efficiency
6. Biosecurity
7. Workforce, skills, education
8. Diversity
9. Collaboration
10. Evaluation

These priorities have been addressed specifically in the Annual Operating Plan for 2010–11; however, they also had significant relevance to R&D activities in 2009–10. Accordingly, they are integrated into the following table.

Addressing Australian Government R&D priorities

Principal contributing activities 2009–10

National Priority An environmentally sustainable Australia	
Rural Priority Natural resource management	
Minister's Priority Sustainable environmental resource management	
STRATEGIC PLAN R&D FOCUS	<ul style="list-style-type: none"> • Effectively manage weeds, pests and diseases and soil health to underpin primary production, environmental sustainability and social needs • Improve our understanding of water resources and their productive and efficient use for commercial, environmental sustainability and social needs • Support the conservation of native vegetation, biodiversity and ecosystems and the provision of ecosystem services within primary production systems
PRINCIPAL ACTIVITIES 2009–10	<ul style="list-style-type: none"> • CRDC research projects into the most efficient way to irrigate Bollgard II® cotton have demonstrated that irrigation deficits can be varied to improve cotton yields and water use efficiency (WUE) when measurements of plant stress are available to assist in making irrigation decisions. • The CRDC-supported annual survey by Cotton Consultants Australia, conducted in 2009–10 but relating to the previous season, found a range of changes aided by CRDC investments, such as: <ul style="list-style-type: none"> • approximately 68 per cent of surveyed growers used Integrated Pest Management (IPM) during the season; • significant improvements in a range of practices to improve soil quality and health; • improvements in irrigation efficiency, mainly in pumping efficiency, storage seepage and evaporation, scheduling techniques and electromagnetic (EM) surveys to ascertain salinity levels.

PRINCIPAL ACTIVITIES 2009–10
(cont.)

- Mitigate the damage to the natural resource base caused by previous production practices, drought and extreme weather events
 - Soil nutrients are being depleted in clay soils in northern NSW and Queensland supporting cotton and grain growing and it is important to ensure their replacement with fertilisers is achieved with optimal results. A preliminary project assessed the potential of new diagnostic tests to identify low levels of available phosphorus (P) and potassium (K). Findings will feed into a joint CRDC and GRDC project to optimise use of P and K fertilisers.
 - The Burdekin region in Queensland, with a secure supply of irrigation water has potential for cotton farming with significant yields. CRDC is collaborating to expand the breadth of research to maximise both water and nutrient use efficiencies in newly emerging farming systems that include cotton within an area that is expected to remain dominated by sugar cane.
 - A web-based herbicide resistance assessment tool released in 2009–10 can be used to quantify the risk of glyphosate resistance developing from field level through to regional level.
 - Investment with Industry and Innovation NSW seeks to expand knowledge of cotton response to herbicide damage.
 - A new CRDC/GRDC project has formulated workshops on best practice spray application that are being delivered in cotton and grains areas.
 - The discovery in 2001 of a single mirid carcass cocooned by fungal hyphae in a cotton field has resulted in development of a new biopesticide formulation, offering efficacy for mirid control equal to the commercial standard, Fipronil®. Research indicates that Silverleaf whitefly control can be included in the registration submission.
 - Research showed an IPM approach to management of all pests in northern NSW is likely to reduce the risk of whitefly infestation.
 - CRDC is assisting in setting future directions for IPM research in the grains industry. As a result CRDC was invited by GRDC to participate in the National Invertebrate Pest Initiative (NIPI) and is negotiating for the inclusion of two projects in the NIPI network.
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- New research is investigating ways to enhance the resistance management plan for Bollgard II® through continuing long term data collection, monitoring networks of refuge crops, evaluating cheaper options for refuge crops and exploring new options for refuge management.
 - An industry-wide CottonMap program, launched in time for the 2009–10 season, enables growers to mark the location of their cotton fields, thus enabling neighbours to identify nearby herbicide sensitive crops like cotton and avoid spray drift. Herbicide drift damage reported to cotton in 2009–10 fell by over 90 percent to just over 1000 ha in 2009–10 compared to 15,910 hectares in 2008–09.

Rural Priority Climate variability and climate change

Minister’s Priority Climate change

STRATEGIC PLAN R&D FOCUS

- Increase our understanding of climate variability and climate change to improve our ability to predict changes and to manage impacts on primary industries and regional economies
- Develop and improve climate information tools, including forecasting models, to enable producers to make informed risk management decisions and build resilience to climate impacts
- Help manage and further reduce greenhouse gas emissions from primary industries
- Enable industries to respond and better adapt to climate change in a timely and sustainable manner and to capitalise on potential growth opportunities

PRINCIPAL ACTIVITIES 2009–10	<ul style="list-style-type: none"> • CRDC is a member of the Australian Government Nitrous Oxide Research Program steering committee. Under this program, a detailed field experiment assessing nitrous oxide emissions under varying irrigation schedule treatments was completed, building on previous CRDC investments. • Research into nitrous oxide and greenhouse gas emissions has indicated that emissions from soils and fuel/electricity on irrigated cotton farms appear to be equal and require equal attention. CRDC is seeking to undertake further work on soil carbon and greenhouse gas emissions as well as energy use on cotton farms • CRDC organised a climate change workshop with support from the National Climate Change Research Strategy for Primary Industries, resulting in a set of priorities for future R&D and communication on the subject. • The final report from a Life Cycle Assessment of a cotton t-shirt confirmed preliminary findings of low emissions from growing and processing cotton compared with those from after-sale use and significantly lower emissions from the production of a cotton t-shirt compared with polyester.
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National Priority Promoting and maintaining good health

Rural Priority Productivity and adding value

Minister's Priority Productivity improvement

STRATEGIC PLAN R&D FOCUS	<ul style="list-style-type: none"> • Enable commodities and food to be produced more efficiently and sustainably • Provide information and tools to help producers identify the best returns on investments, especially in pursuing new product opportunities • Add value through improved products and processes that focus on consumer needs and expectations
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PRINCIPAL ACTIVITIES 2009–10	<ul style="list-style-type: none"> • CRDC investments have led to the development of plants that can produce healthier cottonseed oil for human consumption. Seeds harvested from a field trial approved by the Office of the Gene Technology Regulator are being processed for potential use in cottonseed oil trials and food service sector trials in 2010. • Assessment of the effect on fibre quality of crop conditions at the time of harvest has revealed the potential impact of a range of harvest preparation and harvest management aspects. • CRDC investments have supported development of a new ginning moisture sensor by CSIRO. A provisional patent has been lodged and preliminary discussions held with a potential commercial developer. • Aided by CRDC investment, CSIRO has collected important data on the generation of neps (clusters of tangled fibres), which remain a concern for the industry. • A project established in 2009–10 is gaining a clearer understanding of the effect that classing grade has on the processing performance in relation to yarn and fabric quality. • Collaboration with agribusiness resulted in the release of a Safe Harvesting video for use by growers and contractors in the 2009–10 harvest. • Further CRDC investment in workshops on pesticide management has improved pesticide use industry-wide. • The Collaborative Partnership for Farming and Fishing Health and Safety invested in R&D covering a range of activities relevant to cotton growing. In particular, those relating to the physical and mental health of farming families and workers identified the need to develop and implement an innovative marketing and communications strategy for the program's outputs, to facilitate adoption of results and maximise the knowledge outcomes. • Annual data collected by Cotton Consultants Australia, which details inputs to production on the majority of cotton farms in the 2008–09 crop, provides producers and researchers with benchmarking information in relation to past and future crops.
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Rural Priority Supply chains and markets

Minister's Priorities Value chain effectiveness and efficiency; Maintaining and improving international market access opportunities

STRATEGIC PLAN R&D FOCUS Identify changes in national and international market and consumer requirements (including social and environmental concerns) regarding the integrity and safety of food and other products

PRINCIPAL ACTIVITIES 2009–10

- Surveys conducted at two levels of cotton use, the initial mill processing stage and the final brand owner stage, identified some of the building blocks required for a cohesive industry strategy for value-added placement of Australian cotton in suitable textile markets.
- Combining the Australian Cotton Conference with the Australian Cotton Shippers Association conference has reinforced the industry's awareness of the importance of producing high quality fibre that meets the needs of spinning mills.
- The Premium Cotton Initiative has a goal of understanding opportunities for new premium quality varieties to be marketed as a premium line of cotton. In 2009–10, R&D investments:
 - investigated how new fibre fineness and maturity measurement technologies (developed with CRDC investments) can be used by merchants in marketing Australian cotton;
 - undertook collaborative mill trials that showed mills' efficiency can be improved significantly by selecting Australian premium cotton types;
 - investigated opportunities for research into novel spinning technology, leading to future collaboration with Hong Kong Polytechnic University, CSIRO and Deakin University;
 - together with the Cotton Catchment Communities CRC, began evaluating how new spinning software, Cottonspec, can add value to Australian cotton;

- together with Cotton Australia and ACSA, established links with local brand owners to promote Australian premium cotton: two companies are now using Australian BMP cotton for new products;
- established links with Chinese company, Novotex, which has established a marketing strategy for promotion of Australian premium BMP cotton to market across selective fabrics to brand owners under their eco-products ranges.
- undertook a joint visit to mills in China with Australian Wool Innovation, which resulted in collaboration with two mills to promote Australian natural fibre fabrics. New cotton/wool fabrics developed and test marketed in key international markets;
- developed draft Best Management Practices (BMPs) for future integration into the industry's BMP system for transport, storage and handling, to ensure fibre quality through the value chain;
- continued refinement of BMP implementation in the ginning sector, with 22 gins recommended for certification, with 16 recertified and six audited for the first time.

National Priority Safeguarding Australia

Rural Priority Biosecurity

Minister's Priority Biosecurity

STRATEGIC PLAN R&D FOCUS

- Assist in minimising the risk of entry, establishment or spread of identified target invasive pests and diseases that could have major economic, social, health or environmental impacts
- Where practicable and cost-effective, assist to eradicate, contain, control or mitigate the impact of significant established invasive or endemic pests and diseases

PRINCIPAL ACTIVITIES 2009–10	<ul style="list-style-type: none"> • A survey of endemic disease problems across all cotton growing regions in the early and late stages of the growing season measured existing and potential problems. Despite positive signs from this survey, soil borne fungal diseases are some of the most recalcitrant problems facing the cotton industry in Australia. The annual disease surveys also provide the industry with an excellent surveillance system for early detection of potential invasive diseases and other pests. • For other diseases, such as Fusarium wilt, surveys of the 2009–10 season revealed very encouraging results, with the incidence of disease lower in all growing areas. Rather than a seasonal response, this appears to be closely linked to changes in R&D-led management. • The presence of the Solenopsis mealybug, <i>Phenacoccus solenopsis</i>, was confirmed for the first time in Australia in January 2010 in cotton crops in the Emerald region. Within a month CRDC, Cotton CRC and Cotton Australia brought together a working group to co-ordinate the activities occurring locally and across the industry to respond to the issue. As a result, severe crop infestation was confined to small areas in the Emerald growing region. • CRDC invested with Cotton Australia, Plant Health Australia and Biosecurity Queensland to develop the industry's first Biosecurity Manual for use by producers and their advisors to build awareness of the plant biosecurity system and the key diseases and insect pests considered to be potential threats to the industry.
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National Priority Frontier Technologies for Building and Transforming Australian Industries

Supporting the Rural Research and Development Priorities

I. Improve the Skills to Undertake Research and Apply its Findings

Minister's Priorities Workforce, skills, education; Diversity

STRATEGIC PLAN R&D FOCUS	<ul style="list-style-type: none"> • Constraints on availability and skills for research and innovation • Skills needed by producers to make the best use of research and innovation • Drivers and barriers to adoption of research and innovation by industries and in regional communities • Impacts of research and innovation on industries and regional economies, including on the viability of businesses and communities
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PRINCIPAL ACTIVITIES 2009–10	<ul style="list-style-type: none"> • Work with the Cotton Catchment Communities CRC developed a new R&D Adoption Framework for the cotton industry, which is more targeted, efficient, coordinated and transparent. • Completion of a new Best Management Practices (BMP) system, <i>myBMP</i>, which uses all information gathered under the BMP program over more than a decade but in a responsive, interactive online portal designed for individual growers' needs. <i>myBMP</i> is integrated with the new R&D Adoption Framework. • Co-investment with Cotton Australia and the Cotton Catchment Communities CRC in a General Manager of Best Practice and Research Implementation will allow coordination of the overall extension effort. • Investment in the Future Cotton Leaders program, Australian Rural Leadership Program and Aboriginal school-based traineeships is ensuring leadership skills in the cotton industry, wider agricultural sector and local communities. • The addition of a human resources module to <i>myBMP</i> rounds out the information needed to manage a profitable cotton enterprise. • The role of the National Cotton Training Coordinator has evolved into the Professional Development Manager (Cotton) and now provides leadership and coordination of the cotton industry's online and face to face learning systems, further aligns extension activities with the vocational education sector and develops new workforce initiatives.
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**PRINCIPAL
ACTIVITIES
2009–10**
(cont.)

- A collaborative investment in an Australian Government Primary Industry Centre for Science Education-supported program to attract students to agriculture and science-related university courses. Science and agriculture enrolments at two universities have increased markedly since they commenced their involvement with the program. A pilot project investigated opportunities to develop a cotton agribusiness
- Engagement strategy for greater research, development and extension involvement is leading to plans for enhanced delivery of R&D outcomes, agribusiness feedback on R&D priorities, support for focused and effective industry communications, especially with Crop Consultants Australia.
- A pilot attitudinal study in St George, Dalby and Narrabri identified the need to focus on regionally specific requirements in delivering human capacity investments at the farm and agribusiness level.
- Pilot projects with Tocal College and Australian Agricultural Colleges Corporation provided additional e-Learning capacity to add to existing face-to-face training. Field testing of the pilot projects began in May 2010.
- A pilot demonstration of the FarmPlus system for knowledge harvest showed that a purpose-designed searching system can capably aggregate contemporary information.
- CRDC organised a climate change R&D coordination workshop that identified R&D gaps, opportunities and priorities. Outcomes were presented at an industry forum on climate change the following month.
- CRDC and the Cotton Catchment Communities CRC held a Sustaining Rural Communities Conference in April 2010 to explore with local communities how both organisations can best invest in supporting sustainable communities. A second conference will build on findings in 2011.
- The second forum in CRDC's Value Chain series, the Post- Farm Gate forum, provided a unique opportunity for merchants, ginners, warehousemen, classers and trucking companies, as well as leading researchers, to gain a shared understanding of the industry's activities and value chain pressure points.
- The Field to Fabric training course, delivered once more in 2009–10, significantly raised industry awareness of the nature of cotton fibre, fibre markets and all processes that cotton undergoes 'from dirt to shirt.' A survey showed 92 per cent of participants had implemented changes in their workplace as a result of the course.
- CRDC supported 12 post-graduate student scholarships, including three which began in 2009–10. The knowledge gained from PhD projects assists the agronomic and environmental performance on-farm and provides environmental knowledge about cotton valleys, in addition to building future R&D capacity for cotton.
- Co-investment in the Undergraduate Studentship Program with other RDCs is attracting (and retaining) promising students in careers that will underpin the future viability of the agricultural sector.
- The Big Day Out in Cotton event, held at an innovative dryland cotton enterprise, enabled producers and consultants to help define future needs for knowledge and professional development in the industry.
- In 2009–10, the Recognition of Prior Learning (RPL) process led to ten more people receiving a Diploma of Agriculture – eight in Queensland and two in NSW – with the RPL assessment undertaken against BMP standards. BMP accreditation qualifies the diploma recipients for a Certified BMP Farm Manager Award. Seven Advanced Diplomas of Agriculture and/or Rural Business Management were also awarded in NSW: a very encouraging result for an industry newly exposed to the RPL vocational process.
- The Certified BMP Farm Manager Diploma, aligned to the Australian Training Framework, which began in 2008–09 and acknowledges prior learning on-farm, was selected in 2010 as a case study in a report developed for the International Labour Organisation, within the United Nations.

PRINCIPAL ACTIVITIES 2009–10 <i>(cont.)</i>	<ul style="list-style-type: none"> • CRDC collaboration with Nufarm Australia, the Grains R&D Corporation (GRDC) and Cotton Australia to map sensitive areas where cotton was planned helped to reduce off-target spray drift damage in the 2009–10 season by over 90 percent compared to the previous season. • CRDC investment in enhanced workshops on pesticide management has improved pesticide use industry-wide. • Women in the industry were provided with logistical support through Wincott (Women’s Industry Network – Cotton), and featured prominently in attendance at CRDC-supported courses. CRDC is investing in two Wincott R&D projects in 2010–11. • Young indigenous people were supported to gain office skills through a school-based traineeship program developed by CRDC, with the assistance of the Aboriginal Employment Strategy and the Cotton Catchment Communities CRC. Three graduated in 2009 and two more began traineeships in 2010. • 20 projects supported travel by individuals or groups to conferences, workshops, meetings and training, with a number of R&D projects also containing support for travel relating to the research.
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Supporting the Rural Research and Development Priorities

2. Promote the Development of New and Existing Technology

STRATEGIC PLAN R&D FOCUS	<ul style="list-style-type: none"> • Identification of critical points in the value chain that would benefit from a technological solution • Scanning of international research and innovation so Australia can adopt and tailor technologies to our requirements
PRINCIPAL ACTIVITIES 2009–10	<ul style="list-style-type: none"> • Commercial partners, BSE Electronics have combined two technologies, SiroMat (measures fibre maturity) and Cottonscan (measures fibre fineness), developed with CRDC investments. The new technology, Cottonscope, was released as a prototype in mid-2010 and will allow additional objective fibre quality measurement at mills and dyeing houses. • A new responsive, interactive online <i>myBMP</i> portal designed to meet individual growers’ needs has added to CRDC’s move to an online learning and knowledge environment, enhancing accessibility and relevance. • The introduction of ‘e-Pageturner’ technology is making CRDC publications and online resources more accessible, especially where broadband access is deficient.
	<ul style="list-style-type: none"> • CRDC is developing a range of initiatives to examine nano or micro particle treatments that may be used to achieve improvements, including the use of a nano-structured photochromic coating that could enhance and expand the applications of cotton products in areas such as premium high fashion products, summer cloth and sportswear. • Researchers at Deakin University’s Centre for Material and Fibre Innovation have developed a number of technologies that may offer a competitive advantage in developing new fabrics made from Australian cotton.

Minister’s additional priorities

Minister’s Priorities Collaboration; Evaluation	
PRINCIPAL ACTIVITIES 2009–10	Collaboration and evaluation have become major focuses of CRDC activities under the Strategic Plan 2008–2013. Please see the report on Efficiency and Effectiveness on page 14 for full details.

Composition of National Research Priorities attributed to each CRDC R&D Program 2009–10 (\$'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						
Expenditure																											
Program 1: Value Chain							11			41	886		247														1,185
Program 2: Farming Systems	419	130	440		130		329			849		430		11	60				2178								4,976
Program 3: Human Capacity	80		7				7			152			677	29	596				80								951
Total	499	130	447	130	130	347	347	41	1,887	41	1,887	677	40	656	656	2,258	2,258	2,258	2,258	2,258	2,258	2,258	2,258	2,258	2,258	7,112	

Composition of Rural Research and Development Priorities attributed to each CRDC R&D Program 2008–09 (\$'000)

Rural Research & Development Priorities (RRDP)	Productivity and Adding Value	Supply Chain and Markets	Natural Resource Management	Climate Change and Climate Variability	Biosecurity	Supporting the Priorities		Total
						Innovation Skills	Technology	
Expenditure								
Program 1: Value Chain	597	350		8			248	1,185
Program 2: Farming Systems	771		1,010	299	1,966	542	388	4,976
Program 3: Human Capacity	143	12	87	8	80	603	18	951
Total	1,511	362	1,097	307	2,046	1,145	654	7,112

NOTE: These tables exclude \$1,562,584.00 of R&D grant payments within the National Program for Sustainable Irrigation (NPSI), which became Program Four under a novation agreement during 2009–10 when CRDC assumed the role of NPSI Managing Agent. It also excludes untied grants and corporate research activities supporting R&D planning and adoption.

INCORPORATING STAKEHOLDER R&D PRIORITIES

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

Rural R&D Priorities

Australian Government
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

Cotton Australia

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

Strategic R&D Plan 2008–2013

Annual Operating Plan 2009–10

Annual Report 2009–10



Report of Operations

Report of Operations

RESEARCH & DEVELOPMENT

The R&D investment process

CRDC has a two-part procurement process in evaluating and forming R&D investment decisions. An online database system, Clarity, assists CRDC to manage all existing and future investments with the highest levels of probity while providing for in-depth analysis of its investment portfolios against a wide range of economic and management criteria, to the benefit of industry and government stakeholders.

The two-part process begins with calls for Preliminary Research Proposals nationwide in August/September each year, using advertising in national newspapers, research publications and on the Corporation's website. The deadline for receipt of Preliminary Research Proposals is 1 September.

The second phase is the request for Full Research Proposals, by late January, from those applicants whose Preliminary Research Proposal has satisfied the initial selection criteria, including alignment with the Corporation's strategic priorities.

At an annual budget meeting in March, the CRDC Board considers recommendations from management for R&D investment, inclusive of Full Research Proposals.

All Preliminary and Full Research Proposals submitted for the 2009–10 year were assessed

by CRDC's industry stakeholder, Cotton Australia, which reviews R&D performance and assesses and offers its recommendations on all Preliminary and Full Research Proposals. CRDC may also commission research where gaps or additional needs are identified in the portfolio of research investment. The Board also sets aside an amount for contingencies so that urgent research and development can proceed without undue delay.

Triple Bottom Line Reporting

CRDC Strategic R&D Plan 2008–13 and Annual Operating Plans are formulated to implement the Corporation's objectives and outcomes. A triple bottom line framework for reporting has been adopted in support of communicating performance.

These plans deliver one integrated outcome via three outputs:

- Economic: Profitability and international competitiveness
- Environmental: Sustainable production systems
- Social: Empowered people and communities

These planned outputs underpinned the scoping of planned investments, outputs and measures of success within each R&D program.



General Manager R&D Investment, Bruce Pyke



Manager R&D Implementation, Helen Dugdale

Program One VALUE CHAIN

Goal

Add value to the Australian cotton industry with premium products in improved routes to market

Strategic Objectives

- Develop contemporary knowledge and intelligence about products, markets and supply chains
- Develop improvements in current products
- Facilitate the development of novel products
- Advance cotton product processing
- Facilitate the development of objective measurement of Australian cotton fibre

Strategic Plan 2008–2013 Outputs/Measures of Success	Achieving Strategic Plan outcome: 2009–10 KPIs
<ul style="list-style-type: none"> • Markets, risks and opportunities for Australian cotton products are clearly defined and understood within the industry • New partnerships between industry, researchers and end-users • Post farm-gate best management practices are developed and adopted • New and improved products, processes and measurements. • Assessments of the competitive advantage of the Australian cotton industry 	<ul style="list-style-type: none"> • Competitive potential for an Australian premium class of cotton defined through surveys of mills. • Reports completed and contents communicated to industry. • Collaborations with mills established to objectively assess how Australian cotton is utilised in markets. • Ongoing reporting and information provided to working groups and industry. • Opportunities for Australian cotton from new classing and spinning systems identified, reports generated. • Contents evaluated and communicated. • Market potential for modified cottonseed and cottonseed oils clarified. • Reports generated, contents evaluated and communicated. • Warehousing BMPs developed and participants engaged for adoption. • Benefit communicated and results monitored and evaluated.

Outcome

High quality consumer-preferred Australian cotton products in the world marketplace



Value Chain Investment Manager, Dallas Gibb

Background

CRDC is a key driver of the Australian cotton industry's Premium Cotton Initiative (PCI), which involves partnerships across the cotton value chain to secure higher value markets for Australian premium cotton varieties. The PCI brings together CSIRO-bred varieties, which have delivered a range of superior fibre quality attributes, with new textile processing knowledge, Best Management Practices (BMPs) throughout the value chain and fibre measurement tools developed with CRDC investment.

The PCI is the major focus for the Value Chain Program and involves most of the strategic objectives and key investments discussed below.

Strategic Objective 1

Develop contemporary knowledge and intelligence about products, markets and supply chains

KEY INVESTMENTS 2009–10

- Premium Cotton Initiative
- Expert Paper: The future for Australian cotton in global markets

Understanding customer trends and demands

The focus of CRDC's post-farm gate R&D in recent years has been to understand customer trends and demands. In 2009–10, activities conducted by CRDC, Cotton Australia and the Australian Cotton Shippers Association (ACSA) have shown that a number of new premium market opportunities exist for Australian cotton as a whole and for Best Management Practice (BMP) cotton in particular.

These opportunities were identified through surveys conducted at two levels of cotton use, the initial mill processing stage and the final brand owner stage, to define some of the building blocks required for a cohesive industry strategy for value-added placement of Australian

cotton in suitable textile markets. Specifically, the study identified:

- key growth sectors within the broader textile and apparel market;
- key demand drivers within those textile sectors;
- key leverage opportunities available for Australian cotton at various points in the value chain;
- value chain participants perceptions and expectations regarding third party licensing and branding arrangements;
- supply chain maps for cotton textiles and apparel from spinning mill through to consumer.

It proved impossible to compare sector data from the domestic brand owner surveys accurately because of segregation and specialisation within textile sectors. International spinning mill surveys proved a more accurate measure of growth comparisons between textile markets. In total, 14 of the 17 spinning mills surveyed provided usable data for these comparisons.

With regard to fabric growth markets, the message derived was clear. Formal and business apparel achieved the lowest growth ranking of all sectors with a trend towards more casual wear.

Data collected in the survey showed that fully vertically integrated mills and major brand owners see value in programs such as the Australian cotton industry's BMP program, which fits well with their own corporate social responsibility goals; however, fabric and related garment quality remained critical to achieving any premium market, with environmental and social responsibility secondary considerations for the end consumer.

The second forum in CRDC's Value Chain series, the Post-Farm Gate Forum, was held at the Cotton Collective in Narrabri in August 2009 and for the first time brought merchants, ginner, warehouse, classers and trucking company representatives together with leading researchers. *Find more information on [page 91](#).*

Strategic Objective 2

Develop improvements in current products

KEY INVESTMENT 2009–10

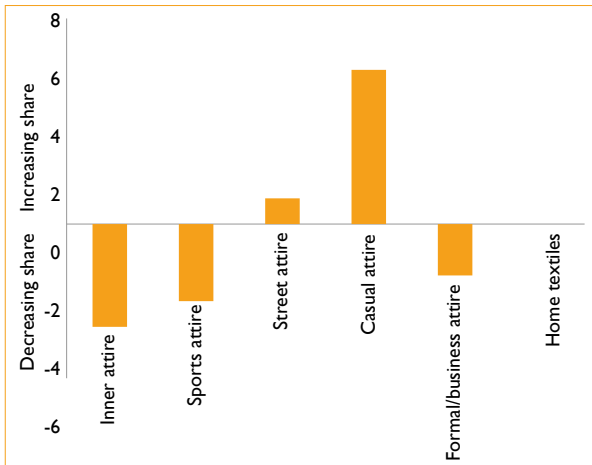
- Premium Cotton Initiative

Background

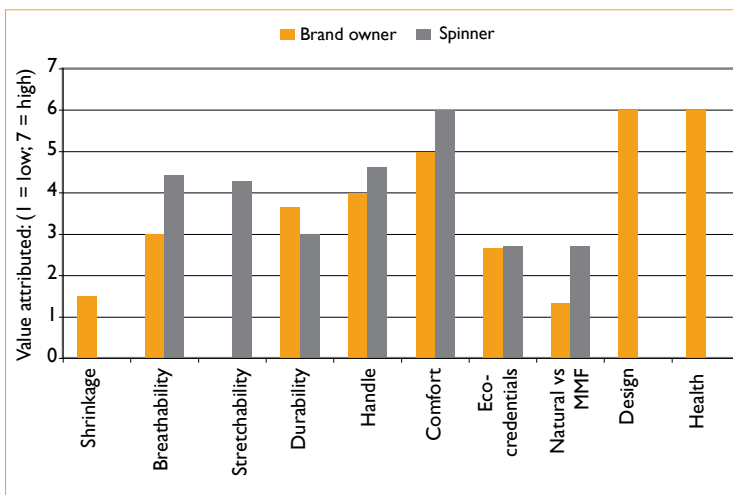
The key tangible and intangible intellectual property assets the industry can utilise to develop partnerships with mills and brand owners can be grouped under three key elements:

- The fibre and its properties;
- The technology and know-how to support use of the fibre and the Australian Cotton Story, and its relation to production efficiency;
- The implementation of BMP for overall environmental and processing management.

The PCI was established with the goal of understanding the market opportunities for new premium quality varieties: if a new premium class of cotton can be defined, it should be marketed not just as a commodity but as a separate premium line of cotton.



This graph demonstrates clearly that casual attire is showing not only the strongest overall growth compared with other key textile uses for cotton but also the strongest growth in terms of cotton's share of the segment. Textile sector growth was measured by asking mills to rank sectors from 1 to 6 in either direction of growth: increasing or decreasing market demand.



Analysis of subsequent data collected on demand drivers within the casual attire market clearly showed comfort as a common key parameter, with handle (qualities such as softness/stiffness, thickness/thinness, and roughness/smoothness) also universally considered important. The data show that mills and brand owners value eco-credentials equally. Brand owner respondents raised health and design factors independently.

In defining a new premium class of cotton, it was recognised that the industry’s BMP program also provided a range of tangible and intangible benefits for the promotion of Australian cotton, so it is important for BMP to be an inherent component of any premium class of cotton. By combining fibre quality and BMP, the PCI program targeted three core outcomes for the industry: strengthening the industry’s reputation for quality, promoting industry values in production and providing value across all key aspects of the value chain.

The business strategy

The business strategy is focused at three levels. The first and second strategies focus on

establishing collaborative product assessment and development programs with mills and fabric producers and the third is targeted at brand owners and the development of new markets for premium fabrics produced from BMP cotton.

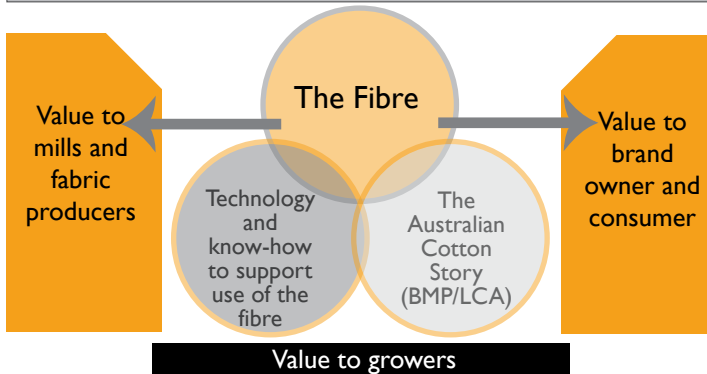
The fibre

CRDC investments under the PCI target the technical attributes of the cotton fibre that provide benefit to mills and to the fabric offered to brand owners. The fundamental basis for establishing a new premium class of cotton is the attributes used to define the fibre and the opportunity exists to establish a set of objective characteristics that are achievable for growers over the medium term. To add value

The Business Strategy



The Fibre



to the cotton being offered to mills, all key fibre properties will be provided to the mills, including measurement for neps, fibre fineness and maturity.

There is growing evidence that mills may improve spinning and/or fabric dyeing efficiency through use of new measurements of fineness and maturity developed with CRDC investment in new instrument technologies, SiroMat and Cottonscan. CRDC is working with the Australian Cotton Shippers Association (ACSA) to investigate how best the new fibre measurement can be used by merchants in marketing Australian cotton. The opportunity will be examined if a small base premium for supply of such cotton with improved objective measurements can be achieved.

Adding value to processing mills

For mills, the value in using premium cotton lies in improved spinning efficiency. Over the last two years, researchers from CSIRO Materials Science and Engineering (CMSE) have travelled to India, China and Thailand to conduct a number of collaborative mills trials with premium cotton types. This work includes assessment of fabrics developed from 100 per cent premium Australian cotton, as well as blends with other fibres, including pima cotton (*Gossypium barbadense* – extra long fibre cotton). The trials have shown that mills' efficiency can be improved significantly by selecting premium cotton types.

The first commercial trials, conducted in India in early 2009, showed that premium Australian cotton could be used to produce high quality fine count Ne 50-70 combed, ring and compact spun yarns (40–59 Ne are higher quality yarn, while 30–39 Ne are lower quality). Subsequent trials with mills in China and Thailand confirmed that premium cottons types suit the needs of high quality spinning mills.

The international trials also provide key feedback on areas where Australian cotton can be improved. Trials conducted in 2009–10 defined the micronaire and nep counts required to ensure evenness in fine count yarns. Surveys

of Australian crop harvested in 2009 showed average nep level were around 300 neps per gram – 50 per cent higher than the standard identified in the trials – and that short fibre content (SFC) was also too high. CRDC will work with ACSA members to ensure that nep count and SFC are key fibre measures used in the selection of bales to be classified as premium cotton.

To further assist mills to capture the value for Australian cotton, CRDC is investigating novel spinning technology. This work includes future collaboration with Hong Kong Polytechnic University, CSIRO and Deakin University. CRDC is also working with the Cotton Catchment Community CRC to evaluate how new spinning software technology, Cottonspec (see below) can best be used to add value to Australian cotton.

Linking BMP outcomes to the strategy

Recognition by local brand owners

CRDC investments in BMP link to the PCI by developing management procedures and guidelines for growers, ginners and classers, as well as the transport, storage and shipping sectors, to ensure that fibre quality is maintained. Investments in BMP guidelines for environmental management enable the industry to develop data on production performance and related natural resource management. Such information will provide key marketing material for brand owners.

Working collaboratively with Cotton Australia and ACSA, CRDC has established links with a number of local brand owners to promote Australian cotton and BMP cotton to consumers. The iconic Australian brand owner, Fletcher Jones, and manufacturer, Australian Weaving Mills, are each launching a range of products in 2010 under a new premium Australian cotton/BMP brand. The two companies expressed strong interest in promoting Australian cotton using the 'field to fabric' focus and the industry's BMP program. Labels developed by the industry will be the first major promotion of BMP to consumers

in Australia. Building on the success of these partnerships, the industry will work with further brand owners in other non-competing market segments.

International brand promotion

The Chinese company, Novetex, has established a marketing strategy for promotion of Australian premium BMP cotton, which it will market across selective fabrics to brand owners under its eco-products range. These fabrics are being promoted alongside organics, non-mulesed wool and cotton/wool natural fibre blended fabrics and were launched in New York in July 2010.

‘As part of Novetex’s continual research to offer new environmentally friendly products we have sourced a cleaner cotton that is more carefully grown and kinder to the planet.

‘This cotton is grown in Australia and along with being a high quality, beautifully soft cotton it is also valued for its environmental, economic and social contribution.’

From the opening statement for the Novetex promotion

Cotton/wool collaboration

Although not apparent in surveys of brand owners, key mill partners are particularly interested in promoting natural fibre fabrics. Collaboration has been established with Australian Wool Innovation to explore this opportunity.

A joint visit to mills within China has resulted in collaboration with two mills to promote Australian natural fibre fabrics. In some cases, new cotton/wool fabrics will be developed and test-marketed within the key international markets of Asia, Japan, the USA and Europe. CRDC investments within the program will examine fabric design and properties relating to the use of different fibre quality inputs, fabric finishes and treatments.



KEY INVESTMENT 2009–10

- **Classing, Ginning and Warehousing BMPs**
CRDC investments in post-farm gate BMP had focused on the ginning and classing sectors; however, over the last 12 months, draft BMPs for transport, storage (warehousing) and handling have also been developed. Key topics covered within the new BMP guidelines include bale integrity related to shape, moisture, coverings, ties and identification; loading techniques; transport standards; and storage and stacking guidelines.

From the perspective of storage, handling and marketing, uniformity of bale packaging will add value to the entire crop, creating efficiencies throughout the supply chain and providing ‘delivery confidence’ for customers. Surveys of key mills showed only a few countries still used jute/hessian; however, it is still used for 60 per cent of the Australian crop, with the rest wrapped in cotton.

In continuing to refine BMPs for the ginning sector, a total of 26 gins were assessed to determine their compliance with the BMP Handbook for Ginning version 6.0, dated March



2010. As a result, 22 gins have been recommended for certification by Cotton Australia: 16 for recertification and six for the first time.

Strategic Objective 3

Facilitate the development of novel products

KEY INVESTMENT 2009–10

- Market potential for modified cottonseed oils
- CRDC investments in CSIRO research into healthier cottonseed oil have centred on the potential for commercial development of 'healthier' high oleic cottonseed oil derived from genetically modified cotton plants. Seeds harvested from the Australian Government's

Key comments recorded from some of the mills surveyed were that cotton bale coverings (above, left) are preferred to jute/hessian coverings (below, left) because they create less contamination and are easy to dispose of. The new BMPs will support the industry's intentions to use cotton coverings for the majority of bales.



Wee Waa cotton grower James Kahl explains the growth habit of Australian varieties to Esquel's Tian Ye and Fletcher Jones' Paul Shannon. Fletcher Jones is working with Esquel – world-leading spinners in China – to produce world class garments using high quality Australian cotton and wool wherever possible.

Office of the Gene Technology Regulator-approved field trial in 2009 will be processed in 2010 for use in cottonseed oil trials and food service sector trials, such as frying tests.

As well as providing advantage for the food service sector, cottonseed provides a key protein source as an animal feed supplement. Due to high level of the natural plant toxin, gossypol, in the seed, the use of cottonseed as a protein source has mainly been restricted to ruminants; however, recent research in the USA has developed cottonseed with reduced levels of gossypol. Cottonseed which combined high oleic levels with low levels of gossypol would have significant market potential and could be used as a protein source not only for all key stockfeed for the livestock, dairy, pork, poultry and aquaculture sectors but also for human consumption. This would benefit farmers in developing countries by providing a source of food and marketable protein grain as an addition to the income from cotton fibre. CRDC is in discussion with CSIRO and Cotton Incorporated in the US to investigate opportunities for the Australian and US technologies to be combined.

KEY INVESTMENT 2009–10

- New markets for Australian cotton with novel spinning technology

The fabric industry continues to develop innovations in fabric treatments that improve function and durability. CRDC is developing a range of initiatives to examine nano or micro particle treatments that may be used to achieve improvements. Researchers at Deakin University's Centre for Material and Fibre Innovation have developed a number of technologies that may offer a competitive advantage in developing new fabrics made from Australian cotton.

One technology under assessment is the use of a nano-structured photochromic coating to achieve novel colour changing effects on cotton fabrics. Coated fabrics not only exhibit very fast photochromic colour change but also provide additional ultraviolet protection. Applying this photochromic material to cotton fabrics could enhance and expand the use of cotton products

in areas such as premium high fashion products, summer cloth and sportswear.

As well as new nano treatment, the use of different structural fabric finishes can improve the function of fabrics. A new collaborative project with an international mill, CSIRO, Deakin University and Australian Wool Innovation will examine the development of new thermal fabrics designed for different markets sectors through the development of different thermal rating. Market research by project partners has indicated that there is growing demand for such new fabrics, particularly for casual business style clothing.

Strategic Objective 4

Advance cotton product processing

KEY INVESTMENT 2009–10

- Agronomic management to optimise textile performance

A major collaborative project with the Cotton Catchment Communities CRC has investigated the key agronomic factors that affect fibre development and subsequent spinning efficiency. One important component assessed in 2009–10 has been the effect on fibre quality of crop conditions at the time of harvest. The work has shown that harvesting a crop that has a high level of immature bolls can have a significant effect on nep content detected past the ginning phase and through the spinning process. Defoliation of a crop with more than 50 to 60 per cent immature bolls was shown to increase nep levels and reduce fibre micronaire, fibre fineness and crop yields. Nep content is an area where Australian cotton must improve its performance and this project provides valuable knowledge about possible on-farm causes.

KEY INVESTMENT 2009–10

- Industrial testing and commercial development of sensors in cotton gins

Moisture management is a fundamental problem in the ginning process: as the cotton dries, it becomes more prone to damage. One key

problem in maintaining moisture has been a lack of accurate measurement of moisture before and after ginning. CSIRO researchers, in a joint investment with CRDC in a Cotton Catchment Communities CRC project, have developed a new moisture sensor. A provisional patent has been lodged for the technology and preliminary discussions have taken place with a potential commercial developer.

The opportunity also exists to combine the sensor with a new cotton flow system being developed as part of a project investigating changes to the lint cleaner. A change in the method of the flow of cotton from the gin stand may enable more effective techniques to be developed for adding moisture to cotton prior to cleaning. The new sensor is expected to play a key role in automating any new moisture management system developed for gins.

KEY INVESTMENT 2009–10

- Investigate new SFC measurement in Australian cotton

As discussed above, neps and short fibre content (SFC) are the key fibre defects monitored by international mills because of their major impact on the quality of the fabric produced. While Australia has a reputation for high quality cotton, the levels of neps and short fibre content (SFC) remain a concern for the industry. As a result of a CRDC investment, data collected by CSIRO has found higher neps levels than expected: a problem that will need to be addressed if the industry wishes to develop higher premiums in the future.

Data developed from the survey of some 1200 cotton samples was analysed in 2009 using different ginning techniques and, where possible, traced back to individual farms and growing regions. This data will provide better guidance as to the key factors leading to these problems and, in turn, provide an indication of where to best target future research.

KEY INVESTMENT 2009–10

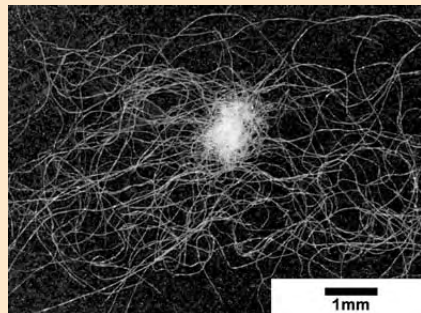
- Investigate the relevance of classing grade on textile processing and quality

The subjective classification of cotton according to established standards or grades, such as United States Department of Agriculture grade boxes, is based primarily on colour (colour grade), visible trash (leaf grade) and preparation (degree of smoothness or roughness of the cotton sample) and often forces the gins to over-clean the fibre to achieve a higher grade and a better price for the cotton grower. This practice is often to the detriment of fibre quality, processing performance and, ultimately, the value of cotton as a raw material for textiles. In fact, subjective grades are often such a poor indicator of the true spinning value of the fibre that some spinning mills offer price premiums for cotton that is harvested, ginned and shipped to their strict specifications.

A study conducted by CMSE in 2003 found that minimum cleaning at the gin results in cotton

What is a nep?

A nep is a small knot or cluster of entangled fibres, consisting either entirely of fibres or of foreign matter such as seeds, leaf and grit, entangled with fibres. The formation of neps is dependent on cotton lint characters as well as on the mechanical handling of the fibre from the field to the yarn. In unginned cotton, neps are typically associated with malformed seed, unfertilised ovules and dead seed.



with a higher dust and trash percentage and, consequently, a lower classing grade; however, fibre properties from the perspective of textile processing performance (staple length, length uniformity, SFC and nep content) are improved.

A project established in 2009–10 with CMSE aims to build on the results of the 2003 study and gain a clearer understanding of the effect that classing grade has on the processing performance in relation to yarn and fabric quality. Two lots of cotton bales were purchased from two commercial cotton ginneries for processing: one with classing grades ranging from colour grade of 21–31–41 with a trash grade of two and the second with classing grades ranging from a colour grade of 51–41–31 with a trash grade of five. Processing of these two lots into yarns and fabrics will give a good indication of the significance of classing grade on textile processing and quality.

Strategic Objective 5

Develop objective measurement of Australian cotton

KEY INVESTMENTS 2009–10

- Objective assessment of Australian cotton fibre
- Technical support of SiroMat in the Australian market

CRDC has invested more than one million dollars in the development of two new objective fibre measurement technologies over the last six years. The first, SiroMat, which measures fibre maturity, began commercial development in 2009. The second, Cottonscan, assesses fibre fineness and was licensed for commercial development in early 2010. Commercial partners, BSE Electronics, have combined the technologies into one machine and released its first prototype in mid-2010 under the name 'Cottonscope' and will promote it to local and international classing houses and mills. To optimise the benefits for industry, the technologies will be used to offer an additional



Textile researcher René van der Sluijs (CSIRO) with the newly developed Cottonscope, which measures fibre fineness and maturity appropriately for the first time using technologies developed at CSIRO Materials Science and Engineering

objective measurement to mills and dyeing houses.

The development of improved spinning software technology by the Cotton Catchment Communities CRC utilises the new measurements and the new fibre fineness values have been shown to improve the prediction of yarn evenness and strength better than values by other methods such as AFIS (Usters Advanced Fibre Information System) or HVI (High Volume Instrument) micronaire measurement.

2009–10 contribution to Program One Strategic Plan outcome

NOTE: In addition to detailing progress against its Strategic Plan 2008–13 planned Program One outcome, CRDC also addressed the Department of Finance Operation Sunlight key performance information for 2009–10, as submitted in the Portfolio Budget Statement. Please see *Appendix Two: Operation Sunlight key performance information 2009–10*, on [page 149](#).

AOP 2009–10 Performance Indicators	Key Inputs	Outputs
Competitive potential for an Australian premium class of cotton defined through surveys of mills. Reports completed and contents communicated to industry.	Surveys conducted at two levels of cotton use: the initial mill processing stage and the final brand owner stage.	Surveys identified building blocks required for a cohesive industry strategy for value-added placement of Australian cotton in suitable textile markets. Information communicated at Post-Farm Gate Forum and scheduled for 15th Australian Cotton Conference in August 2010.
Collaborations with mills established to objectively assess how Australian cotton is utilised in markets. Ongoing reporting and information provided to working groups and industry.	Collaborative mills trials for premium cotton types conducted. Investigation of novel spinning technology.	Trials showed that mills' efficiency can be improved significantly by selecting premium cotton types. Novel spinning technology investigation leading to future collaboration with Hong Kong Polytechnic University, CSIRO and Deakin University. Information on mill surveys and collaboration communicated at Post-Farm Gate Forum. Value Chain session and forum scheduled for Australian Cotton Conference in August 2010. Value Chain information provided in <i>Spotlight</i> magazine.
Opportunities for Australian cotton from new classing and spinning systems identified, reports generated. Contents evaluated and communicated.	A project to gain a clearer understanding of the effect that classing grade has on the processing performance.	Project ongoing. Cotton bales purchased: processing will indicate significance of classing grade on textile processing and quality. Value Chain information provided in <i>Spotlight</i> magazine. Value Chain session and forum scheduled for Australian Cotton Conference in August 2010.
Market potential for modified cottonseed and cottonseed oils clarified. Reports generated, contents evaluated and communicated.	Continuing assessment of market potential for healthier cottonseed oils.	Seeds with higher (healthier) oleic acid levels harvested from OGTR-approved field trial in 2009 for use in cottonseed oil trials. Cotton Incorporated (USA) has bred cottonseed with reduced levels of gossypol, CRDC is in discussion with CSIRO and Cotton Incorporated to investigate opportunities for the technologies to be combined to provide protein source for all key stock feed for the livestock, dairy, pork, poultry and aquaculture sectors and for human consumption.
Warehousing BMPs developed and participants engaged for adoption. Benefit communicated and results monitored and evaluated.	Development of draft BMPs for storage (warehousing).	Draft warehousing BMPs incorporated into post-farm gate BMP system for evaluation in 2010–11.

Program Two **FARMING SYSTEMS**

Goal

Cotton in a highly productive farming system with improved environmental performance

Strategic Objectives

- Build the industry's understanding of climate and natural resource challenges
- Enhance the capacity of the industry to adopt resilient and adaptive farming systems
- Protect industry from biosecurity threats

Strategic Plan 2008–2013 Outputs/Measures of Success	Achieving Strategic Plan outcome: 2009–10 KPIs
<ul style="list-style-type: none"> • Climate and natural resource management risks and opportunities for Australian cotton producers are defined and understood • Climate and natural resource policy implications are interpreted • Collaborations and partnerships within and between rural industries delivering innovation, capacity and knowledge for farming systems • Benchmarking, assessing and reporting on productivity and environmental performance of cotton farming systems • An industry capable of managing its biosecurity responsibilities 	<ul style="list-style-type: none"> • Enhanced capacity to measure greenhouse gas emissions • New protocol for measuring nitrogen use efficiency tested on farms in five regions • Collaborative farming systems research program established in coastal North Queensland • New methods for improving refuge crop efficacy evaluated and communicated to industry and producers • Increased industry participation in ongoing changes in pest resistance to insecticides and Bt cotton • Evidence of adoption of innovative farming system practices • Farming systems research gaps identified and future investment priorities detailed • New collaborative farming systems R&D with Rural R&D Corporations

Outcome

A more resilient, profitable and competitive cotton farming system



Farming Systems Investment Manager, Tracey Leven

Strategic Objective 1

Build the industry's understanding of climate and natural resources challenges

KEY INVESTMENT 2009–10

- Measuring greenhouse gas emissions in irrigated cotton/grain farming systems

The Australian Government's Nitrous Oxide Research Program aims to develop knowledge, monitoring tools, and management strategies to assist agricultural producers to reduce their greenhouse gas emissions without loss of productivity. It will also develop nationally standardised methodology for the collection of data on nitrous oxide emissions from agricultural soils.

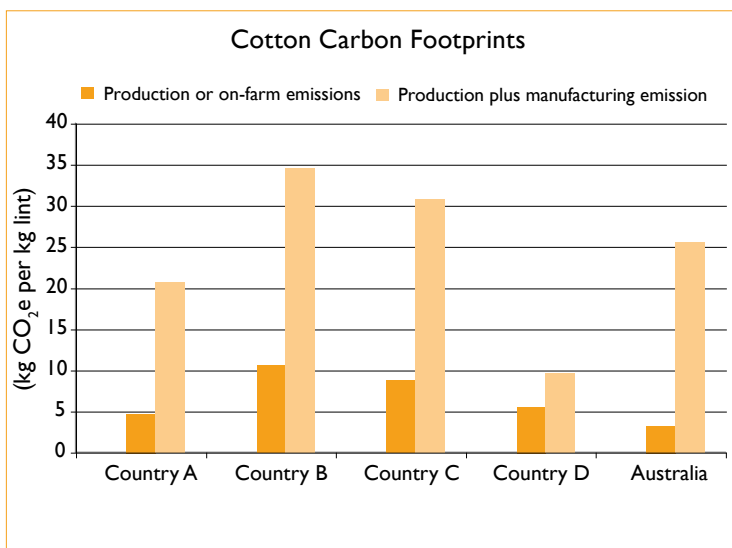
CRDC is a member of the Steering Committee, along with Nitrous Oxide Research Program member agencies. Its role is to monitor and evaluate the implementation of the research program on behalf of the investing agencies.

As part of this research program, a detailed field experiment assessing nitrous oxide emissions across a range of irrigation scheduling treatments is underway at Kingsthorpe, on the

Darling Downs in Queensland. This builds on earlier CRDC research investments into the study of greenhouse gas emissions in irrigated cotton systems at other research sites.

A project to benchmark and reduce greenhouse gas emissions and improve resource use efficiency has found that nitrous oxide losses from a wide selection of cotton growing soils of Australia is still broadly within the emission factor determined by the Australian Government for cotton systems. The project has developed a relatively simple way to estimate a field's nitrous oxide emissions in the laboratory or, at the very least, identify soils that have a high potential to lose nitrous oxide. Benchmarking can now be done in two days, compared with the full 17-day assay.

The project also found that the increased inputs of carbon into soil from grain-based crops within the system, whilst essential for soil structure and soil carbon sequestration, also increase the potential for gaseous nitrogen losses. This demonstrates that mixed cotton-grains systems require sophisticated management of nitrogen fertiliser to minimise losses.



Preliminary estimates for some major cotton producing countries compared to Australia. As can be seen in this graph, Australia has the lowest carbon intensity per kilogram of cotton lint produced on-farm. However, as almost all of Australia's production is spun and manufactured overseas, particularly in China, the carbon intensity per kilogram of the manufacturing phase is affected by the source of electricity used in those countries.

In July 2009, CRDC worked with the National Climate Change Research Strategy for Primary Industries (CCRSPI) to organise a workshop on the impact of climate change on the cotton industry. A key outcome was a set of priorities for future R&D and communication on climate change for the cotton industry. *Find more information on [page 91](#).*

A paper by CRDC researcher, Dr Ian Rochester (CSIRO), *Sequestering carbon in minimum-tilled clay soils used for irrigated cotton and grain production*, to be published in the journal *Soil Biology and Biochemistry*, contributes new information on carbon sequestration in modern high-yield cotton and grain production systems in Australia and some insight into how farm managers can improve their soil fertility by adopting better management practices to conserve stubble and sequester carbon. A provisional patent has been prepared within this project that will allow growers to adjust their fertiliser management according to their cottonseed nitrogen analyses.

KEY INVESTMENT 2009–10

- Understanding soil water balance and deep drainage

CRDC has invested in research, development and extension to understand and reduce deep drainage (the loss of water beyond the root zone) for more than a decade. As a consequence, Australian cotton growers are gaining a greater understanding that it is essentially a natural process that helps to move salts through the soil profile and thus must be allowed for within water budgets. The research has shown that inefficient irrigation management or poor siting of on-farm water storages can lead to drainage in excess of natural events. On the other hand, adoption of highly efficient irrigation systems can lead to limited drainage and, depending on the quality of water applied, could, in the long term, lead to accumulation of salts in the sub-soil.

International Cotton Advisory Committee

CRDC's General Manager R&D Investment, Bruce Pyke, was a member of Australia's delegation to the 68th plenary meeting of the International Cotton Advisory Committee (ICAC), held in South Africa in September 2009. In recognition of the role CRDC investments and involvement play in agricultural greenhouse gas research in Australia, he was invited to present a paper at a breakout session on *The Impacts of Carbon Trading on the Cotton Industry*.



Australia's delegation to the plenary meeting had strong CRDC connections. At the back are Cotton Australia CEO (and former CRDC Director) Adam Kay, former CRDC Executive Director and cotton industry pioneer Ralph Schulzé, CRDC Chair Mike Logan and CRDC General Manager R&D Investment Bruce Pyke. In front are Queensland Cotton Chief Executive Richard Haire and Peter Ottesen of the Department of Agriculture, Fisheries and Forestry, with Terry Townsend, Executive Director of ICAC.

Strategic Objective 2

Enhance the capacity of the industry to adopt resilient and adaptive farming systems

Investments addressing this strategic objective seek to ensure that the cotton farming system continues to evolve. The capacity to respond and adapt to changes in environmental conditions and soil and water resource constraints using new R&D-driven knowledge,

practices and technology underpins resilience and helps to maintain the Australian cotton industry's competitive advantage as an efficient, environmentally responsible producer of high yielding, high quality cotton.

KEY INVESTMENT 2009–10

- Dynamic deficits – matching irrigation to plant requirements in a variable climate

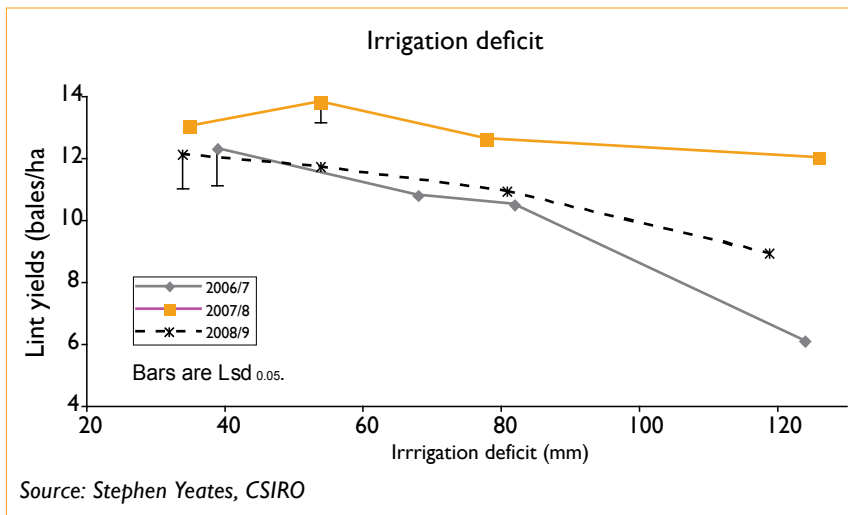
Newly completed research into the most efficient way to irrigate Bollgard II® cotton have demonstrated that irrigation deficits can be varied to improve cotton yields and water use efficiency (WUE) when measurements of plant stress are available to assist in making irrigation decisions. Changes in vapour pressure affect the level of stress cotton plants experience, irrespective of the level of soil moisture. Stress will be less during periods of lower vapour pressure deficits, allowing irrigations to be delayed without impacting yield under these conditions and resulting in higher WUE. The need to avoid water-stressing Bollgard II® cotton

varieties during late flowering has also been confirmed in this research. Yield losses per day of stress were double those of the conventional variety at the same growth stage.

CRDC, together with CSIRO, is investing in a new project to continue to explore the feasibility and reliability of using evaporative demand as a trigger for dynamic deficit irrigation scheduling. The project seeks to identify predictive means of applying this knowledge, needed to enable broad commercial adoption. The 2009–10 season was characterised by long periods of low evaporative demand, providing excellent conditions to evaluate the magnitude of water savings from dynamic deficit strategies.

KEY INVESTMENT 2009–10

- Crop Consultants Australia annual survey
CRDC supports this survey as an important means of ascertaining 'on the ground' conditions to help to determine the directions for future agronomic research. Twenty three consultants responded to the qualitative survey, conducted



This graph shows the lint yield (b/ha) response of high fruit retention Bollgard II® cotton to irrigation deficit (millimetre of plant-available soil water removed at the time of irrigation) over three seasons. Where the 2006–07 season had high evaporative demand and low in-crop rainfall, in 2007–08 evaporative demand was below average and in-crop rainfall above average. In 2008–09, evaporative demand was high during flowering. The soil water deficit was calculated as the soil water extracted from the drained upper limit.

in 2009–10 but relating to the 2008–09 season, representing about 50 per cent of total hectares planted and 379 growers, with at least one consultant from each valley.

Integrated pest management (IPM) has been an R&D and extension focus for CRDC for some years and the survey found that approximately 68 per cent of these growers have implemented IPM in that season. IPM uses a locally appropriate combination of agronomic non-chemical tools with the aim of reducing insecticide use while maintaining profitability, yield and fibre quality.

Significant improvements are evident in a range of practices to improve soil quality and health, including the use of soil management best practice, minimum or zero tillage and the use of leguminous crop rotation to improve soil nitrogen.

The survey found that improvements to irrigation efficiency have mainly been made in pumping efficiency, reducing storage seepage and evaporation, scheduling techniques, storage surveys and EM surveys (which ascertain salinity levels).

Other information gleaned from the survey includes:

Insect management

The survey found that mirids were less prevalent in 2008–09 compared to the 2007–08 season, but Silverleaf whitefly and stinkbugs were more prevalent. *Helicoverpa* spp. levels remained much the same. While *Helicoverpa armigera* and *H. punctigera* were the principal insect threats to profitability prior to the introduction of GM Bt cotton varieties (INGARD® cotton varieties with a single gene of resistance to *Helicoverpa* was introduced in 1996 and superseded by Bollgard II® varieties with two resistance genes, introduced in 2003); sucking pests not controlled by the Bt genes, such as mirids and whitefly, are now the main insect threats.

Disease prevalence

Although Fusarium wilt prevalence remained mainly unchanged in 2008–09, it remains the

most common disease threat to profitability. Black root rot was less prevalent.

Weed management

Volunteer (self-sown) cotton levels were about the same as the previous twelve months, while Fleabane weed was more prevalent and remains the principal weed threat to profitability. The use of all weed control methods had been reduced compared to five years ago, except for glyphosate used in-crop. This is almost certainly explained by the widespread adoption of Roundup Ready® and Roundup Ready Flex® cotton varieties.

Find more information on insects, diseases and weeds under Strategic Objective 3 on [page 71](#).

KEY INVESTMENT 2009–10

- Big Day Out: helping the industry build adaptive and resilient farming systems

The CRDC/Cotton Catchment Communities CRC Big Day Out in Cotton, held in March 2010 on the Darling Downs, proved once again to be a significant event for showcasing the role innovation plays in building adaptive and resilient cotton farming systems. Hosts in 2010 were Jamie and Susie Grant, of 'Keilli', winners of the 2009 Innovative Cotton Grower of the Year Award. The day followed the successful format of last year's Big Day Out, with key industry researchers present to explain the scientific principles behind various aspects of this farming system.

The cotton farming system at Keilli is exclusively dryland, with no access to, or development for, irrigated production; however, attendance on the day included irrigated cotton producers from Central Queensland and the Macquarie, Namoi, Gwydir and MacIntyre valleys interested to see how consistent, profitable yields can be achieved without irrigation.

A follow up survey of participants, several weeks after the event, has helped CRDC to understand exactly how an event such as this adds value to the industry.

KEY INVESTMENT 2009–10

- Continued improvement of cotton nutrition diagnosis and nitrogen use efficiency

Over several seasons cotton extension officers, in collaboration with Dr Ian Rochester, CSIRO, have collected nitrogen use efficiency (NUE) data, from Emerald (4 sites), Darling Downs and Goondiwindi (13 sites), Warren (9 sites) and Hillston (3 sites).

Results from these regional NUE monitoring sites were presented at an industry forum in August 2009, in CRDC's *Spotlight* magazine and

in the *Australian Cottongrower* magazine. These results show that there is an opportunity to improve NUE significantly in the cotton industry and additional resources have been allocated to the Development and Delivery team to achieve this. This includes the provision of data from both research and the NUE monitoring on cotton farms to assist the revision of the NutriLOGIC decision support program. This new information will allow crop managers to more easily assess soil and plant tissue test data with accepted nutrient levels derived from high-yielding cotton crops.

The Big Day Out in Cotton: aiding innovative thinking

“We have to think of ourselves as moisture farmers. This is where practices like zero till, controlled traffic, well managed fallows and the use of cover crops really make the difference”

Jamie Grant
‘Keilli’



BDO participants examine the dryland cotton crop on ‘Keilli’, grown using only rainfall. A clear understanding by the Grants of their soil – its water holding capacity, nutrient levels and requirements and soil biology – is a major part of their successful cotton farming system.

Work has also continued on the field calibration of a new test for cottonseed nitrogen, which can be correlated with nitrogen use efficiency. If this test proves to be robust, a commercial service can be envisaged which would provide a simple measure for cotton growers to obtain estimates of NUE and thus use this information to improve their nitrogen management decision making for subsequent crops.

KEY INVESTMENT 2009–10

- Defining critical soil nutrient concentrations in soils supporting irrigated cotton in northern NSW and Queensland

Soil nutrients, in particular phosphorus (P) and potassium (K), are being depleted in the clay soils supporting the grains and cotton industries of northern NSW and Queensland, especially in the deeper layers of the soil profile. Current commercial soil tests used to measure these reserves do not detect some of these changes because previously unrecognised pools of nutrients have been replenishing those measured by the extractants.

A small preliminary project conducted in 2009–10 assessed the potential of new diagnostic tests to clearly identify sites with low levels of available P and K where future fertiliser trials

could be conducted. The project was also part of an initial assessment of the variability in P and K reserves in different soils and cropping systems across the region. Findings will feed directly into a joint GRDC and CRDC project in which laboratory, field and glasshouse studies will develop new guidelines to ensure profitable use of P and K fertilisers, as well as long term sustainability of grains and cotton farming systems.

KEY INVESTMENT 2009–10

- The development of sustainable cotton farming systems for coastal north Queensland

In recent years, research conducted by the Queensland Department of Employment, Economic Development and Innovation (DEEDI), through the Cotton Catchment Communities CRC, found that cotton could be grown in the Burdekin region of north Queensland, with significant yield potential. Cotton would represent a new crop in the sugarcane cropping system that dominates irrigated agriculture in this region.

The evident commercial potential of cotton in the region, together with the region’s secure supply of irrigation water, has led CRDC to



Researchers Stephen Yeates (CSIRO) and Paul Grundy (DEEDI) in the Burdekin region, where cotton is being investigated as a new crop in the existing regional farming system.

work with the original project partners and CSIRO to expand the breadth of the research undertaken in this region to include managing the risks that annual cropping could pose to the region's natural assets and maximising both water and nutrient use efficiencies in the newly emerging farming system. Experiments have been established on clay and sandy textured soils in the region, measuring nitrogen efficiency in cotton following sugarcane, maize, mungbean cover crop or millet cover crop. The first year experiments concluded in July 2010, with sites used for quantifying farming systems impacts kept active for the duration of the project.

Strategic Objective 3

Protect industry from biosecurity threats

KEY INVESTMENT 2009–10

- The ecology and sustainable management of soil-borne fungal diseases

Supported by CRDC investments, cotton pathologists from Industry and Investment NSW (I&I NSW) and DEEDI surveyed endemic disease problems across all cotton growing regions in the early and late stages of the growing season. Survey results show 2009–10 to have been a mixed season. Some diseases such as boll rots caused higher production losses than average;

however, the outcome was primarily due to unusual seasonal conditions.

For other diseases, such as Fusarium wilt, the survey revealed very encouraging results, with the incidence of disease lower in all growing areas. Rather than a seasonal response, this appears to be closely linked to changes in R&D-led management. In the worst affected region, the Darling Downs, sowing was delayed between two and four weeks to minimise the likelihood of cold stress exacerbating disease. Across the industry there was widespread use of varieties with high F-ranks, which denote the level of Fusarium resistance. Bion® seed treatment, developed with the support of CRDC investments, was used on more than half the crop area.

Understanding the prevalence and spread of diseases is an important part of protecting the industry, and the nation, against invasive pests. Despite positive signs from this season's survey, soil borne fungal diseases are some of the most recalcitrant problems facing the Australian cotton industry. The pathogens causing Black Root Rot, Verticilium wilt and Fusarium wilt all survive for long periods in the soil. In order to realise the gains that can be made through varietal tolerances for the wilt diseases and seed treatments over the long term, the industry needs complementary management practices.



Research program leader, Dr Allison Seyb (I&I NSW) analyses cotton roots using the WhinRhizo, which measures diameter, volume, surface area, length and branching of roots and differentiates between healthy and diseased roots.

This has driven new investment with I&I NSW to gain a greater understanding of the ecology of these pathogens within cotton farming systems and provide a basis for improved management practices. In its first season, the project team has gathered information about the diversity of spore production and survival of spores under differing soil conditions, investigated capacity of repetitive spore germination events and evaluated the effects of different winter crops on pathogen survival in field conditions.

KEY INVESTMENT 2009–10

- Managing weeds and herbicides in a genetically modified cotton farming system

Years of work by the DEEDI weeds research team culminated in 2009–10 in the launch of a web-based herbicide resistance risk assessment tool for growers and their advisors, collaboratively funded by CRDC, DEEDI, the Grains R&D Corporation (GRDC) and Monsanto. The tool can be used to quantify the risk of glyphosate resistance developing in any field, on any farm and in any cotton growing region and has relevance to the full range of cotton and grains farming systems in Queensland and NSW. The creation of the tool draws upon knowledge gained from CRDC-supported PhD studies and research projects during the past eight years. The availability of the tool, which can be found at www.dpi.qld.gov.au, comes at a critical time, with use of the diversity of weed management tactics in decline in cotton production.

As cotton and grain farming systems have become more integrated in the past decade and cotton growers have adopted the minimum tillage practices of their dryland neighbours, much has changed in weed management. While the availability of Roundup Ready Flex® technology has seen a simplification of weed management in the crop, greater complications have arisen in herbicide choices for fallow management and weed control in rotation crops. The intermingling of different farming systems sees occasions when cotton crops suffer herbicide damage. The cotton industry has only limited knowledge of how crops are likely to

respond once damaged and how management could be altered to reduce the impact of such damage. New investment with I&I NSW seeks to expand knowledge of cotton response to herbicide damage through a study of symptoms displayed by cotton following application/s of low doses of herbicide, to determine whether impacts can be reduced.

KEY INVESTMENT 2009–10

- Developing industry capacity for BMP in spray application

Previous investments in this area have sought to address problems of spray drift in recent seasons with some success. However, a new, more holistic project established in 2009–10 has been formulated to deliver workshops on best practice spray application, tailored to meet the specific needs of growers in a local district or on a regional basis. CRDC's investment is complementary to an investment by GRDC that covers grain growers. A CRDC/GRDC steering committee ensures that there are synergies between the two industries, including consistency in communication to farmers. The project also collaborates with the Vocational Education Training (VET) sector to increase the technical competence of trainers delivering spray application workshops across the agricultural sector.

KEY INVESTMENT 2009–10

- Continued investigations to improve management of emerging pests and integrated pest management (IPM) in Bollgard II® cotton

The presence of the *Solenopsis mealybug*, *Phenacoccus solenopsis*, was confirmed for the first time in Australia in January 2010, in cotton crops in the Emerald region. This species attacks a wide range of cultivated plants, including cotton, fruit, vegetables, ornamental plants and weeds. Although mealybugs are usually only a minor pest of cotton, occasionally populations increase and 'hotspots' of infestation occur. Adults and nymphs can pierce and suck the sap from both soft and hard plant tissue. This can occur at all stages of crop development and can

result in significant yield losses. There are no registered insecticides for control of mealybugs on cotton in Australia.

Within a month of the identification of the exotic species, CRDC, Cotton CRC and Cotton Australia brought together a working group of all interested parties to coordinate the activities occurring locally and across the industry in response to the issue. The working group ensured open and effective communication and helped to reduce industry concerns. Protocols were put in place to enable crop checkers to continue to monitor fields with minimum risk of spreading infestations and to enable machinery for picking to be moved safely between farms in the region and to other cotton growing regions. As a result, severe crop infestation was confined to 88 hectares within one area of the Emerald growing region.

CRDC provided support for DEEDI to conduct research trials in the Burdekin during the winter so as to go into the next cotton season

with more information about how mealybug populations can best be managed.

Since the discovery in 2001 of a single mirid carcass cocooned by fungal hyphae in a cotton field, the I&I NSW research team have worked to turn this unusual and isolated incident into a mainstream control option for the cotton industry. Early demonstrations of efficacy of the new product helped to secure the commercial backing of Becker Underwood.

As the biopesticide formulation, BC639, has become more refined, so too have the associated pest control opportunities in cotton, culminating in the submission for registration for use in cotton expected in mid-2010. In the past two seasons, cotton throughout northern NSW has been infested by Silverleaf whitefly and it now appears certain that whitefly will



Industry organisations CRDC, Cotton Australia and Cotton CRC brought together a working group of all interested parties including DEEDI, Queensland Biosecurity and the Central Highlands Cotton Growers Association in Emerald, central Queensland, to develop a coordinated response to the issues raised by the arrival of the exotic *Solonopsis* mealybug (shown at top). Pictured are Emerald cotton growers, Cameron Geddes and Renee Anderson, and DEEDI researchers, Paul Grundy and Melina Miles



The *Solonopsis* mealybug

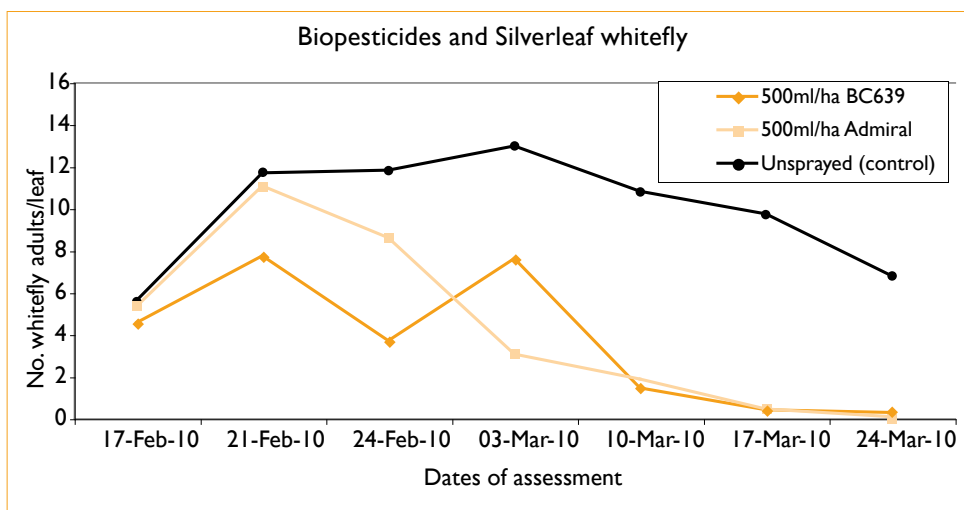
be a routine inclusion in the pest complex in NSW, not just the central Queensland and St George regions where it was found previously. Opportunistic trial work carried out in 2008–09 indicated some efficacy of the experimental biopesticide against whitefly. In 2009–10, trial work was more extensive and consistent results have provided the opportunity for label claims for the control of Silverleaf whitefly to be included in the registration submission.

As shown in the graph below, the new biopesticide, currently named BC639, offered equal control to the commercial standard, Admiral®. This new control option will be of particular significance to the cotton industry, as there are currently very few control options and those available have very limited windows for use during the season due to the very high risks of resistance. The biopesticide will carry a much lower resistance risk.

Within the CRDC-funded Integrated Pest Management (IPM) research project conducted by CSIRO Plant Industry is a 'response to emerging pest problem' clause. This clause was activated in 2009–10, with planned work on jassids and aphids postponed to accommodate the urgent need for new information on the behaviour of Silverleaf whitefly populations in cotton in northern NSW. Experiments

were conducted to validate the management recommendations originally developed in central Queensland. Results showed that, as in central Queensland, an IPM approach to management of all pests is required to reduce risk of whitefly infestation. Where broad-spectrum chemistries were used mid-season for mirid control, subsequent whitefly infestations were more severe. The relevance of other aspects of whitefly management recommendations will be considered in the 2010–11 season.

CRDC attended a strategic planning workshop at the invitation of GRDC to assist in setting the future direction for IPM research in the grains industry. The workshop highlighted opportunities for the strengths in IPM research and adoption in the cotton industry to be replicated for some grains IPM issues and for both industries to share in capacity building for IPM research and extension. To see these opportunities realised, CRDC has been invited by GRDC to participate in the National Invertebrate Pest Initiative (NIPI). CRDC is working with its investment partners and the NIPI partners to negotiate the inclusion of two CRDC projects in the NIPI network.



KEY INVESTMENT 2009–10

- Continued studies monitoring and managing resistance to insecticides and Bt crops

Programs to monitor *Helicoverpa armigera* and *H. punctigera*, *Aphis gossypii*, *Bemisia tabaci b-biotype* and Tetranychid mites for changes in the occurrence of resistance to insecticides and to the Bt toxins contained in Bollgard II® cotton continued in 2009–10. Results across all programs show either no, or very minor, change from last season, meaning there will be no amendments to the industry's voluntary Insecticide Resistance Management Strategy for the coming season. The industry has now shown long term decline in resistance to a number of key chemistries used for *Helicoverpa* control. The Resistance Management Plan (RMP) for Bollgard II® cotton will, however, change in the coming season as a consequence of the elevated resistance frequency in *H. punctigera* detected

in the year previous and regulatory time frames delaying opportunity for response. The RMP will no longer allow the use of corn or sorghum as refuge crop options, as neither of these crops is a host for *H. punctigera*.

KEY INVESTMENT 2009–10

- Enhancing the efficiency of Bt refuge crops within a changing cotton environment

The use of refuge crops and pupae busting carry significant direct costs for growers using cotton varieties incorporating Bollgard II® technology, with additional indirect costs specific to the grower, the season and the farming system. A new project established with CSIRO is researching ways to enhance the RMP for Bollgard II® cotton through the continuation of long term data collection on seasonal abundance of *Helicoverpa* spp., monitoring networks of refuge crops across the landscape, evaluating new, cheaper options for refuge crops and exploring options for refuge management.



One of the key types of data collected in refuge research is pupae numbers. Pupae digging (top) is a laborious task and soil conditions are not always favourable for accurate sampling, so CSIRO researchers are trialing an alternative method of data collection. Beginning in 2009–10, they are investigating whether emergence cages (bottom) can provide an equal or more accurate method of data collection, suitable for use in a broader range of soil conditions and requiring much less physical effort than pupae digging.

KEY INVESTMENT 2009–10

- Map cotton fields as communication tool to minimise off-target herbicide application

Cotton is sensitive to damage from a range of herbicides commonly used in the management of summer fallows in cotton and grain systems and a key aspect of the industry’s approach to stewardship of crop protection products is minimising off-target impacts. As a means of helping inform neighbours of where nearby cotton crops are located, CRDC, GRDC, Nufarm and Cotton Australia launched an industry-wide web-based CottonMap in time for the 2009–10 season. CottonMap (www.cottonmap.com.au) enables cotton growers to mark their cotton fields on a regional map, which can then be printed and distributed to neighbours. In its first year, over 85 per cent of cotton acreage was mapped and maps were widely distributed by agribusinesses, crop agronomists and growers themselves. The area of cotton damaged by herbicide spray drift in the 2009–10 season fell to just over 1000 hectares compared to 15,910 hectares in 2008–09.



Through the web-based CottonMap cotton growers can highlight the location of cotton fields to their neighbours, enabling improved decision making about fallow herbicide applications. Use of the CottonMap is believed to be a key reason for the reduction in herbicide damage to cotton crops in its first season of operation. CottonMap is ‘live’ from 1 September to 30 April each year, covering the growing season.

2009–10 contribution to Strategic Plan Program Two outcome

NOTE: In addition to detailing progress against its Strategic Plan 2008–13 planned outcome for Program Two, CRDC also addressed the Department of Finance Operation Sunlight key performance information for 2009–10, as submitted in the Portfolio Budget Statement. Please see *Appendix Two: Operation Sunlight key performance information 2009–10*, on [page 149](#).

2009–10 AOP Performance Indicators	Key Inputs	Outputs
Enhanced capacity to measure greenhouse gas emissions	Field experiment assessing nitrous oxide emissions at Kingsthorpe, on the Darling Downs in Queensland	Nitrous oxide emissions assessed across a range of irrigation scheduling treatments
	A project to benchmark and reduce greenhouse gas emissions and improve resource use efficiency	Development of a relatively simple way to estimate a field’s nitrous oxide emissions in the laboratory or identify soils that have a high potential to lose nitrous oxide. Evidence that increased inputs of carbon into soil from grain-based systems, whilst essential for soil structure and soil carbon sequestration, also increase the potential for gaseous nitrogen losses. Consequently, mixed cotton-grains systems require sophisticated management of nitrogen fertiliser to minimise losses.

2009–10 AOP Performance Indicators	Key Inputs	Outputs
New protocol for measuring nitrogen use efficiency tested on farms in five regions	Over several seasons, including 2009–10, data has been collected by cotton extension officers from Emerald (4 sites), Darling Downs and Goondiwindi (13 sites), Warren (9 sites) and Hillston (3 sites). A continuation of field calibration of a new test for cottonseed nitrogen, which can be correlated with nitrogen use efficiency.	Results from the regional nitrogen use efficiency (NUE) monitoring program have been presented at an industry forum in August 2009, in Spotlight magazine and in the Australian Cottongrower magazine. These results show that there is an opportunity to significantly improve NUE in the cotton industry and additional resources in the Development and Delivery team have been allocated to encourage this.
Collaborative farming systems research program established in coastal North Queensland	Project to develop sustainable cotton farming systems for coastal north Queensland (with DEEDI, Cotton CRC and CSIRO)	Continuing experiments measuring NUE in cotton following sugarcane and other crops providing enhanced knowledge on managing the risks that annual cropping could pose to the region's natural assets and maximising water and nutrient use efficiencies.
New methods for improving refuge crop efficacy evaluated and communicated to industry and producers	A new project to enhance the RMP for Bollgard II® cotton	Continuation of long term data collection on seasonal abundance of <i>Helicoverpa</i> spp., monitoring networks of refuge crops across the landscape, evaluating new, cheaper options for refuge crops and exploring options for refuge management.
	Investigate emergence cages as a source of data collection	Ongoing investigation into whether emergence cages provide an equal or more accurate method of data collection, suitable for use in a broader range of soil conditions and requiring much less physical effort than pupae digging.
Increased industry participation in ongoing changes in pest resistance to insecticides and Bt cotton	August 2009 CRDC convened a Resistance Roadshow to all cotton growing areas and a resistance forum (REFCOM) at the industry forum.	TIMS committee approved changes to the Bollgard II® Resistance Management Plan for 2009/10 and continued the development of a Bt cotton resistance contingency plan. The Development and Delivery team produced an updated Cotton Pest Management Guide 2010-11 planned for delivery to the industry at the Australian Cotton Conference in August 2010.
Evidence of adoption of innovative farming system practices	Invest in annual survey of consultants by Crop Consultants Australia	Survey found a range of R&D-driven improvements, including IPM (implemented by 68 per cent of growers), practices to improve soil quality and health and irrigation efficiency
Farming systems research gaps identified and future investment priorities detailed	Climate change and cotton R&D Coordination workshop – Sydney July 2009. Preliminary Research Proposal evaluation and prioritisation process with Cotton Australia Biannual meetings between CRDC and GRDC program management teams	Priorities for farming systems and adaptation research to address emerging climate change, greenhouse emissions and carbon sequestration issues. Closer collaborations with GRDC on a range of farming systems and biosecurity R, D and E initiatives.
New collaborative farming systems R&D with Rural R&D Corporations	Continue and expand a range of activities with other RDCs	Improved knowledge and its extension in relation to crop nutrition, spray drift minimisation, insecticide resistance monitoring and management, insect management, weed management, climate change and irrigation

Program Three HUMAN CAPACITY

Goal

A culture of innovation and learning

Strategic Objectives

- Identify, understand and plan for future industry capacity needs
- Improve human resource development and capacity
- Enhance capacity to innovate

Strategic Plan 2008–2013 Outputs/Measures of Success	Achieving Strategic Plan outcome: 2009–10 KPIs
<ul style="list-style-type: none"> • Industry and R&D capacity needs identified and gaps being addressed • An industry with the capacity to deliver our future R&D innovation needs and their adoption • The adoption of a shared vision for the cotton industry's future • An industry with the capacity to deliver our future R&D innovation needs and their adoption. • The adoption of a shared vision for the cotton industry's future • Assessments of industry capacity to innovate, lead and adapt 	<ul style="list-style-type: none"> • Innovation forums delivering practice change • Increased preparedness for biosecurity threats • Adoption of the myBMP system • Proof of concept in alternative R&D delivery methods and channels • A culture of learning demonstrated • Communities assisting practice change • Aggregation of industry knowledge services and systems • Agribusiness engagement in R&D products and services • Shared industry vision for investment in human capacity

Outcome

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



Human Capacity Investment Manager, Rohan Boehm

Strategic Objective 1

Identify, understand and plan for future industry capacity needs

Under the 2008–2013 Strategic R&D Plan, the cotton industry embarked on a new strategy for investing in the human capacity of the industry. During the first two years CRDC has worked closely with the industry to scope future human capacity needs and investment. This has resulted in a renewed focus on the skills needed for best practice production, with an emphasis on collaboration with registered training organisations (RTOs), other rural RDCs and specialist organisations such as Agrifood Skills.

New opportunities to improve industry capability have also been articulated in a pilot project that identified new mechanisms to engage with independent agronomy consultants and retail agribusiness in accessing and delivering industry's research outputs, to achieve greater efficiency and timeliness of uptake.

Evidence that CRDC could address the industry's future scientific capacity strategically comes from some early success arising from a collaborative investment with the Cotton Catchment Communities CRC, through the Australian Government-supported Primary Industry Centre for Science Education (PICSE). This project, which is also supported by other rural RDCs, applies proven techniques to attract students to the world of agricultural science and then to retain and support them and has already seen enrolments at two universities increase markedly.

During 2009–10, CRDC partnered with the Cotton Catchment Communities CRC and Cotton Australia to restructure and refocus extension and knowledge system services. The result is the establishment of a Development and Delivery team that will work in a fully integrated way with the industry's new Best Management Practices system, myBMP.

Bollgard II® cotton varieties must be managed carefully to avoid the development of resistance

to the *Bt* genes that protect the crop from *Helicoverpa* spp. Similarly, Roundup Ready® and Roundup Ready Flex® varieties resistant to glyphosate sprays must be managed to preserve their efficacy. CRDC had originally planned to create a new position to improve extension of transgenic technologies management and support the operation of the key industry advisory body, the Transgenic and Insecticide Management Strategies committee (TIMS). This did not proceed, because the restructuring of industry extension delivery services became a higher priority. In addition, support for the TIMS committee was achieved through a CRDC-sponsored resistance forum, REFCOM, and the CRDC-funded Resistance Roadshow, which enabled key researchers to visit all major cotton growing regions to discuss their work with industry.

CRDC will continue to keep a watching brief on the complex issue of identifying and implementing the appropriate resistance management tactics for Bollgard II® cotton varieties to determine whether any further support is required by TIMS.

In order to make CRDC publications, including *Spotlight* magazine, more easily accessible, CRDC has introduced 'e-pageturner' technology to its website, www.crdc.com.au, as part of our overall move to an e-platform for learning and information. A number of publications already on the website have been converted to this technology and future reports produced by CRDC will be available in the new format. Each e-pageturner publication is searchable and readers are able to flick quickly through a publication and zoom in on pages of interest. Publications can still be downloaded in pdf format.

KEY INVESTMENT 2009–10

- Encouraging agribusiness engagement (including crop consultants)

During the year CRDC invested in a pilot project that investigated opportunities to develop cotton agribusiness engagement. The project focused on the services provided to the industry by consulting agronomic advisers

and Crop Consultants Australia (CCA), the professional organisation to which the majority of these advisers belong. It demonstrated that there were opportunities to develop more formal arrangements with this sector, particularly with the CCA, to:

- develop more innovative and streamlined delivery of high quality, relevant and up-to-date cotton (and grains) industry R&D results and outcomes;
- provide more formal opportunities for this sector of agribusiness to provide feedback on R&D priorities at a strategic and operational level;
- support and facilitate structured, focused and effective industry communications, especially to and from the consultant sector;
- assist the CCA to develop a new business model that matches the new Development and Delivery model to support R&D adoption and *myBMP*.

CRDC plans to assist the CCA in 2010–2011 with the development of its new business model to achieve the key opportunities identified in the pilot study.

Safe harvesting

Picking cotton is the most labour intensive part of the industry and each year involves many casual employees, some of whom are inexperienced. In an effort to reduce the risk of injury during this busy time, CRDC produced a Harvest Safety DVD in time for the 2009–10 season. CRDC has encouraged growers and contractors to help train their people at harvest time using this induction to the dangers at harvest time and the strategies needed to avoid accidents. The video is comprehensive, covering worker site inductions, communication, powerlines, maintenance, night work, fire hazards, transport, machinery and equipment.

Development of the DVD involved collaboration with John Deer, and broad industry collaboration, aided by a widespread awareness within the industry of the onus on employers to provide proper training and a safe workplace.

KEY INVESTMENT 2009–10

- Stakeholder attitudinal interviews

CRDC undertook intensive face-to-face attitudinal interviews with industry stakeholders to assess the impact CRDC Program Three investments are having at stakeholder level and whether they could be better targeted. The project began late in the reporting year with a series of structured interviews in St George, Dalby and Narrabri.

One key finding was the need to focus on regionally specific requirements in delivering human capacity investments at the farm and agribusiness level. CRDC believes local Cotton Grower Associations (CGAs) could provide excellent partners for delivering specific programs. As a result, CGAs will be invited to apply for investment support in 2010–2011 to deliver capacity building programs to their members.

Strategic Objective 2

Improve human resource development and capacity

KEY INVESTMENT 2009–10

- Coordination of national cotton training initiatives

The role of National Cotton Training Coordinator originally focused on developing both competency-based and non-vocationally aligned industry short courses; however, this has evolved into a broader strategic leadership role of Professional Development Manager (Cotton). The role is an enhancement of previous activities rather than a replacement, as it now provides leadership and coordinates the development of a range of initiatives described below, relating to:

- the cotton industry's learning systems both online and face to face,
- an alignment of extension activities with the vocational education sector,
- new workforce development initiatives.

KEY INVESTMENT 2009–10

- BMP program support

After more than a decade of evolution of the groundbreaking cotton Best Management Practices (BMP) program, the 2009–10 year marked revolution, rather than just evolution. Beginning in 2008–09, CRDC worked closely with Cotton Australia and the Cotton Catchment Communities CRC to finalise the development of a new BMP system, *myBMP* (www.mybmp.com.au), which uses all the

information gathered under the BMP program but replaces the manual with a responsive, interactive online portal designed to meet individual growers' needs.

To assist with this complex task, CRDC commissioned the consultancy services of former cotton grower, Stuart Higgins, who brought extensive involvement in cotton R&D to the position. The new system underwent rigorous testing with 15 cotton growers prior to its launch at the 2010 Cotton Conference in August 2010.

How is *myBMP* different?

Aspect	Former BMP Program	New <i>myBMP</i> System
Format	Paper-based manual	Dynamic, interactive, web-based
Original purpose	To reduce pesticide off target movement. Later, a broader range of environmental standards for farm hygiene; land and water management and pesticide storage and handling were added.	To improve cotton farm business management (production, human resources and environmental) by providing direct access to the best information and latest R&D
Links to R&D	Strong initially with pesticides but researchers less directly involved with later modules	Researchers have provided input to all modules. Links to information and knowledge assets and tools are included on the <i>myBMP</i> website.
Scope and Flexibility	Limited: focus was on a grower completing all modules and meeting either legislative requirements or industry 'standards'. Success was measured by a farm achieving certification by demonstrating it had met or exceeded all industry standards.	Considerable: growers can use the system to work on any individual production performance issue or environmental risk management issue, or can choose to complete all modules. If required, a grower can choose to be audited. <i>myBMP</i> allows growers to identify whether they have met legislative requirements (Level 1); industry standards (Level 2) or set about achieving higher level performance and/or aspirational goals (Levels 3 and 4).



A *myBMP* team was established to prepare for the August 2010 launch of *myBMP* and to roll out the initiative to the broader Australian cotton industry. *Left to right:* Rohan Boehm and Bruce Pyke (CRDC), James Houlahan, Jim Wark, Ken Flower and Stuart Higgins

The reporting year saw development of a human resources module for the BMP program. This provides resources to allow growers to develop staff induction processes and provides templates in areas such as interviewing and induction. This module adds to the holistic nature of BMP in enhancing the range of information cotton enterprises need in order to run successfully.

KEY INVESTMENTS 2009–10

- On-line learning: e-Learning and FarmPlus; Co-investment in Recognition of Prior Learning (RPLs) and Skills

Over recent years, the cotton industry has pioneered a range of on-farm competency based training packages from Certificate II to Diploma levels. 2009–10 saw the development of pilot projects designed to expose industry to the training and skills based delivery, using e-Learning. CRDC engaged Tocal College (NSW) and Australian Agricultural Colleges Corporation (AACC) to co-develop their e-Learning skills so that the cotton industry could apply this additional capacity to its own proven face-to-face training services. Funding for this project was from the Australian Government’s program, the Australian Flexible Learning Framework Initiative, which is administered independently by the states.

In May 2010, CRDC entered into new pilot projects for 2010–11 with its e-Learning partners to field test the original ‘learning objects’ developed. Future field testing will include new technologies that gather highly targeted information and knowledge from the cotton industry’s *myBMP* system. The initial focus will be on extending new e-Learning products to begin to enhance producer’s skills in relation to employment and workplace Occupational Health and Safety (OH&S).

The 2009–10 year saw an important pilot project to demonstrate the opportunity of collecting and distributing knowledge from R&D. A demonstration of FarmPlus, an agriculture-specific search engine designed to access all key agricultural information in the fastest and easiest way, showed that a purpose-designed searching system could capably aggregate contemporary information.

KEY INVESTMENT 2009–10

- Field to Fabric training course

The Field to Fabric course, held at CSIRO Materials Science and Engineering ten times over the past six years, including one course in 2009–10, has achieved recognition throughout the industry and beyond for the breadth and depth of knowledge it provides.

The Field to Fabric course

An evaluation survey of participants in 2009–10 found that:

- 97 per cent of respondents regarded the course positively;
- 92 per cent had implemented changes in their workplace as a result of the course;
- 97 per cent have recommended this course to others, or would do so.

Field to Fabric participants comment:

‘Great course, good insight into whole procedure from start to finished product.’

‘It gave me a better understanding of agronomic practices and how these influence the final product. This enables more focus on these practices to ensure quality products post-farm gate, especially in relation to fibre quality.’



Recognition of prior learning

In 2009–10, the Recognition of Prior Learning (RPL) process led to ten people receiving a Diploma of Agriculture – eight in Queensland and two in NSW – with the RPL assessment undertaken against BMP standards. BMP accreditation qualifies the diploma recipients for a Certified BMP Farm Manager Award. Seven Advanced Diplomas of Agriculture and/or Rural Business Management were also awarded in NSW: a very encouraging result for an industry newly exposed to the RPL vocational process.

Cotton industry qualification featured

The cotton industry Certified BMP Farm Manager qualification was selected in 2009–10 as one of two Queensland case studies to feature in a report developed for the International Labour Organisation within the United Nations and released in June 2010. The green jobs initiative is intended to support efforts by governments, employers and trade unions to promote environmentally sustainable jobs and developments in a climate-challenged world.

Certified BMP Farm Manager

Extract from *Skills for Green Jobs in Australia*, Draft Report October 2009

Mike Rafferty and Serena Yu (University of Sydney)
for the International Labour Organisation 'Skills for Green Jobs' study

In 2007, the Australian government funded a cotton industry initiative to map the skills and learning implied by a farmer managing a BMP accredited farm to a formal vocational qualification. The process has culminated in the development of the formal qualification: Diploma of Agriculture, and its accompanying industry award, the Certified BMP Farm Manager.

The skills embedded in the Diploma of Agriculture, the associated delivery of training, and the accreditation process can be summarised as follows:

- *The Diploma is comprised of ten competency modules, mapping industry requirements underlying BMP guidelines to the national training framework underpinning the vocational education system;*
- *A system for the recognition of prior learning exists, involving an assessment process, which identifies existing industry skills and skills gaps. This analysis is used to both award farmers on BMP accredited properties, and develop future training programs*
- *In NSW, the Diploma has been endorsed by the Registered Training Organisation, Tocal College. In Queensland, the program has been taken up by the Australian Agricultural College Corporation;*
- *Innovations to the training program are an ongoing theme, with the focus on implementing advances in research and development. Additional topics currently under construction include Human Resource management, biosecurity, water management, and greenhouse gas and carbon management.*

The Industry BMP documentation and evidence required for the farm accreditation has been aligned to competency standards and from that a Diploma qualification was developed. The assessments use on-farm holistic recognised prior learning (RPL) assessments and focus on the business management aspects (the how) of implementing BMP, while the farm level focuses on the 'what' is implemented.

The course has significantly raised awareness of the nature of cotton fibre, fibre markets and the processes that Australian cotton undergoes in its journey from field to fashion. This has led to changed perceptions of the opportunity to add value to the Australian industry. The course has attracted Australian and international participation by textile students, farmers, agronomists, ginners and marketers, which has led to a better understanding of the Australian industry among domestic brand owners and overseas spinners and manufacturers.

KEY INVESTMENT 2009–10

- **Post-graduate support**

In 2009–10, CRDC supported 12 post-graduate students, including three who commenced in 2009–10, undertaking PhD studies in diverse fields such as plant nutrition, irrigation and soil quality. The knowledge gained from PhD projects continues to assist the agronomic and environmental performance of the cotton industry on-farm but also, increasingly, environmental knowledge within cotton producing valleys.

Key Investment: Undergraduate support

CRDC is a co-investor in the Undergraduate Studentship Program, the first collaborative program of the RDCs that seeks to attract and retain promising students into careers that will underpin the future productivity of the agricultural sector. The CRDC-sponsored undergraduate scholarship for 2010 was awarded to Naomi Marks, who studied agriculture at school for four years and has commenced a Bachelor of Agribusiness at the University of New England. Naomi has a strong interest in agricultural finance and marketing and in pursuing a career in agribusiness.

Insert pic: Naomi Marks

KEY INVESTMENT 2009–10

- **Human Capacity Pilot Projects and Farming Systems Case Studies**

This investment did not proceed owing to the major changes underway in the creation and development of the industry's Development and Delivery Team and the need to contextualise

Some of our post-grads

John Bennett

Viability of lime and gypsum use in mitigating sodicity in an irrigated vertosol soil

John's area of study, sodicity, is an important one for the cotton industry. His thesis, *Combating sodicity in the Lachlan and Macquarie Valleys*, is based around the viability of using lime and gypsum to mitigate sodicity on four irrigated cotton growing properties (two near Hillston, one near Warren and one near Trangie).

Under this project, various rates of lime and gypsum were applied to full field length experimental strips and measurements taken at six months and 2.5 years to compare the effects of lime, gypsum, and lime/gypsum combinations to a control for exchangeable cations (sodium, calcium, magnesium and potassium), pH, electrolyte concentration, nitrogen, carbon, aggregate stability and yield. His main conclusion is that gypsum solubilises and leaches through the profile too quickly under irrigated circumstances to have a lasting effect and the project has sought to mitigate this outcome. John found that landholders in the Lachlan and Macquarie Valleys were very enthusiastic about soil health and acknowledged that longevity of productivity would most likely be enhanced through such a program, but that few use them consistently. In order to extend the knowledge from his research, John will present his results at the 19th World Congress of Soil Science in Brisbane and at field days in both valleys.



Alison McCarthy

Optimal irrigation of cotton via real-time, adaptive control of large mobile irrigation machines

Alison's thesis, which she completed in 2009–10, is concerned with spatial sensing for precision application of water via lateral move and centre pivot machines. A simulation framework 'VARLwise' has been created to aid the development, evaluation and management of spatially and temporally varied site-specific irrigation control strategies. VARLwise permits application of differing control strategies within the field, as well as differing irrigation amounts down to a scale of one square metre.

Alison is the National Program for Sustainable Irrigation 2010 travelling fellow, which is '...awarded to outstanding individuals who have demonstrated an understanding of major strategic issues facing irrigation practice and policy and who have demonstrated they can make a significant contribution.'

Alison is interested in how Australia might gain from US developments of automated control systems that apply irrigation with the aid of such techniques as crop canopy temperature measurement using infrared and advanced real-time soil moisture and temperature sensing.



Merry Errington

Experiments to assess the nutrient uptake and translocation in cotton crops having high fruit retention

Merry's PhD research will aid in the diagnosis and early detection of nutrient deficiencies and contribute to a better understanding of the nutrient demands and use patterns of modern high yielding/high boll retention cultivars. CRDC supported Merry to attend the 16th International Plant Nutrition Colloquium in Sacramento, California and presented the poster *Nitrogen allocation in high yielding cotton*. Her accompanying paper was published in the proceedings of the conference. Merry will to complete her thesis in the 2010–11 year.

Rhiannon Smith

Benefits of establishing and managing native vegetation on cotton farms in the Namoi catchment

Rhiannon submitted her thesis in 2009–10. Her findings in the final year reinforced the value of woody vegetation as the dominant ecosystem component determining vegetation condition in the context of carbon sequestration. Her results show that river red gum-dominated vegetation is particularly important for biodiversity conservation, with the greatest plant and bird species richness recorded in these sites and the greatest retention of carbon. Of the bird species recorded during this study, the most unique or infrequently encountered species were recorded in river red gum vegetation and this was shown to be as a result of greater habitat complexity. In line with her findings, Rhiannon has developed native vegetation management suggestions to assist farmers.



Knowledge adoption: 'delivering more, better and faster'

The Australian cotton industry's extension network has served the industry well for more than a decade; however, 2009–10 saw CRDC, the Cotton Catchment Communities CRC and Cotton Australia work together to develop a new R&D Adoption Framework for the cotton industry. The new method of extension by the Development and Delivery team will deliver R&D outcomes in a more targeted, efficient, coordinated and transparent manner throughout the industry.

The framework and the targets within it will give the cotton industry a way to measure its performance. The three organisations identified 15 key areas of R&D investment, ranging from production-related issues such as pest management, water use and crop nutrition to the broader environmental and social issues impacting on the industry and its regions. Specific targets have been set within

each of the 15 areas, relating the practices which previous research has indicated should be more commonly adopted.

Each of the targets will be delivered by Target Leads, who are mainly drawn from the existing cotton extension network. These leaders will prioritise activities to achieve the target change needed, develop products that will deliver the R&D messages required to deliver change and monitor the progress of this change over time. To coordinate the overall extension effort, the three organisations have jointly appointed a General Manager of Best Practice and Research Implementation, Ken Flower.

A key strength of the new framework is its integration with the release of the new online myBMP, scheduled to commence in 2010.



Caption: Newly appointed General Manager of Best Practice and Research Implementation Ken Flower (right) with Namoi Catchment Management Authority Director Dr Hugh Barrett and Boggabri cotton grower, John Watson. Ken Flower brings an extensive background to ensuring the new Adoption Framework delivers 'more, better and faster'.

content of the pilot projects and case studies within this new extension model. Any future pilot projects and farming systems case studies will be developed and applied within the new knowledge delivery system.

KEY INVESTMENT 2009–10

- Delivering extension services in NSW and Queensland farming systems

Highlights for the National Cotton Extension Team in 2009–10 included:

- effectively facilitating wider industry awareness of the incursion of exotic mealybug in Central Queensland, avoiding significant crop losses. Management protocols developed will assist with management of mealybug in the future.
- establishing and monitoring three refuge trial sites as part of a research project by Dr Mary Whitehouse (CSIRO) after concern about refuges and resistance was identified as a key local priority by Cotton Australia's Research and Technical panel. The trials are investigating the best type and continued efficacy of pest refuges.
- two area-wide meetings addressing a range of important issues such as Silverleaf whitefly, mealybug, the survival of *Helicoverpa* spp., in Bollgard II® cotton and water-related issues. These meetings help to ensure an area-wide approach to integrated pest management and other emerging issues.
- an entomology meeting for local agronomists which utilised the skills of visiting researchers to build local capacity.
- training for the extension team on herbicide resistance to glyphosate, so that extension team members have the capacity to run similar workshop in their own areas.
- a proactive extension approach to reducing spray drift in the St George area using the CottonMap website services saw spray drift reduced to zero in the district.
- a borehole and groundwater monitoring project has raised the awareness of the potential danger of deep drainage from inefficient irrigation practices.

KEY INVESTMENT 2009–10

GRDC Farming systems collaboration

The meeting between CRDC and GRDC management in April 2010 yielded a number of opportunities for closer collaboration. The strongest opportunities for Program Three lie in jointly communicating research outcomes in a farming systems context. There are also some opportunities for closer alignment of future research investments in Program Two relating to soil carbon, weed management for northern farming systems, insecticide resistance monitoring in aphids, integrated pest management strategies, spray drift modelling capacity for ground application technologies and farming systems development for new areas. *Find more information on CRDC/GRDC farming systems collaborative research in Program Two, starting on page 64.*

KEY INVESTMENT 2009–10

Invest collaboratively in human capacity development for workforce, industry leadership, research and innovation skill outcomes

Future Cotton Leaders program

CRDC has backed its commitment to supporting leadership development of industry participants by investing in a second Future Cotton Leaders program. 32 participants (22 in the first program and ten in the recent program) have now completed the 14-month program, which included involvement in skill development, field trips and industry networking in Goondiwindi and Narrabri. Participants worked on their own leadership projects, requiring the setting of goals, development of a plan and then implementation and review, ensuring outcomes for themselves and the industry. CRDC will continue to support graduates of the program to take up leadership roles and positions across the industry.

Australian Rural Leadership Program

In 2009–10, CRDC once again invested in two scholarships to the Australian Rural Leadership Program. Barb Grey, who completed the course



2009–10 Future Cotton Leader participants at CRDC with Cotton Australia Chair Joanne Grainger, and CRDC’s Executive Director Bruce Finney and R&D Implementation Manager Helen Dugdale

in June 2010, is now Chair of Wincott (Women in Cotton Network), on the board of the Cotton Catchment Communities CRC and on the Australian Cotton Conference organising committee. The new scholarship holder, Arthur Spellson, is Chair of the Australian Cotton Shippers Association, reflecting the value chain emphasis of CRDC’s research program. Arthur will complete the course in 2011.

‘My participation in the ARLP has been instrumental in my personal and professional development, my ‘launch pad’ for my growing involvement in off-farm industry events. I take this opportunity to sincerely thank my generous cotton sponsors, and enthusiastically look forward to seizing opportunities in my continued involvement in agriculture.’

Barb Grey
ARLP graduate



Aboriginal school-based traineeships

The success to date of this program, run jointly with the Cotton Catchment Communities CRC and Aboriginal Employment Strategy (AES) ensures that CRDC continues its support. Participants combine their school studies with paid office skills training at CRDC or the Cotton Catchment Communities CRC one day a week. Two of the previous year’s trainees are now in full time employment, including Chloe Pokarier, who undertook her traineeship at CRDC. Chloe graduated in December 2009 and is in a government position in Narrabri.

Farming and Fishing Health and Safety R&D Program

CRDC continues as a partner in the Farming and Fishing Health and Safety R&D Program (CPFFH&S), managed by the Rural Industries Research and Development Corporation. The program is guided by a five-year R&D Plan, which can be found at <https://rirdc.infoservices.com.au/downloads/09-073.pdf>.

In 2009–10, the program’s Research and Development Advisory Committee identified the need for the development and implementation of a marketing and communications strategy for the Program, and has appointed a communications consultant firm to work with the program and its Advisory Committee to develop and implement an innovative marketing and communications strategy to facilitate adoption of results and



Erika Anderson, the new CRDC-based AES trainee (left, with CRDC's Margaret Wheeler and Dianne Purcell), is from Wee Waa High School. She is undertaking the TAFE Business Skills Certificate II course as part of her studies and working at CRDC one day a week

maximise the knowledge outcomes. The consultants will also formulate and disseminate key messages to the target audiences and monitor and evaluate the outcomes.

Cotton-related activities 2009–10

The Sustainable Farm Families (SFF) Future Directions project will provide ongoing evidence-based information to support and inform future health, wellbeing and safety directions for Australia's agricultural industries, informed by the initial results and hypothesis of the original SFF (funded through the Joint Research Venture for Farm Health and Safety) program which ran from 2003 to 2010 and the sugar and cotton program which ran for three years in NSW and Queensland, involving 65 participants.

Evaluation and development of Farm Health and Safety Toolkit for Rural GPs. This one-year evaluation project by the University of Sydney's Australian Centre for Agricultural Health and Safety will introduce the newly developed information and promotion resource package to rural primary health care providers, initially in NSW and Victoria, and formally evaluate the utility and impact of use of the Toolkit by rural medical practices.

Staying healthy: Behaviours and services used by farmers and fishers.

This research by Deakin University is developing an evidence-base for health behaviour and health service use by farmers and fishers. Outcomes will include a better understanding of the links between physical and mental health of the study group, the challenges and opportunities associated with maintaining good health and their health service usage. This will inform policy and practices in the areas of health behaviour as it relates to specific industries, and health service planning and development.

Interventions for best practice health and safety behaviour change – Stage 1.

Project personnel from the Australian Centre for Agricultural Health and Safety are working in association with the Partnership to achieve its three objectives relating to safety, physical and mental health in the farming and fishing industries.

Health and safety practices on

Australian Farms. ABARE, in association with the Australian Centre for Agricultural Health and Safety, is collecting data from farm operators on physical health, including incidence of injuries, accessibility of health services and the proportion undertaking an annual health check; mental health, including social inclusion and incidence of pressure/stress; and safety, including measurement of OH&S management practice uptake, incidence of injury and death, and exposure to known hazards. The survey will also obtain data on the characteristics of farms and farm managers, including enterprise type, number of households on farm, number of residents by age group and number of workers.

Capacity building of rural and remote communities to manage their mental

health. This project by the University of Southern Queensland is designed to build community capacity and more effectively manage mental health.

Drug and alcohol use by farming and fishing workers. This project will investigate farm and fishing workers use of drugs and alcohol, identify any effects on their physical and mental health and link these to workplace health and safety.

Support for women in the industry

Women are well represented in CRDC-supported programs (for example, half the Future Cotton Leaders group – which has competitive entry – were women). In addition, CRDC provides support to Wincott, which has become a healthy, self-sustaining organisation with a large membership from across the industry.

In 2009–10, Wincott ran a total of six ‘Voices in Ag’ leadership workshops, aided by funding from the Department of Agriculture, Fisheries and Forestry, with input from CRDC staff. The report on the workshops demonstrates improved capacity to change and lead. Women from other agricultural sectors are encouraged to participate in Wincott activities and do so in growing numbers.

In 2010–11 Wincott will undertake two projects in the CRDC program: a natural resources survey to assist women’s understanding and awareness of environmental and ethical

stewardship to enhance the uptake of positive practices which impact on the agricultural footprint, as well as a tour of a non-cotton growing agricultural area to look at how other industries disseminate information and assist grower uptake.

Strategic Objective 3

Enhance capacity to innovate

KEY INVESTMENT 2009–10

Innovation forums

The Big Day Out in Cotton

The Big Day Out is now an annual event, providing producers and cotton consultants with a forum to identify R&D-driven technologies that may be applicable to their own enterprises. The 2010 Big Day Out featured ‘low risk agriculture’ and attracted some 130 farmers. The event, held at ‘Kielli’, a dryland farming enterprise on the Jimbour Plain, north of Dalby, attracted many irrigation farmers keen to learn about cutting edge dryland techniques for managing scarce water resources. Big Day Out hosts, Jamie and Susie Grant, were awarded the 2009 Cotton Industry Innovative Cotton Growers of the Year and have established a productive and efficient farming system, within



Breakout groups at a Wincott workshop, ‘Climate Change 101’, which was devised and delivered by CRDC R&D Implementation Manager, Helen Dugdale.

which they produce high quality, high yielding cotton. The Grants have been constantly involved in trial work with private consultants, state agriculture departments, CSIRO and many commercial agribusinesses.

Climate Change and Cotton

CRDC organised a climate change R&D coordination workshop in Sydney in July 2009, funded by the Australian Government's Climate Change Research Strategy for Primary Industries (CCRSPI). The workshop provided members of the cotton industry with a chance to discuss R&D issues related to climate change, particularly on-farm impacts. Following a series of invited presentations, a workshop session allowed participants to consider R&D coordination, gaps, opportunities and priorities. A break-out session allowed small groups of participants to discuss and list R&D issues, needs, gaps and opportunities under the headings of Productivity, Social/Capacity, Biophysical and Communication. Outcomes from the workshop were presented at a cotton industry forum on climate change in Narrabri the following month.

Sustaining Rural Communities

CRDC and the Cotton Catchment Communities CRC jointly organised a Sustaining Rural Communities Conference, held in Narrabri in April 2010. More than 200 delegates from the mining, cotton, broad acre, health, education, local government and business sectors were brought together with a range of speakers with

expert knowledge of rural and remote issues: the challenges and social structures which influence the physical, social and economic health of rural communities. Just as importantly, in the opposite direction it demonstrated that the wider regional communities offer significant scope for engaging the cotton industry's people.

A second conference building on this event will be held in March 2011. All presentations at the 2010 conference are available at www.cottoncrc.org.au.

Value Chain forums

The second forum in CRDC's Value Chain series, the Post-Farm Gate Forum, was held at the Cotton Collective in Narrabri in August 2009 and attended by merchants, ginners, warehousemen, classers and trucking company representatives, along with leading researchers. It provided a unique opportunity for all sectors to gain a shared understanding of the industry's activities and the pressure points that exist throughout the value chain. The forum canvassed a range of research initiatives affecting the post-farm gate sector and identified potential issues that need further research and investigation. A full report can be found in the [March 2010 edition of Spotlight](#), available at www.crdc.com.au. A major Value Chain session, sponsored by CRDC, the Australian Cotton Shippers Association and Cotton Australia is scheduled for the 2010 Cotton Conference in August 2010.



The Sustaining Rural Communities Conference provided valuable information on how CRDC and the Cotton Catchment Communities CRC could best invest to achieve their strategic goals of supporting sustainable rural communities.

2009–10 contribution to Strategic Plan Program Three outcome

NOTE: In addition to detailing progress against its Strategic Plan 2008–13 planned Program Three outcome, CRDC also addressed the Department of Finance Operation Sunlight key performance information for 2009–10, as submitted in the Portfolio Budget Statement. Please see *Appendix Two: Operation Sunlight key performance information 2009–10*, on [page 149](#).

AOP 2009–10 Performance Indicators	Key Inputs	Outputs
Innovation forums delivering practice change	Big Day Out in Cotton	Growers received information on low risk, sustainable dryland cotton farming and aspects applicable to irrigation farming.
Increased preparedness for biosecurity threats	Support for extension work in relation to exotic pests. Investment in development of a Biosecurity Manual for cotton	Fast control and containment of the first Australian incursion of <i>Solenopsis mealy bug</i> in Central Queensland and management protocols for future management; enhanced area wide approach to IPM and emerging biosecurity issues; increased knowledge about the best type and continued efficacy of pest refuges. Surveillance of other Queensland cotton growing areas of the mealybug and post harvest survey of survival on weeds and other crops at Emerald. Early and late season disease survey results indicating a nil presence of exotic diseases. Additional surveillance for Cotton Leaf Curl Virus – a potential exotic disease threat. Planned delivery of the industry’s first Biosecurity Manual at the Australian Cotton Conference in August 2010.
Adoption of the <i>myBMP</i> system	Completion and adoption of <i>myBMP</i> development	Dynamic, interactive, web-based <i>myBMP</i> , which uses all the information gathered under the BMP program in an online portal designed to meet individual growers’ needs. For launch at the Australian Cotton Conference in August 2010.
Proof of concept in alternative R&D delivery methods and channels	A restructured Development and Delivery team to enhance implementation of R&D and <i>myBMP</i> across the industry	New development and production arrangements for the Cotton Pest Management Guide aimed at delivering the product at the Australian Cotton Conference (up to 2 months earlier than previous editions). A new publication, the Cotton Production Manual, to target anticipated new cotton growers or growers returning to cotton production in 2010-11. <i>myBMP</i> – see above.

AOP 2009–10 Performance Indicators	Key Inputs	Outputs
A culture of learning established	Review of the role of the National Cotton Training Coordinator Stakeholder attitudinal survey of Program Three investment	National Cotton Training Coordinator role now Professional Development Manager (Cotton), Stakeholder interviews at St George, Dalby and Narrabri provided valuable information on future investments. e-learning pilot projects established with Tocal and AACC. Ongoing demand for the Certified BMP Farm Manager qualification. Pilot evaluation of the <i>myBMP</i> system with a cross section of cotton producers prior to launch at the Australian Cotton Conference.
Communities assisting practice change	Sustaining Rural Communities Conference	An understanding of the challenges and social structures which influence the physical, social and economic health of rural communities; a finding that wider regional communities offer significant scope for engaging the cotton industry's people. Follow-up conference to be held in 2011.
Aggregation of industry knowledge services and systems	Pilot project to demonstrate the opportunity for collecting and distributing knowledge from R&D	A demonstration of the FarmPlus system for knowledge harvest showed that a purpose-designed searching system could capably aggregate contemporary information.
Agribusiness engagement in R&D products and services	Pilot project to explore new opportunities involving agribusinesses	New key roles identified for independent agronomy consultants and retail agribusiness in accessing and delivering industry's research outputs with greater efficiency and timeliness.
Shared industry vision for investment in human capacity	<i>Vision 2029</i> to encompass improved industry performance, collaboration and capacity, using a twenty year time frame to ensure a longer term strategic focus	<i>Vision 2029</i> identified 'capability' as a major success indicator: human resource capacity; an attractive industry to work in; encouraging new researchers and environmentalists (including from overseas); a culture renowned for innovation and responsiveness to change.

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 was established in one of Australia's major cotton-growing areas, Narrabri, in north-west NSW, to ensure it was centrally located within 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: a collaborative research site and headquarters of the Cotton Catchment Communities Cooperative Research Centre (Cotton CRC), in which CRDC is a core participant. The activities of the Cotton CRC for 2009–10 are reported in that organisation's Annual Report, accessible on its website, www.cottoncrc.org.au, and its activities associated with CRDC are also contained in this publication in Report of Operation – Research and Development, starting on [page 53](#).

Board of Directors

Composition

The Corporation's Board comprises the Chair (appointed by the Minister for Agriculture, Fisheries and Forestry), the Executive Director (selected by the Board) and seven non-executive Directors nominated by an independent Selection Committee established by legislation. Appointment of non-executive Directors is subject to Ministerial approval and directors other than the Executive Director are appointed for three-year terms.

Appointments

The Minister appointed seven Directors for a three-year period commencing 1 October 2008. No changes or appointments occurred during the reporting year.

Expertise

Directors are selected from across the industry, business and research communities and together they must, and do, bring expertise in cotton production, processing and marketing, conservation/management of natural resources, science and technology and technology transfer, environmental and ecological matters, economics, finance and business management, administration of research and development, sociology and public administration. The Primary Industries and Energy Research and Development (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

Following appointment to the Board, each Director is provided with a Director's Manual, which provides 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 Board Charter, Strategic R&D Plan and relevant legislation are 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.

Training

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. In 2009–10, one Director undertook the Australian Institute of Company Directors' company directors update.

Directors' Responsibilities

The roles and responsibilities of Directors are set out in the Board Charter, which includes conduct and ethical standards provisions. Internal reviews of Board performance are conducted periodically. The Board also obtains an external review of its performance periodically. An internal Board review was held in late 2009 and reported to the November Board meeting. The Board performance was evaluated as of a high standard, meeting its charter. The outcome of the review led to increased time allocated for discussion of strategic matters at Board meetings and informed the Board work plan for the coming year.

Board 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. Close links between the Board of Directors and management have assisted the development of a sense of mutual confidence, trust, teamwork and common purpose. Senior management participates in Board meetings, with other staff invited to contribute wherever appropriate.

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.

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, which is an agenda item at each Board meeting and is updated as necessary.

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

Board of Directors 2009–10

Chair

Mike Logan
(GAICD)



Mike Logan, who was appointed Chair of CRDC on 13 August 2007, is a cotton farmer from Narrabri, NSW. Mr Logan is Chair of the Remuneration Committee and a member of the Audit Committee.

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 International Organisation for Standardisation (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 Australia, 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).

Executive Director

Bruce Finney
BSc Ag (MAICD)



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 in corporate agriculture in various corporate, management and agronomy roles in Australia and in an advisory role in Argentina. He is a past chair of the Australian Cotton Growers Research Association, a past director of the Cotton Catchment Communities CRC and Irrigation Association of Australia.

Mr Finney is a graduate of the Australian Rural Leadership Program and of the Company Directors Course of the Australian Institute of Company Directors.

Non-executive Directors at 30 June 2009

Kerry Adby
LLM (ANU), PED (IMD,
University of Lausanne)
(FAICD)



Kerry Adby was appointed to the Board for a three-year term commencing 1 October 2008. She is a member of the Intellectual Property Committee.

Ms Adby is an investment banker and a solicitor, and Managing Director of Copernican Securities Pty Ltd. She also holds non-executive positions on various boards, such as the NSW WorkCover Insurance Investment Fund Board and the Australian infrastructure investment vehicles of the Canadian Pension Plan Investment Board. Ms Adby has extensive experience in government and the private sector and has worked in senior executive positions in Australia and Asia, including with AIDC Limited. She specialises in infrastructure finance and in the feasibility and funding of irrigation and water saving initiatives and has worked extensively as a consultant to the World Bank and Asian Development Bank.

Vice-Chair

Leith Bouilly

BRuSc, DipBusStud (GAICD)



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

Ms Bouilly is an Adjunct Professor with the School of Integrative Systems at the University of Queensland. She is also Chair of Wide Bay Water Corporation, The Glennie School Council and Lower Balonne Water Resources Ministerial Advisory Council, and a Board member of Seqwater, Murrumbidgee Irrigation Ltd and Agrifood Skills Australia Ltd. She is a graduate of the Australian Rural Leadership Program.

Mary Corbett

BSc PhD (FAICD, AFAIM)



Mary Corbett was appointed to the Board for a three-year term commencing 1 October 2008. She is the Chair of the Intellectual Property Committee.

Dr Corbett is Managing Director of Australian Business Class, an organisation specialising in executive leadership development. She has a strong research background and over ten years experience in rural agriculture. She has an extensive background in the private and public sectors, with specific emphasis on capacity building and governance.

Dr Corbett was previously on the Boards of Food Science Australia and the Sugar Research and Development Corporation.

Glenn Fleischfresser

(Fresser)
(MAICD)



Glenn Fresser was appointed to the CRDC Board in October 2005 and reappointed for a further three-year term commencing 1 October 2008. He has owned and operated a successful cotton and grain production business on the Darling Downs since 1981. He is a member of the Intellectual Property Committee.

Mr Fresser has extensive experience in the cotton industry. His farming approach is underpinned by a respect for the natural environment, and an interest in adopting new technology and farming systems approaches. Mr Fresser 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. 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, Chairman of TIMS Committee and Cotton Biotechnology Review Panel. He is an Honorary Ambassador to the Queensland Minister for Primary Industries and Fisheries.

Juanita Hamparsum

B Bus, CA, (GAICD)



Juanita Hamparsum was appointed to the Board for a three-year term commencing 1 October 2008. She is Chair of the Audit Committee.

Ms Hamparsum is a chartered accountant. She is a Director of the Hamparsum Family Trust and Kalori Pty Ltd, where she is the corporate trustee, accountant and finance manager for the family farming agribusiness of irrigated and broad acre cropping of cotton, wheat, sunflowers, chickpeas and sorghum. She is also a board member of the Namoi Catchment Management Authority and a member of the Watermark Coal Project Consultative Committee. Ms Hamparsum has previously worked with Goldman Sachs in London and Ernst and Young in Sydney. She is a graduate member of the Australian Institute of Company Directors.

Peter Hayes

BSc, Dip Ed, BAppSci, M S



Peter Hayes was appointed to the Board for a three-year term commencing 1 October 2008. He is a member of the Remuneration Committee.

Mr Hayes is a self-employed wine industry strategist and adviser. He worked as a national viticulturist, with roles in industry relations and grower relations management for Southcorp Wines/Fosters Wine Estates.

Mr Hayes has extensive knowledge and experience in strategic planning and in the international commercial environment. He is a former Executive Director of the Grape and Wine Research and Development Corporation and is currently Vice President of the International Organisation of Vine and Wine.

Lisa Wilson

BAGSci (Hons) (FAICD)



Lisa Wilson was appointed to the CRDC Board in October 2005 and reappointed for a further three-year term commencing 1 October 2008. She is a member of the Audit Committee.

Ms Wilson is an agribusiness professional, senior executive and company director with more than 20 years experience in the agricultural sector. She was Chief Executive Officer of Australian Dairy Farmers Limited until April 2009 and previously acting Executive Director of the Australian Rural Leadership Foundation. She is Chair of the Albert Park Advisory Group for Parks Victoria and a Victorian Advisory Group Member of Landcare Australia Ltd. Her past non-executive directorships include Deputy Chair of the Australian Rural Leadership Foundation.

Board meetings

The Board held five meetings during 2009–10:

Board Meeting	Date	Location
2009/05	17 & 18 August 2009	Goondiwindi, Qld
2009/06	5 & 6 November 2009	Dalby, Qld
2010/01	1 & 2 February 2010	Canberra, ACT
2010/02	23 & 24 March 2010	Sydney, NSW
2010/03	1 & 2 June 2010	Narrabri, NSW

Directors' attendances at Board Meetings

Director	Board meeting				
	2009/05	2009/06	2010/01	2010/02	2010/03
Mike Logan (<i>Chair</i>)	Yes	Yes	Yes	Yes	Yes
Kerry Adby	Yes	Yes	No	Yes	Yes
Leith Bouilly	Yes	Yes	Yes	Yes	Yes
Mary Corbett	Yes	Yes	Yes	Yes	Yes
Bruce Finney	Yes	Yes	Yes	Yes	Yes
Glenn Fresser	No	Yes	Yes	Yes	Yes
Juanita Hamparsum	Yes	Yes	Yes	Yes	Yes
Peter Hayes	Yes	Yes	Yes	Yes	Yes
Lisa Wilson	Yes	Yes	Yes	Yes	Yes

Board Committees

The Board operated three committees in 2009–10: the Audit, Intellectual Property and Remuneration Committees. In addition to formal meetings, much of the work of the Committees is conducted via email and telephone. 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.

Juanita Hamparsum continued as Chair of the committee in 2009–10, with Mike Logan and Lisa Wilson as the other members. The Executive Director, Bruce Finney, attended the meetings as an observer. The Audit Committee met three times during 2009–10.

Intellectual Property Committee

The role of the Intellectual Property 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 relating to the management of intellectual property (IP). The Committee's specific responsibilities are to review the operation of CRDC's IP Policy and IP Operating Principles and to consider IP matters directed to it by the Board for consideration.

Mary Corbett was Chair of the Intellectual Property Committee in 2009–10. Kerry Adby and Glenn Fresser were the other members. Executive Director, Bruce Finney, attended as an observer. The committee met twice in 2009–10.

Remuneration Committee

The Remuneration Committee advises the Board on the Executive Director's remuneration and senior staff remuneration adjustments. In 2009–10, the members were Mike Logan (Chair), Leith Bouilly and Peter Hayes. The Remuneration Committee met twice during 2009–10.

Board Charter

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

Indemnities

The Board has taken the necessary steps to ensure professional indemnity cover is in place for present and past Directors and officers of

Attendances at Audit Committee meetings

Member	Date of meeting		
	11 August 2009	20 January 2010	1 June 2010
Juanita Hamparsum (Chair)	Yes	Yes	Yes
Mike Logan	Yes	Yes	Yes
Lisa Wilson	Yes (by phone)	Yes	Yes

Attendances at Intellectual Property Committee meetings

Member	Date of meeting	
	19 February 2010	1 June 2010
Mary Corbett (Chair)	Yes	Yes
Kerry Adby	Yes	No
Glenn Fresser	Yes	Yes

Attendances at Remuneration Committee meetings

Member	Date of meeting	
	24 March 2010	2 June 2010
Mike Logan (Chair)	Yes	Yes
Leith Bouilly	Yes	Yes
Peter Hayes	Yes	Yes

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. These requirements, as well as government and industry research priorities, form the Corporation's planning instruments and are addressed in the three R&D programs devised under the five-year Strategic Plan for 2008–2013.

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*.

Legislative Functions

- 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, Cotton Australia, as well as the industry peak body, the Australian Cotton Industry Council (ACIC). Cotton Australia undertakes a range of functions relating to CRDC, including an annual review to ensure the CRDC Strategic Plan remains current and relevant. The cotton industry and cotton researchers were closely involved in development of the CRDC Strategic Plan 2008–2013, which incorporated Government and industry R&D priorities, as well as advice from the Minister and the Department of Agriculture, Fisheries and Forestry.

- 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 R&D 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 usually 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 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.

In order to ensure stringent evaluation of its R&D activities, CRDC is committed to the ongoing Council of Rural Research and Development Corporation's Impact Evaluation process.

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

Over the past decade, the Australian cotton industry has benefited from having an industry-wide extension network, the Cotton Catchment Communities CRC-coordinated Australian Cotton Extension Team. In 2009–10 industry consolidation and investigation of new approaches for supporting R&D adoption by CRDC led actions to transition to a new demand driven and 'commercial-like' model. The new model recognises the importance of supporting adoption of R&D through multiple delivery pathways and will be underpinned by the redevelopment of the industry best management practice program, myBMP.

CRDC staff members continued to play a pivotal role in facilitating fast and effective dissemination of CRDC-funded research outcomes.

More broadly, CRDC hosts forums, participates in roadshows and the annual cotton trade show, 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.

Responsible Minister

The Corporation is accountable to the Australian Parliament through the Minister for Agriculture, Fisheries and Forestry. The Hon Tony Burke MP was appointed Minister for Agriculture, Fisheries and Forestry on 3 December 2007 and continued in that role throughout 2009–10.

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, as well as other members of that Committee
- 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 2010, CRDC is compliant with 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 (see [page 104](#)), foreign exchange risk management, cost recovery policy, National Code of Practice for the Construction Industry (National Code) and the Australian Government Implementation Guidelines for the National Code of Practice for the Construction Industry (Implementation Guidelines), the Australian Government Property Ownership Policy 2005 and the Protective Security Manual 2005 as a general policy of government.

On 23 September 2008, the Minister directed CRDC to comply with the Australian Government Bargaining Framework when exercising its power to engage employees in relation to sections 12, 87 and 119 of the PIERD Act. Arrangements are being finalised in line with the Framework to ensure fairness and flexibility, promote productivity, provide for collective agreement negotiated at the individual authority level and enshrine accountability for compliance with the framework.

Research Accountabilities

The Corporation is accountable to the Australian people through the Australian Government and to the cotton industry through its industry representative body, Cotton Australia.

The Corporation has been subject to the *Commonwealth Authorities and Companies (CAC) Act 1997* since August 1998. The CAC Act provided enhanced levels of accountability, as well as a new planning and reporting framework. The Annual Operating Plan 2009–10 marked the second year of operation under the framework requirements of the Strategic Plan 2008–2013.

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 planned outcomes and the identification of key outputs.

Intellectual Property

A review of the Corporation's Intellectual Property (IP) procedures is underway and will be finalised in 2010–11.

In 2007–08, CRDC applied for a 'Cotton Ready' trademark for communication purposes. Due to changes in industry communication policies, this application is not proceeding. No other applications for patents or activities relating to patents were undertaken in 2009–10.

Risk Management

The Corporation has a Risk Management Plan as part of its approach to identifying and managing areas of significant business risk. Following a 2007 review by the Board's Audit Committee of the Corporation's risk management framework, new policies for Terms of Employment, Equal Employment Opportunity and Harassment, Appropriate Internet and Email Access, Government Protective Security, Delegations of Authority and Risk Register were implemented.

The risk management process also involves consulting widely and participating in appropriate industry, Rural Research and Development Corporations 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 since 1 March 2007. In accordance with subsections 28(2) and 28(3) of the CAC Act, the Corporation must ensure that the policy is carried out. Implementation of a Protective Security Policy for the Corporation was completed before the reporting year.

The Board holds a focused and facilitated strategic review session in conjunction with

Board meetings, focusing 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. In 2009–10, the Corporation adopted risk management as a standing item at staff meetings, including discussing and defining fraud.

During 2009–10, CRDC adopted new business continuity and donations policies. The Board updated policies for travel and fraud control (see the adjoining page).

Industry Stakeholder Reporting

CRDC’s reporting processes include the presentation of a formal report to its industry stakeholder. Part of this presentation includes an opportunity for questioning and debating Board decisions. The Corporation’s industry stakeholder is Cotton Australia. Further information on the relationship between the Corporation and Cotton Australia can be found on [page 38](#).

Risk Management

Directors and/or employees conducted, commissioned or enacted the following reviews during 2009–10:

Corporate reviews	
Review	Process and/or Outcome
Information and Communication Technologies (ICT)	An external audit found that ‘... taking into account the nature of CRDC’s business and size, we conclude that the Information Technology systems and Practices provide an adequate control framework which mitigates the risks inherent in IT environments.’ The audit recommendations, adopted by the CRDC Board in August 2009 informed an update to the ICT Security policy, with improvements to password, backup and support procedures.
Intellectual property (IP) procedures	A review is currently being undertaken and will be finalised in the 2010–2011 year.
Reserves policy	A review is currently being undertaken and will be finalised in the 2010–2011 year.
R&D strategic reviews	
R&D strategies	The Corporation internally reviewed each of the five-year strategies contained in the CRDC Strategic R&D Plan 2008–2013 to determine their continuing relevance to industry and government needs and found them to be current and relevant.

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 its Annual Operating Plan 2009–10 to the Minister for Agriculture, Fisheries and Forestry, the Hon. Tony Burke MP, on 30 April 2008 and received written advice of approval dated 25 June 2008. The Annual Operating Plan for 2010–11 was submitted on 23 April 2010 and received written advice of approval on 24 May 2010.

The Corporation submitted its Annual Report 2009–10 to the Minister on 3 October 2009 and received acknowledgement from him on 28 October 2009. The report was tabled in the House of Representatives on 16 November 2009.

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 Australian Government's Fraud Control Guidelines. 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) carry out the functions of a fraud investigation unit collectively, as described in the Commonwealth Fraud Investigation Model. The support of the Australian Federal Police would be sought if the Corporation felt there was a prima facie case of fraud and further investigation was required. No such action was necessary in 2009–10.

CRDC's fraud control policy and risk register were reviewed and updated in 2009–10 and an annual Fraud Control Plan adopted.

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 at the front of this publication. It embodies the set of values underlying our decisions, actions and relationships.

Our People

Employment

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 seven full-time employees and one part-time casual employee as at 30 June 2010.

The Minister has directed CRDC to comply with the Australian Government Bargaining Framework when exercising its power to engage employees in relation to sections 12, 87 and 119 of the PIERD Act. Arrangements are being finalised in line with the Framework to ensure fairness and flexibility, promote productivity, provide for collective agreement negotiated at the individual authority level and enshrine accountability for compliance with the framework with individual authorities.

Staff Changes during 2009–10

General Manager Business and Finance, David Coleman resigned on 17 July 2009 and was replaced on 7 September 2009 by Craig Young, who subsequently resigned on 29 January 2010. Graeme Tolson commenced as General Manager Business and Finance on 15 June 2010. Elizabeth Morrissey commenced as a casual Bookkeeper on 4 January 2010. Project Administration Manager Lee-Anne Melbourne completed her consultancy on 29 April 2010.

Appointments after the reporting year

Elizabeth Eather (formerly Morrissey), who had been employed as a casual Bookkeeper since 4 January 2010 was appointed permanently as part-time Trainee Accountant on 1 July 2010.

Staff training and development

The Corporation spent \$13,956.82 on training and \$31,051.00 on recruitment in 2009–10. Areas of direct training activities were Central Budget Management System training, executive coaching, first aid, facilitation, chartered secretaries' course, ComSuper workshop, national archive workshop, Australian Institute of Company Directors' company directors update (for a Board member) and a blended learning conference.

Throughout the year, Corporation Directors and staff participate in a wide range of Corporation-related activities involving external bodies relating to the operations of the

Corporation, providing valuable experience, as well as skills and knowledge upgrades for the personnel involved.

Equal Employment Opportunity

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

CRDC's Equal 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).

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 \$477,728.41 to remunerate consultants and contractors. Privacy and confidentiality arrangements mean that Corporation policy is not to disclose amounts paid to individual consultants. A list of contractors and consultants can be found on the adjoining page.

Organisational structure at 30 June 2009

CRDC Board of Directors		
Chair Mike Logan		
Executive Director Bruce Finney		
R&D Investment Team	Communication	Business and Finance Team
General Manager R&D Investment Bruce Pyke* Research Program Investment Managers Program 1 Dallas Gibb** Program 2 Tracey Leven* Program 3 Rohan Boehm* R&D Implementation Manager Helen Dugdale*	Manager Communication and Capacity Investment Rohan Boehm* <i>(also part of the R&D Investment Team)</i>	General Manager Business and Finance Graeme Tolson* Trainee Accountant Elizabeth Eather* Executive Assistant Dianne Purcell* Project Administration Manager (acting)/ Administrative Assistant Margaret Wheeler*
* Employee ** External (contractor)		

Contractors and consultants

Contractor	Service provided 2009–10
Aboriginal Employment Strategy Ltd	Temporary staff
Armtrol Security	Security
B&C Druce	Cleaning
Christine Brown	Publication content
Bytes & PCs Narrabri	IT support
CA (Pacific) Pty Ltd	IT support
Chasm Resources Pty Ltd	OH&S
Clancy Communications	NPSI consultant
Mary Ann Day	Publication content
Megan J James	Publication content
Melanie Jenson	Cotton Conference/ publication content
Lee-Anne Melbourne	Project administration management
Melissa Gabelle	IT support
Genya Miller	Publication content
Neil Deacon Art Director	Creative advice
Pink Hygiene Solutions	Hygiene amenities
Pola Media	Publication content
RMCG	NPSI support
Roth Rural & Regional Pty Ltd	NPSI coordination
Christopher Skene	IT support
TechMAC Pty Limited	Program management
Triple Helix Consulting	Strategic advice
Tristan Rossell	Publication content
Weemalah Writeability	Publication content, editing and design
Wordsworth Writing	Annual Report Indexing

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 on [page 106](#).

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 notified the Minister on 17 June 2009 that it proposed to assume the role of Managing Agent for the National Program for Sustainable Irrigation during 2009–10 and on 28 September notified him that the role had been formalised. This event had a significant impact on the Corporation operations in the reporting year but had occurred too late for inclusion in the Annual Operating Plan 2009–10.

The Corporation also provides regular briefings to the Minister for Agriculture, Fisheries and Forestry on its key issues and activities.

Significant Changes in the State of Affairs

CRDC had no significant change in its state of affairs in 2009–10 as defined in section 16 of the CAC Act 1997.

Judicial decisions and reviews by outside bodies

In 2009–10, CRDC had no judicial decisions or reviews by outside bodies within the meaning of Division two of Part two of the PIERD Act 1989.

Occupational Health and Safety

CRDC has a strong culture of achieving best practice and continuous improvement in Occupational Health and Safety (OH&S), as required by the *Occupational Health and Safety Act 1991*. This is achieved by providing the necessary resources (both human and financial) to ensure that OH&S functions effectively.

In terms of incidences of illness or injury, a more productive and available workforce, a lower

social impact as a result of workplace injury and reduced costs, as defined in s.74 (1) of the Act, CRDC is not able to demonstrate year-on-year improvement, as shown in the adjacent table:

The Corporation sets annual objectives for improvements under its Health and Safety Management Arrangements. In view of its OH&S record, CRDC remains vigilant in maintaining its safety performance by conducting both internal and external audits and reviews of policies and procedures, to ensure this incident-free record is maintained.

Notifiable OH&S incidents	2006–07	2007–08	2008–09	2009–10
Deaths	0	0	0	0
Dangerous occurrences	0	0	0	0
Serious personal injury	0	0	0	0
Incapacity	0	0	0	0
Total	0	0	0	0

CRDC Occupational Health and Safety 2009–10: a summary

Legislative reporting requirements under s.74 of the Occupational Health and Safety Act 1991	Action undertaken 2009–10
Health and safety management arrangements	Regular OH&S committee meetings. OH&S is a standing item at general staff meetings.
Initiatives during the year	An external audit of OH&S highlighted the Corporation's sound practices and systems already in place and recommended areas for improvement in information recording. These recommendations were implemented. Safety issues formally discussed, workplace inspections held (including vehicles) and staff consulted in resolving safety issues and physical conditions of the workplace. Flu vaccination program for all staff. General OH&S inductions were provided for new staff, directors and contractors.
Statistics of any accident or dangerous occurrence as defined by s.68 of the OH&S Act	CRDC had no OH&S incidents to report in 2009–10. Should any such incident occur, it would be managed in accordance with the Act.
Details of any investigations conducted during the year, including details of all notices given to the employee under s.29, 46 or 47 of the OH&S Act	CRDC conducted no investigations and no notices were given to an employee.

Freedom of Information

General enquiries regarding access to documents or other matters relating to Freedom of Information should be made in the first instance to the General Manager Business and Finance. The Corporation did not receive any requests under the *Freedom of Information Act 1982* in 2009–10.

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

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 in 2009–10 was Cotton Australia. The role of the industry representative body involves:

- 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 the industry representative body to ensure CRDC's activities for that year have met its strategic objectives (listed on [page 38](#) in this report) and to question senior staff on any matters of interest or concern.
- Other R&D-related activities, which vary from year to year.

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

In 2009–10, CRDC contributed a total of \$39,513 to Cotton Australia for the following activities:

- Review of CRDC research 2009–10 research applications and reports
- Support for the myBMP software program
- Support for the CottonMap Program
- Support for the Future Cotton Leaders Course



Financial Statements



INDEPENDENT AUDITOR'S REPORT

To the Minister for Agriculture, Fisheries and Forestry

Scope

I have audited the accompanying financial statements of the Cotton Research and Development Corporation for the year ended 30 June 2010, which comprise: the Statement by the Directors, Executive Director and Chief Finance Officer; Statement of Comprehensive Income; 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 Directors' Responsibility 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 controls 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. I have conducted my audit in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards. These auditing standards require that I comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Cotton Research and Development Corporation's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the

circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Cotton Research and Development Corporation's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the directors, as well as evaluating the overall presentation of the financial statements.

I believe that the audit evidence 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 2010 and its financial performance and cash flows for the year then ended.

Australian National Audit Office

S. Buchanan

Serena Buchanan
Senior Director

Delegate of the Auditor-General

Canberra
8 September 2010

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Statement by the Directors, Executive Director and Chief Finance Officer

In our opinion, the attached financial statements for the year ended 30 June 2010 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*, as amended.

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

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

Signed

Signed

Signed

Signed

Mike Logan
Chairperson

Juanita Hamparsum
Director

Bruce Finney
Executive Director

Graeme Tolson
Chief Finance Officer

8th September 2010

8th September 2010

8th September 2010

8th September 2010

STATEMENT OF COMPREHENSIVE INCOME*for the period ended 30 June 2010*

	Notes	2010 \$	2009 \$
EXPENSES			
Employee benefits	3A	1,163,108	1,176,962
Supplier expenses	3B	474,246	287,252
Grants	3C	9,810,662	7,882,847
Depreciation and amortisation	3D	53,338	61,408
Total expenses		11,501,354	9,408,469
LESS:			
OWN-SOURCE INCOME			
Own-source revenue			
Levies and penalties	4A	3,433,626	2,378,925
Interest	4B	567,559	739,565
Rental income	4C	15,000	15,000
Royalties	4D	1,896,750	1,610,254
Other	4E	2,826,716	500,488
Total own-source revenue		8,739,651	5,244,232
Gains			
Sale of assets	4F	—	796
Total gains		—	796
Total own-source income		8,739,651	5,245,028
Net cost of (contribution by) services		2,761,703	4,163,441
Revenue from Government	4G	2,996,541	2,435,794
Surplus (Deficit) attributable to the Australian Government		234,838	(1,727,647)
OTHER COMPREHENSIVE INCOME			
Changes in asset revaluation reserves		—	71,107
Total comprehensive income (loss) attributable to the Australian Government		234,838	(1,656,540)

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

BALANCE SHEET

as at 30 June 2010

	Notes	2010 \$	2009 \$
ASSETS			
Financial Assets			
Cash and cash equivalents	5A	11,282,420	9,376,385
Trade and other receivables	5B	3,384,817	3,077,730
Total financial assets		14,667,237	12,454,115
Non-Financial Assets			
Land and buildings	6A,C	540,500	550,000
Property, plant and equipment	6B,C	59,869	80,198
Intangibles	6D,E	31,997	55,506
Other	6F	7,485	7,965
Total non-financial assets		639,851	693,669
Total Assets		15,307,088	13,147,784
LIABILITIES			
Payables			
Suppliers	7A	73,452	30,417
Grants	7B	3,260,945	2,561,457
Other	7C	32,561	54,950
Total payables		3,366,958	2,646,824
Provisions			
Employee provisions	8A	222,363	205,952
Other	8B	1,187,921	–
Total provisions		1,410,284	205,952
Total Liabilities		4,777,242	2,852,776
Net Assets		10,529,846	10,295,008
EQUITY			
Parent Entity Interest			
Reserves		206,699	206,699
Retained surplus (accumulated deficit)		10,323,147	10,088,309
Total parent entity interest		10,529,846	10,295,008
Total Equity		10,529,846	10,295,008

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

STATEMENT OF CHANGES IN EQUITY*for the period ended 30 June 2010*

	Retained earnings		Asset revaluation reserve		Total equity	
	2010 \$	2009 \$	2010 \$	2009 \$	2010 \$	2009 \$
Opening balance						
Balance carried forward from previous period	10,088,309	11,815,956	206,699	135,592	10,295,008	11,951,548
Comprehensive income						
Other comprehensive income	-	-	-	71,107	-	71,107
Surplus (Deficit) for the period	234,838	(1,727,647)			234,838	(1,727,647)
Total comprehensive income	234,838	(1,727,647)			234,838	(1,656,540)
of which:						
Attributable to the Australian Government	234,838	(1,727,647)			234,838	(1,656,540)
Closing balance as at 30 June	10,323,147	10,088,309	206,699	206,699	10,529,846	10,295,008

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

CASH FLOW STATEMENT*for the period ended 30 June 2010*

	Notes	2010 \$	2009 \$
OPERATING ACTIVITIES			
Cash received			
Industry levies & penalties		3,113,854	2,276,179
Commonwealth contributions		3,475,473	1,430,175
Royalties		1,702,528	365,103
NPSI novation receipts		3,449,120	–
Interest		439,807	1,004,251
NPSI Interest		59,306	–
Net GST received		389,185	46,401
Other		529,646	474,076
Total cash received		13,158,919	5,596,185
Cash used			
Employees		1,171,032	1,151,846
Grants		9,088,938	6,802,187
Suppliers		269,931	418,749
NPSI novation grants paid		650,853	–
NPSI novation suppliers paid		72,130	–
Total cash used		11,252,884	8,372,782
Net cash from (used by) operating activities	9	1,906,035	(2,776,597)
INVESTING ACTIVITIES			
Proceeds from sales of property, plant and equipment		–	1,400
Net cash from (used by) investing activities		–	1,400
Net increase (decrease) in cash held		1,906,035	(2,775,197)
Cash and cash equivalents at the beginning of the reporting period		9,376,385	12,151,582
Cash and cash equivalents at the end of the reporting period	5A	11,282,420	9,376,385

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

COTTON RESEARCH AND DEVELOPMENT CORPORATION

SCHEDULE OF COMMITMENTS

as at 30 June 2010

BY TYPE	2010	2009
	\$	\$
Commitments receivable		
Operating lease income	8,250	8,250
GST recoverable on commitments	848,723	1,350,419
Total commitments receivable	856,973	1,358,669
Commitments payable		
Other commitments		
Operating leases	109,218	149,574
Research grant commitments	9,234,984	14,705,038
Total other commitments	9,344,202	14,854,612
Net commitments payable by type	8,487,229	13,495,943
BY MATURITY		
Commitments receivable		
Operating lease income		
One year or less	8,250	8,250
Total operating lease income	8,250	8,250
Other commitments receivable		
One year or less	848,723	1,350,419
Total other commitments receivable	848,723	1,350,419
Total commitments receivable	856,973	1,358,669
Commitments payable		
Operating lease commitments		
One year or less	48,541	44,678
From one to five years	60,677	104,896
Total operating lease commitments	109,218	149,574
Research grant commitments		
One year or less	4,852,792	8,486,816
From one to five years	4,382,192	6,218,222
Total other commitments	9,234,984	14,705,038
Net Commitments payable by maturity	8,487,229	13,495,943

NB: Commitments are GST inclusive where relevant.

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

Research grant commitments are amounts payable under grant agreements in respect of which the recipient is yet to perform the services required or meet eligibility conditions.

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

SCHEDULE OF CONTINGENCIES

as at 30 June 2010

The Corporation had no contingent assets and liabilities in the current or prior period.

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

Note 1: Summary of Significant Accounting Policies

1.1 Objective of Cotton Research and Development Corporation

Cotton Research and Development Corporation is an Australian Government controlled entity. The objective of the Corporation is to bring industry and researchers together to establish research and development strategic directions and to fund projects that provide the cotton industry with the innovation and productivity tools to compete in global markets.

The Corporation is structured to meet one outcome:

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

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

1.2 Basis of Preparation of the Financial Statements

The financial statements are required by clause 1(b) of Schedule 1 to the *Commonwealth Authorities and Companies Act 1997* and are general purpose financial statements.

The financial statements have been prepared in accordance with:

- Finance Minister's Orders (or FMOs) for reporting periods ending on or after 1 July 2009; 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 in accordance with historical cost convention, except for certain assets and liabilities at fair value. Except where stated, no allowance is made for the effect of changing prices on the results or the financial position.

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

Unless an alternative treatment is specifically required by an accounting standard or the 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 or a future sacrifice of economic benefits will be required and the amounts of the assets or liabilities can be reliably measured. However, assets and liabilities arising under 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 or the schedule of contingencies.

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

1.3 Significant Accounting Judgements and Estimates

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

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

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

I.4 New Australian Accounting Standards

Adoption of New Australian Accounting Standard Requirements

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

No new standards, amendments to standards or interpretations applicable to the current reporting period had a material financial impact, and are not expected to have a future financial impact on the entity.

Future Australian Accounting Standard Requirements

Of the new standards, amendments to standards or interpretations that have been issued by the Australian Accounting Standards Board that are applicable to future reporting periods, none will have a material impact on the Corporation.

I.5 Revenue

Revenue from the sale of goods is recognised when:

- the risks and rewards of ownership have been transferred to the buyer;
- the Corporation retains no managerial involvement or 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 associated with the transaction will flow to the entity.

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

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

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

Resources Received Free of Charge

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

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

Revenue from Government

Funding received or receivable from agencies (appropriated to the DAFF as a CAC Act body payment item for payment to the Corporation) is recognised as Revenue from Government unless they are in the nature of an equity injection or a loan.

I.6 Royalties

Revenue from royalties are recognised on an accruals basis in accordance with relevant agreements. Our major agreement in plant breeding royalties with CSIRO ceases at 30th June 2017.

1.7 Gains

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.

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

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 1.8).

Sale of Assets

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

1.8 Transactions with the Government as Owner

Equity Injections

Amounts that are designated as equity injections for a year are recognised directly in contributed equity in that year.

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.

1.9 Employee Benefits

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

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

Other long-term employee benefits 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 at the estimated salary rates that will be applied at the time the leave is taken, including the Corporation's employer superannuation contribution rates to the extent that the leave is likely to be taken during service rather than paid out on termination.

The liability for long service leave has been determined by reference to the work of an actuary as at 30 June 2010. The estimate of the present value of the liability takes into account attrition rates and pay increases through promotion and inflation.

Separation and Redundancy

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

Superannuation

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

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

The liability for defined benefits is recognised in the financial statements of the Australian Government and is settled by the Australian Government in due course. This liability is reported by the Department of Finance and Deregulation as an administered item.

The Corporation makes employer contributions to the employee superannuation schemes 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 days worked for the final fortnight of the year.

1.10 Leases

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

Where an 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.

1.11 Borrowing Costs

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

1.12 Cash

Cash and cash equivalents includes cash on hand and demand deposits in bank accounts with an original maturity of 12 months or less that are readily convertible to known amounts of cash and subject to insignificant risk of changes in value. Cash is recognised at its nominal amount.

1.13 Financial Assets

The Corporation classifies its financial assets in the following categories:

- 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 through the expected life of the financial asset, or, where appropriate, a shorter period.

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

Financial Assets at Fair Value Through Profit or Loss

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

- 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 Corporation 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.

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.

Available-for-sale financial assets are recorded at fair value. Gains and losses arising from changes in fair value are recognised directly in 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 and loss for the period. The Corporation has no available-for-sale assets. Where a reliable fair value cannot be established for unlisted investments in equity instruments cost is used. The Corporation has no such instruments.

Held-to-Maturity Investments

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

Loans and Receivables

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

Impairment of Financial Assets

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

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

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

1.14 Financial Liabilities

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

Financial liabilities are recognised and derecognised upon trade date.

Financial Liabilities at Fair Value Through Profit or Loss

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

Other Financial Liabilities

Other financial liabilities, 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 are recognised at amortised cost. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

Grants

Grant liabilities are recognised to the extent that:

- the services required to be performed by the grantee have been performed, or
- the grant eligibility criteria have been satisfied, but payments due have not been made.

A commitment is recorded when the Corporation enters into an agreement to make these grants but services have not been performed or criteria satisfied.

1.15 Contingent Liabilities and Contingent Assets

Contingent liabilities and contingent assets are not recognised in the 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 asset or liability in respect of which the amount cannot be reliably measured. Contingent assets are disclosed when settlement is probable but not virtually certain and contingent liabilities are disclosed when settlement is greater than remote.

1.16 Financial Guarantee Contracts

Financial guarantee contracts are accounted for in accordance with AASB 139 *Financial Instruments: Recognition and Measurement*. They are not treated as a contingent liability, as they are regarded as financial instruments outside the scope of AASB 137 *Provisions, Contingent Liabilities and Contingent Assets*. The Corporation does not have financial guarantee contracts.

1.17 Acquisition of Assets

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

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

1.18 Property, Plant and Equipment

Asset Recognition Threshold

Purchases of property, 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).

The initial cost of an asset includes an estimate of the cost of dismantling and removing the item and restoring the site on which it is located.

Revaluations

Fair values for each class of asset are determined as shown below:

Asset Class	Fair value measured at
Land	Market selling price
Buildings	Market selling price
Office equipment	Depreciated replacement cost
Computer equipment	Depreciated replacement cost
Fixtures and fittings	Depreciated replacement cost

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

Fair value is measured at market selling price where the market value can be determined in an "Active Market" in accordance with AASB 116 Property, Plant and Equipment, and AASB 136 Impairment. Where an active market is not available then "Depreciated Replacement Cost" has been used.

Revaluation adjustments 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 in the surplus/deficit. Revaluation decrements for a class of assets are recognised directly in the surplus/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

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

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

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

	2010	2009
Buildings on freehold land	40 years	40 years
Plant and Equipment	3 to 10 years	3 to 10 years

Impairment

All assets were assessed for impairment at 30 June 2010. 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.

Derecognition

An item of property, plant and equipment is derecognised upon disposal or when no further future economic benefits are expected from its use or disposal.

1.19 Intangibles

The Corporation's intangibles comprise internally developed software for internal use. These assets are carried at cost less accumulated amortisation and accumulated impairment losses.

Software is amortised on a straight-line basis over its anticipated useful life. The useful lives of the Corporation's software are 5 years (2008-09: 5 years).

All software assets were assessed for indications of impairment as at 30 June 2010.

1.20 Taxation

The Corporation is exempt from all forms of taxation except Fringe Benefits Tax (FBT), NSW 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
- for receivables and payables.

Note 2: Events After the Reporting Period

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.

Note 3: Expenses

Note 3A: Employee Benefits

	2010	2009
	\$	\$
Wages and salaries	973,454	1,004,906
Superannuation:		
Defined contribution plans	75,461	69,679
Defined benefit plans	48,411	56,858
Leave and other entitlements	65,782	45,519
Total employee benefits	<u>1,163,108</u>	<u>1,176,962</u>

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	2010 \$	2009 \$
Note 3B: Suppliers		
Goods and services		
External parties	424,972	251,308
Total goods and services	424,972	251,308
Goods and services are made up of:		
Provision of goods – external parties	62,412	49,095
Rendering of services – external parties	362,560	202,213
Total goods and services	424,972	251,308
Other supplier expenses		
Operating lease rentals – external parties:		
Minimum lease payments	48,237	34,294
Workers compensation expenses	1,037	1,650
Total other supplier expenses	49,274	35,944
Total supplier expenses	474,246	287,252
Note 3C: Grants		
Public sector:		
Australian Government entities (related entities)	2,529,109	1,859,792
State and Territory Governments	1,359,437	994,358
Universities & Colleges	594,370	318,959
Other Research Institutions	3,777,822	3,698,113
Corporate activities	932,838	683,225
Private sector:		
Commercial entities	617,086	328,400
Total grants	9,810,662	7,882,847
Note 3D: Depreciation and Amortisation		
Depreciation:		
Buildings	9,500	9,423
Office equipment	4,097	4,097
Computer equipment	11,814	18,960
Fixtures & fittings	4,418	4,419
Total depreciation	29,829	36,899
Amortisation:		
Intangibles:		
Computer software	23,509	24,509
Total amortisation	23,509	24,509
Total depreciation and amortisation	53,338	61,408
Note 4: Income		
REVENUE		
Note 4A: Levies and Penalties		
Industry Levies	3,433,414	2,374,239
Penalties	212	4,686
Total fees and fines	3,433,626	2,378,925

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	2010 \$	2009 \$
Note 4B: Interest		
Deposits	499,354	739,565
Deposits held for NPSI	68,205	–
Total interest	567,559	739,565
Note 4C: Rental Income		
Operating lease:		
Other	15,000	15,000
Total rental income	15,000	15,000
Note 4D: Royalties		
Patents	1,896,750	1,610,254
Total royalties	1,896,750	1,610,254
Note 4E: Other Revenue		
Resources received free of charge:		
Project Refunds	476,652	498,300
Industry Grants	–	2,188
Land & Water Communications Grant	280,000	–
NPSI novation revenue utilised	1,947,643	–
Other Revenue	122,421	–
Total other revenue	2,826,716	500,488
GAINS		
Note 4F: Sale of Assets		
Property, plant and equipment:		
Proceeds from sale	–	1,400
Carrying value of assets sold	–	(604)
Net gain from sale of assets	–	796
REVENUE FROM GOVERNMENT		
Note 4G: Revenue from Government		
Department of Agriculture, Fisheries and Forestry PIERD Act 1989 Contribution	2,996,541	2,435,794
Total revenue from Government	2,996,541	2,435,794
Note 5: Financial Assets		
Note 5A: Cash and Cash Equivalents		
Cash on hand or on deposit	4,782,420	1,376,385
Deposits on Call	6,500,000	8,000,000
Total cash and cash equivalents	11,282,420	9,376,385

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	2010 \$	2009 \$
Note 5B: Trade and Other Receivables		
Other receivables:		
GST receivable from the Australian Taxation Office	121,552	105,732
Interest	119,897	51,451
Industry levies receivable	744,711	424,939
Commonwealth contributions receivable	560,746	1,039,678
Royalties receivable	1,757,080	1,387,249
Other receivables	80,831	68,681
Total other receivables	3,384,817	3,077,730
Total trade and other receivables (net)	3,384,817	3,077,730
Receivables are expected to be recovered in:		
No more than 12 months	3,384,817	3,077,730
More than 12 months	-	-
Total trade and other receivables (net)	3,384,817	3,077,730
Receivables are aged as follows:		
Not overdue	3,371,858	3,077,730
Overdue by:		
0 to 30 days	-	-
31 to 60 days	-	-
61 to 90 days	-	-
More than 90 days	12,959	-
Total receivables (gross)	3,384,817	3,077,730

Note 6: Non-Financial Assets

Note 6A: Land and Buildings

Land at fair value	170,000	170,000
Buildings on freehold land:		
Fair value	380,000	380,000
Accumulated depreciation	(9,500)	-
Total buildings on freehold land	540,500	550,000

No indicators of impairment were found for land and buildings.

No land or buildings are expected to be sold or disposed of within the next 12 months.

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	2010 \$	2009 \$
Note 6B: Property, Plant and Equipment		
Office equipment:		
Fair value	40,970	40,970
Accumulated depreciation	(16,359)	(12,262)
Accumulated impairment losses	-	-
Total office equipment	24,611	28,708
Computer equipment:		
Fair value	49,692	51,942
Accumulated depreciation	(41,478)	(31,915)
Accumulated impairment losses	-	-
Total computer equipment	8,214	20,027
Fixtures and fittings:		
Fair value	44,188	44,188
Accumulated depreciation	(17,144)	(12,725)
Accumulated impairment losses	-	-
Total fixtures and fittings	27,044	31,463
Total property, plant and equipment	59,869	80,198

All revaluations were conducted in accordance with the revaluation policy stated at Note 1. On 30th June 2009, an independent valuer conducted the revaluations.

Revaluation for land (2009: increment of \$40,000) and for buildings on freehold land (2009: increment of \$31,107) were credited to the asset revaluation reserve by asset class and included in the equity section of the balance sheet.

No indicators of impairment were found for property, plant and equipment.

No property, plant or equipment is expected to be sold or disposed of within the next 12 months.

Note 6C: Reconciliation of the Opening and Closing Balances of Property, Plant and Equipment (2009–10)

	Land	Buildings	Total	Office	Computer	Fixtures	Total	Total
	\$	\$	land and	equipment	equipment	& fittings	property,	Total
	\$	\$	buildings	\$	\$	\$	plant &	\$
							equipment	\$
As at 1 July 2009								
Gross book value	170,000	380,000	550,000	40,970	51,942	44,188	137,100	687,100
Accumulated depreciation and impairment	-	-	-	(12,262)	(31,915)	(12,725)	(56,902)	(56,902)
Net book value 1 July 2009	170,000	380,000	550,000	28,708	20,027	31,463	80,198	630,198
Additions by purchase	-	-	-	-	-	-	-	-
Depreciation/amortisation expense	-	(9,500)	(9,500)	(4,097)	(11,813)	(4,419)	(20,329)	(29,829)
Disposals:								
Gross book value	-	-	-	-	(2,250)	-	-	(2,250)
Accumulated depreciation	-	-	-	-	2,250	-	-	2,250
Net book value 30 June 2010	170,000	370,500	540,500	24,611	8,214	27,044	59,869	600,369
Net book value as of 30 June 2010 represented by:								
Gross book value	170,000	380,000	550,000	40,970	49,692	44,188	134,850	684,850
Accumulated depreciation/amortisation	-	(9,500)	(9,500)	(16,359)	(41,478)	(17,144)	(74,981)	(84,481)
	170,000	370,500	540,500	24,611	8,214	27,044	59,869	600,369

Note 6C (Continued): Reconciliation of the Opening and Closing Balances of Property, Plant and Equipment (2008-09)

	Land	Buildings	Total land and buildings	Office equipment	Computer equipment	Fixtures & fittings	Total property, plant & equipment	Total
	\$	\$	\$	\$	\$	\$	\$	\$
As at 1 July 2008								
Gross book value	130,000	376,918	506,918	40,970	58,692	44,188	143,850	650,768
Accumulated depreciation/amortisation and impairment	-	(18,602)	(18,602)	(8,165)	(19,101)	(8,306)	(35,572)	(54,174)
Net book value 1 July 2008	130,000	358,316	488,316	32,805	39,591	35,882	108,278	596,594
Additions:								
By purchase	-	-	-	-	-	-	-	-
Revaluations & impairments recognised in other comprehensive income	40,000	31,107	71,107	-	-	-	-	71,107
Depreciation expense	-	(9,423)	(9,423)	(4,097)	(18,960)	(4,419)	(27,476)	(36,899)
Disposals:								
Gross book value	-	-	-	-	(6,750)	-	(6,750)	(6,750)
Accumulated depreciation	-	-	-	-	6,146	-	6,146	6,146
Net book value 30 June 2009	170,000	380,000	550,000	28,708	20,027	31,463	80,198	630,198
Net book value as of 30 June 2009 represented by:								
Gross book value	170,000	380,000	550,000	40,970	51,942	44,188	137,100	687,100
Accumulated depreciation/amortisation	-	-	-	(12,262)	(31,915)	(12,725)	(56,902)	(56,902)
	170,000	380,000	550,000	28,708	20,027	31,463	80,198	630,198

COTTON RESEARCH AND DEVELOPMENT CORPORATION

	2010 \$	2009 \$
Note 6D: Intangibles		
Computer software:		
Purchased	117,545	117,545
Accumulated amortisation	<u>(85,548)</u>	<u>(62,039)</u>
Total intangibles	<u>31,997</u>	<u>55,506</u>

No indicators of impairment were found for intangible assets.

No intangibles are expected to be sold or disposed of within the next 12 months.

Note 6E: Reconciliation of the Opening and Closing Balances of Intangibles

	Computer software purchased 2010 \$	Computer software purchased 2009 \$
As at 1 July		
Gross book value	117,545	117,545
Accumulated depreciation/amortisation and impairment	<u>(62,039)</u>	<u>(37,530)</u>
Net book value 1 July	55,506	80,015
Amortisation	<u>(23,509)</u>	<u>(24,509)</u>
Net book value 30 June	31,997	55,506
Net book value as of 30 June represented by:		
Gross book value	117,545	117,545
Accumulated depreciation/amortisation and impairment	<u>(85,548)</u>	<u>(62,039)</u>
	31,997	55,506

Note 6F: Other Non-Financial Assets

Prepayments (current)	<u>7,485</u>	<u>7,965</u>
Total other non-financial assets	7,485	7,965

No indicators of impairment were found for other non-financial assets.

Note 7: Payables

Note 7A: Suppliers

Trade creditors and accruals	<u>73,452</u>	<u>30,417</u>
Total supplier payables	73,452	30,417
Supplier payables expected to be settled within 12 months:		
External parties	73,452	30,417
Supplier payables expected to be settled in greater than 12 months:		
External parties	-	-
Total supplier payables	<u>73,452</u>	<u>30,417</u>

Settlement is usually made within 30 days.

COTTON RESEARCH AND DEVELOPMENT CORPORATION

	2010 \$	2009 \$
Note 7B: Grants		
Grants:		
Public sector:		
Australian Government entities (related entities)	1,086,877	1,079,234
State and Territory Governments	699,252	323,869
Universities and colleges	492,556	106,932
Other research organisations	807,297	761,237
Private sector:		
Other	174,963	290,185
Total grants	<u>3,260,945</u>	<u>2,561,457</u>

Total grants, subsidies and personal benefits are expected to be settled in:

No more than 12 months	3,260,945	2,561,457
More than 12 months	-	-
Total grants	<u>3,260,945</u>	<u>2,561,457</u>

Settlement is usually made according to the terms and conditions of each grant. This is usually within 30 days of performance.

Note 7C: Other Payables

Employee withholdings payable	24,893	45,595
Taxes payable	7,668	9,355
Total other payables	<u>32,561</u>	<u>54,950</u>

Total other payables are expected to be settled in:

No more than 12 months	32,561	54,950
More than 12 months	-	-
Total other payables	<u>32,561</u>	<u>54,950</u>

Note 8: Provisions

Note 8A: Employee Provisions

Leave	205,422	194,471
Salary and wages	16,528	11,382
Superannuation	413	99
Total employee provisions	<u>222,363</u>	<u>205,952</u>

Employee provisions are expected to be settled in:

No more than 12 months	163,132	154,230
More than 12 months	59,231	51,722
Total employee provisions	<u>222,363</u>	<u>205,952</u>

COTTON RESEARCH AND DEVELOPMENT CORPORATION

	2010 \$	2009 \$
Note 8B: Other Provisions		
Novation of National Program for Sustainable Irrigation Revenue received in advance refundable on termination of agreement	<u>1,187,921</u>	—
Total other provisions	<u>1,187,921</u>	—
Other provisions are expected to be settled in:		
No more than 12 months	855,069	—
More than 12 months	<u>332,852</u>	—
Total other provisions	<u>1,187,921</u>	—

The Novated Program Management Agreement for the National Program for Sustainable Irrigation states in clause 14.5 Repayment of Contributions: The Manager must, on termination of this agreement, repay any unexpended or uncommitted monies to the Parties in accordance with their respective Interests.

The Program Management Agreement also states that any Party to the agreement can terminate the agreement with 60 days notice. Therefore, partner contributions received and held by Cotton Research and Development Corporation are a current liability held in trust until paid to Project Researchers in accordance with the research agreements.

The Corporation currently has no agreements for the leasing of premises.

Note 9: Cash Flow Reconciliation

Reconciliation of cash and cash equivalents as per Balance Sheet to Cash Flow Statement

Cash and cash equivalents as per:

Cash flow statement	11,282,420	9,376,385
Balance sheet	<u>11,282,420</u>	<u>9,376,385</u>
Difference	<u>—</u>	<u>—</u>

Reconciliation of net cost of services to net cash from operating activities:

Net cost of services	(2,761,703)	(4,163,441)
Add revenue from Government	2,996,541	2,435,794

Adjustments for non-cash items

Depreciation / amortisation	53,338	61,408
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Changes in assets / liabilities

(Increase) / decrease in net receivables	(306,989)	(2,241,232)
(Increase) / decrease in prepayments	382	17,573
Increase / (decrease) in employee provisions	16,410	(9,529)
Increase / (decrease) in employee withholdings	(20,702)	45,595
Increase / (decrease) in supplier payables	43,036	(31,324)
Increase / (decrease) in other payable	(1,687)	(21,155)
Increase / (decrease) in grants payable	699,488	1,129,714
Increase / (decrease) in NPSI novation payable	<u>1,187,921</u>	—

Net cash from (used by) operating activities	<u>1,906,035</u>	<u>(2,776,597)</u>
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Note 10: Contingent Liabilities and Assets**Significant Remote Contingencies**

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 2009–10 Commonwealth contributions were capped to a GVP of \$2,996,541, leaving a remote contingent receivable of \$10.484m. The probability of receiving this receivable is remote whilst cotton production and prices continue to remain low.

Note 11: Directors Remuneration**Director's Remuneration**

	\$ 2010	\$ 2009
The number of senior executives who received:		
less than \$15,000	–	7
\$15,000 to \$29,999	7	3
\$30,000 to \$44,999	1	1
\$220,000 to \$234,999	–	1
\$235,000 to \$249,999	1	–
Total	9	12
Total full-time equivalent director positions:	9	9

Total expense recognised in relation to Director's employment

Short-term employee benefits:		
Salary (including annual leave taken)	363,160	339,176
Changes in leave provisions	(7,345)	16,107
Other ¹	9,056	19,051
Total Short-term employee benefits	364,871	374,334
Superannuation (post-employment benefits)	32,685	30,526
Total	397,556	404,860

During the year the entity paid \$nil in termination benefits to directors (2009: \$nil)

Notes: 1. Other includes motor vehicle allowances, other allowances and fringe benefits tax on allowances.

Note 12: Related Party Disclosures

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.

Grants to director-related entities

Australian Rural Leadership Foundation	–	23,920
CRC Irrigation Futures	78,215	–
CSIRO (Entomology, Plant Industry, Land & Water, Textile & Fibre)	–	1,639,672
Queensland Dept. Of Primary Industries & Fisheries	681,133	480,018
University of Queensland	5,000	17,800
Grants to director-related entities	764,348	2,161,410

Note 13: Executive Remuneration**Note 13A: Actual Remuneration Paid to Executives**

	2010	2009
The number of Senior Executives of the Authority included in these figures are shown below in the relevant remuneration bands:		
less than \$145,000*	3	1
\$160,000 to \$174,999	1	–
\$175,000 to \$189,999	–	1
Total	<u>4</u>	<u>2</u>
Total full-time equivalent senior executive positions:	<u>2</u>	<u>2</u>

* Excludes part year and acting arrangements.

Changes to Finance Minister's Orders require disclosure of senior executive amounts to include amounts less than \$145,000. The comparative year amounts have not been changed to reflect the new procedure.

	2010	2009
	\$	\$
Short-term employee benefits:		
Salary (including annual leave taken)	195,039	264,737
Changes in leave provisions	(2,929)	17,401
Other ¹	<u>26,628</u>	<u>17,000</u>
Total Short-term employee benefits	<u>218,738</u>	<u>299,138</u>
Superannuation (post-employment benefits)	25,942	23,826
The aggregate amount of total remuneration of senior executives shown above.	<u>244,680</u>	<u>322,964</u>
The aggregate amount of separation and redundancy/termination benefit payments during the year to executives shown above.	<u>6,423</u>	<u>2,444</u>

Notes: 1. Other includes motor vehicle allowances, other allowances and fringe benefits tax on allowances.

Note 13B: Salary Packages for Executives

Average annualised remuneration packages for substantive Executives

As at 30 June 2010		
No.	Base salary (including annual leave)	Total remuneration package ¹
Averaged Annualised Remuneration Package ^{2, 3} :		
	\$	\$
less than \$145,000	1	123,853
\$160,000 to \$174,999	1	135,724
Total	2	171,490

As at 30 June 2009		
No.	Base salary (including annual leave)	Total remuneration package ¹
Averaged Annualised Remuneration Package ^{2, 3} :		
	\$	\$
less than \$145,000	1	129,055
\$160,000 to \$174,999	1	135,724
Total	2	171,490

Notes

1. Non-Salary elements available to Senior Executives include:
 - (a) Performance Bonus
 - (a) Motor vehicle allowance
 - (b) Superannuation
2. Average Annualised Remuneration Package include:
 - (a) The salary and remuneration package as at 30th June 2010 annualised.
 - (b) The average of total remuneration packages where more than one executive is in a band.
3. Average Annualised Remuneration Package excludes leave accruals.
4. The amounts in Note 13A are actuals and do not match Note 13B as packages may change during the year.

Note 14: Average Staffing Levels

	2010	2009
The average staffing levels for the Corporation during the year were:	7.2	8.0
	2010	2009
	\$	\$

Note 15: Remuneration of Auditors

Financial statement audit services are provided to the Corporation by the Auditor General.

The fair value of the services provided was:	12,250	12,100
	12,250	12,100

No other services were provided by the Auditor-General.

Note 16: Financial Instruments

	2010	2009
Note 16A: Categories of Financial Instruments	\$	\$
Financial Assets		
Loans and receivables:		
Cash & cash equivalents	11,282,420	9,376,385
Trade and other receivables	1,957,808	1,507,381
Carrying amount of financial assets	13,240,228	10,883,766
Financial Liabilities		
At amortised cost:		
Grants payable	3,260,945	2,561,457
Other payables	73,452	30,417
Carrying amount of financial liabilities	3,334,397	2,591,874
Note 16B: Net Income and Expense from Financial Assets		
Loans and receivables		
Interest revenue	567,559	739,565
Net gain/(loss) from financial assets	567,559	739,565

Note 16C: Fair Value of Financial Instruments

	Carrying amount 2010	Fair value 2010	Carrying amount 2009	Fair value 2009
	\$	\$	\$	\$
Financial Assets				
Cash & cash equivalents	11,282,420	11,282,420	9,376,385	9,376,385
Trade and other receivables	1,957,808	1,957,808	1,507,381	1,507,381
Total	13,240,228	13,240,228	10,883,766	10,883,766
Financial Liabilities				
Grants payable	3,260,945	3,260,945	2,561,457	2,561,457
Other payables	73,452	73,452	30,417	30,417
Total	3,334,397	3,334,397	2,591,874	2,591,874

1. The Corporation's financial assets and financial liabilities comprise cash and deposits held at banks, current receivables and current liabilities. It is held that their carrying amount and fair value are the same.

Note 16D: Credit Risk

The Corporation's maximum exposure to credit risk is the risk that arises from the potential default of a debtor. This amount is equal to the total amount of trade receivables (2010: \$3,384,817 and 2009: \$3,077,730). The Corporation has assessed that there is no risk of default and has not recognised an impairment allowance account.

The Corporation manages its credit risk through monthly reviews by management of the Corporation's investments and the use of policies and procedures that guide employees in managing debtors.

The Corporation holds no collateral to mitigate against credit risk.

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

	Not past due nor impaired	Not past due nor impaired	Past due or impaired	Past due or impaired
	2010	2009	2010	2009
	\$	\$	\$	\$
Cash and cash equivalents	11,282,420	9,376,385	-	-
Trade and other receivables	1,944,849	1,507,381	12,959	-
Total	13,227,269	10,883,766	12,959	-

Ageing of financial assets that were past due but not impaired for 2010

	0 to 30 days	31 to 60 days	61 to 90 days	90+ days	Total
	\$	\$	\$	\$	\$
Trade and other receivables	1,944,849	-	-	12,959	1,957,808
Total	1,944,849	-	-	12,959	1,957,808

Ageing of financial assets that were past due but not impaired for 2009

	0 to 30 days	31 to 60 days	61 to 90 days	90+ days	Total
	\$	\$	\$	\$	\$
Trade and other receivables	1,507,381	-	-	-	1,507,381
Total	1,507,381	-	-	-	1,507,381

The following list of assets have been individually assessed as impaired

The Corporation's receivables overdue are not impaired as they relate to grant refunds due from government entities and the grants have not been finalised.

Note 16E: 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.

Maturities for non-derivative financial liabilities 2010

	On demand	within 1 year	1 to 5 years	> 5 years	Total
	\$	\$	\$	\$	\$
Grants payable	–	3,260,945	–	–	3,260,945
Other payables	–	73,452	–	–	73,452
Total	–	3,334,397	–	–	3,334,397

Maturities for non-derivative financial liabilities 2009

	On demand	within 1 year	1 to 5 years	> 5 years	Total
	\$	\$	\$	\$	\$
Grants payable	–	2,561,457	–	–	2,561,457
Other payables	–	30,417	–	–	30,417
Total	–	2,591,874	–	–	2,591,874

The Corporation manages its finances to ensure it has adequate funds to meet payments as they fall due. In addition, the Corporation has policies in place to ensure timely payments are made when due and has no past experience of default.

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

Note 16F: Market Risk

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

Interest Rate Risk

The only interest-bearing items on the balance sheet are the "Cash and cash equivalents". Cash at bank has variable interest rates and term deposits have fixed interest. Interest will fluctuate due to changes in the market interest rate. The interest rate risk does not have any impact on the fair value of the Cash and cash equivalents.

Interest rates for cash held at banks in operating accounts and at call accounts ranged from 0% to 4.5% as at 30th June 2010. Term deposit fixed interest rates during the year increased from 3.9% to 6.33% and have been fluctuating around 6.0% at the end of the year. It is expected that interest rates will remain volatile as the world economy continues to effect the Australian economic recovery. The sensitivity analysis has used 150 basis points as a reasonable representation of the continued volatility in the economy.

Sensitivity analysis of the risk that the Corporation is exposed to for 2010

	Risk variable	Change in Risk variable	Effect on	
			Profit and loss	Equity
		%	\$	\$
Interest rate risk	Interest	+1.50%	154,941	154,941
Interest rate risk	Interest	-1.50%	(154,941)	(154,941)

Note 17: Reporting of Outcomes

The Corporation is structured to meet one outcome:

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

Note 17A: Net Cost of Outcome Delivery

	Outcome 1	
	2010 \$	2009 \$
Expenses	11,501,354	9,408,469
Income from non-government sector		
Industry contributions	3,433,626	2,378,925
Interest	567,559	739,565
Other	4,738,466	2,126,538
Total	8,739,651	5,245,028
Net cost/(contribution) of outcome delivery	2,761,703	4,163,441

Note 17B: Major Classes of Expenses, Income, Assets and Liabilities by Outcomes

	Outcome 1	
	2010	2009
Expenses:		
Grants	9,810,662	7,882,847
Employees	1,163,108	1,176,962
Suppliers	474,246	287,252
Depreciation	53,338	61,408
Total	11,501,354	9,408,469
Income:		
Income from government	2,996,541	2,435,794
Industry contributions	3,433,626	2,378,925
Interest	567,559	739,565
Other	4,738,466	2,126,538
Total	11,736,192	7,680,822
Assets		
Cash and cash equivalents	11,282,420	9,376,385
Trade and other receivables	3,384,817	3,077,730
Land and buildings	540,500	550,000
Infrastructure, plant and equipment	59,869	80,198
Intangibles	31,997	55,506
Other non-financial assets	7,485	7,965
Total	15,307,088	13,147,784
Liabilities		
Grants payable	3,260,945	2,561,457
Suppliers payable	73,452	30,417
Other payables	32,561	54,950
Employee provisions	222,363	205,952
Other provisions	1,187,921	–
Total	4,777,242	2,852,776



Appendices

1 July 2010

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* (PIRD Act), I write to inform you of the activities of the Cotton Research and Development Corporation (CRDC) Selection Committee during the period 1 July 2009 to 30 June 2010.

The three-year terms of the seven Directors appointed by you to the CRDC Board commenced on 1 October 2008. Accordingly, there was no requirement for a Selection Committee to be authorised in the 2009–10 year and no costs have been incurred.

Yours sincerely

Dr Prue McMichael
Presiding Member
CRDC Selection Committee

Appendix Two OPERATION SUNLIGHT KEY PERFORMANCE INFORMATION 2009–10

Operation Sunlight is the Government's reform agenda to improve the openness and transparency of public sector budgetary and financial management and to promote good governance practices. The original policy and reforms were detailed in *Operation Sunlight – enhanced budget transparency; a practical suite of measures to enhance budget transparency* and were developed after extensive consultation with a range of academics, journalists, and professional analysts. Find further information at www.finance.gov.au.

Operation Sunlight has six key objectives:

1. Tightening the outcomes and outputs framework;
2. Changing the Budget Papers to improve their readability and usefulness;
3. Improving the transparency of estimates;
4. Expanding the reach of budget reporting;
5. Improving inter-generational reporting; and
6. Improving the financial framework.

CRDC planned outcome 2008–2013

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

To achieve the outcome

Goal One: Add value to the Australian cotton industry with premium products in improved routes to market (Program One: Value Chain)

Goal Two: Cotton in a highly productive farming system with improved environmental performance (Program Two: Farming Systems)

Goal Three: Development of a culture of innovation and learning (Program Three: Human Capacity)

Key Performance Information 2009–10*

* as submitted by CRDC in the Portfolio Budget Statement for 2009–10

KPIs 2009–10	KPIs Strategic Plan 2008–2013	Number required 2009–10	Comment
Goal One			
New spinning and classing technologies	Interim reports	2	Partially achieved. Novel spinning technology investigation leading to future collaboration with Hong Kong Polytechnic University, CSIRO and Deakin University. Evaluation of how new spinning software technology, Cottonspec, can be used to add value to Australian cotton is underway.
Market potential for modified cottonseed and cottonseed oils	Human product analysis	1	Partially achieved. Field trial in 2009, approved by the Office of the Gene Technology Regulator. Seed harvested from trial will be processed in 2010 for use in cottonseed oil trials and food service sector trials, such as frying tests.

KPIs 2009–10	KPIs Strategic Plan 2008–2013	Number required 2009–10	Comment
Warehousing BMPs	Development	1	Achieved. Draft warehousing BMPs developed and will be incorporated into post-farm gate BMP system for evaluation in 2010–11.
Goal Two			
Greenhouse gas measurement	Interim reports	2	Achieved. Collaborative research involving GRDC, DAFF, Cotton CRC, DEEDI and QUT at Kingsthorpe near Toowoomba further clarified greenhouse gas emissions for irrigated cotton and grain systems.
	Final report		Achieved. A final report on the Life Cycle Assessment of a 100 per cent Australian Cotton t-shirt has been completed, showing that cotton production, ginning and spinning contributes many times less greenhouse emissions over the life of a cotton product than do laundering and drying. It also showed that production of a cotton t-shirt is associated with lower greenhouse gas emissions than a polyester t-shirt.
Measuring N use efficiency protocol	Interim reports	1	Achieved. The cotton industry now has protocols for the measurement of nitrogen use efficiency in commercial crops. Leaf testing during the season can be used to indicate how closely the supply of nitrogen to the crop has matched the crop's needs. In addition, the testing of seed from the crop at the end of the season is being investigated as an alternative method of evaluating the efficiencies of N use.
	Final report	1	Partially achieved. Research on this project was completed on 30 June 2010 and a final report is due by 30 September 2010.
Farming systems research program in coastal North Queensland	Interim reports	2	Achieved. New investment, partnering with CSIRO, complements current investment by Cotton CRC and DEEDI. Together the projects will see a comprehensive agronomic package for cotton production in the Burdekin irrigation area available by 2012. The first interim report was received in May 2010, highlighting significant gains in knowledge and establishment of medium to long term research sites.
New methods for measuring refuge crops	Interim reports	2	Partially achieved. New investment into enhancing refuges is underway with research partner CSIRO. A new method for measuring the production of moths by refuge crops has been used in field trials in 2009–10 with some success, although modification is required before it could be adopted more broadly. Searches for molecular markers in moths that identify which plant hosted the larval stage of development have been unsuccessful to date. Identification of markers would greatly assist in measuring how effective the refuge crop strategy is in the Australian environment.
Changes in resistance to insecticides and transgenic (Bt) cotton			Achieved. Annual monitoring of resistance to insecticides and Bt resistance in <i>Helicoverpa armigera</i> and <i>H. punctigera</i> populations is sensitive enough to detect small changes in the occurrence of resistance. Monitoring provides the industry with early warning to enable early response. The industry's preventative resistance management practices can be changed before resistance builds to levels that would result in the field failure of insecticide or Bt products. Monitoring in 2009–10 showed no changes in resistance frequencies.

KPIs 2009–10	KPIs Strategic Plan 2008–2013	Number required 2009–10	Comment
Changes in resistance to insecticides and transgenic (Bt) cotton (cont.)	Surveys	1	Achieved. Annual monitoring of resistance to insecticides and Bt resistance in <i>Helicoverpa armigera</i> and <i>H. punctigera</i> populations is sensitive enough to detect small changes in the occurrence of resistance. Monitoring provides the industry with early warning to enable early response. The industry's preventative resistance management practices can be changed before resistance builds to levels that would result in the field failure of insecticide or Bt products. Monitoring in 2009–10 showed no changes in resistance frequencies.
	Result communication forums	1	Achieved. Research into the stewardship of Bt cotton in Australia, undertaken in both the public and private sectors, was jointly presented to the cotton industry in August 2009. The forum was followed by a series of regional meetings, ensuring all parties in the industry had direct access to latest research findings.
Collaborative farming systems research	Identification of opportunities	1	Achieved. CRDC and GRDC worked together in 2009–10 to identify opportunities for collaborative farming systems research.
	Collaborative model established	1	Partially achieved. CRDC and GRDC have identified several opportunities for collaborative research, such as in weeds R&D, integrated pest management and insecticide resistance monitoring. However, it has been found that the nature of the collaborations in each instance is unique to the issue at hand, thus making the development of a broad investment collaborative model challenging. Nevertheless the alignment of business processes and regular exchanges between program managers and grower advisor panels for each organisation have enabled easier identification of priorities and subsequent development of collaborative opportunities.
	Events held to promote innovative practice	1	Achieved. CRDC worked collaboratively with the Cotton CRC to hold the Cotton Industry's second Big Day Out in Cotton event, the focus of which was innovative practices in dryland cotton production. The event was attended by 140 people from across all cotton producing regions, including irrigated cotton producers looking for opportunities to innovate their farming practices to increase the value of rainfall in their operations. A third event is planned for 2010–11.
Goal Three			
Online aggregation of knowledge services and systems	Farmplus pilot	1	Achieved. A demonstration of the FarmPlus system showed that a purpose-designed searching system could capably aggregate contemporary information.

Appendix Three ECOLOGICALLY SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL PERFORMANCE

CRDC has integrated the principles of ecologically sustainable development under s.516A of the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* into its planning framework and developed contributions to Strategic Plan Measures of Success within each program for the broader triple bottom line outputs contained in the CRDC Strategic R&D Plan 2008–2013. In line with this, the Annual Operating Plan 2009–10 was designed to ensure strategic research initiatives that provide measurable environmental, economic and social benefits to the cotton industry and the wider community.

The principles contained in the EPBC Act 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.

Each of the three programs contains research investments that support these principles. Program One extends environmental sustainability and best practice beyond the farmgate into the areas of classing and ginning.

Program Two contributes research that enhances on-farm sustainability and catchment health, and addresses the adaptation to, and mitigation of, climate change.

Program Three addresses the skills and education, health and wellbeing and economic sustainability of industry participants and cotton communities. Within this program, CRDC also addresses the development of the capacity of women, through support of Wincott (Women's Industry Network – Cotton) in particular, and indigenous participants (through investment in a school-based traineeship program, developed by CRDC with the help of the Aboriginal Employment Strategy and the Cotton Catchment Communities CRC), and farming families. The development of leadership skills for the industry and wider agricultural communities is a priority, with a high take up of these opportunities by women a notable feature in recent years.

To ensure sustainably produced cotton, CRDC developed, and continues to broaden and update, the cotton industry's environmental management system, Best Management Practices (BMP). BMP facilitates continuous improvement in farm and environmental risk management throughout the value chain – 'from field to fabric'.

These environmental and social objectives also underpin the economic viability of the industry. Improvements in the efficient use of resources (water, nutritional supplements and chemicals), crop yields per hectare, and efficient farming methods aid the economic performance of cotton growers. A three-year contract with Crop Consultants Australia gathers on-farm information across the industry, which CRDC then analyses.

Appendix Four

RESEARCH AND DEVELOPMENT PORTFOLIO

Contracted R&D Organisations 2009–10

ACSA	Australian Cotton Shippers Association	POL	Cooperative research Centre for Polymers
BGC	Bill Gordon Consulting	DAN	New South Wales Department of Primary Industry
CA	Cotton Australia	DAQ	Queensland Department of Primary Industries
CRC	Cotton Catchment Communities Cooperative Research Centre	QUT	Queensland University of Technology
CRDC	Cotton Research and Development Corporation	RIR	Australian Rural Leadership Foundation
CCA	Crop Consultants Australia	RIRDC	Rural Industries Research and Development Corporation
CIF	Cooperative Research Centre for Irrigation Futures	RST	Peter R Day Resource Strategies Pty Ltd
CMSE	CSIRO Entomology	SRDC	Sugar Research and Development Corporation
COT	CSIRO Plant Industries and Cotton Seed Distributors (CottTech Unincorporated Joint Venture)	SRP	Soils Research Pty Ltd
CSP	CSIRO Plant Industries	TFT	CSIRO Material Science and Engineering
CSE	CSIRO Entomology	VDPI	Victorian Department of Primary Industries
CTFT	CSIRO Material Science and Engineering	UA	University of Adelaide
EF	Emergent Futures Pty Ltd	UCQ	University of Central Queensland
FP	Farm Plus	UQ	University of Queensland
GHD	GHD Pty Ltd	USQ	University of Southern Queensland
GMW	Goulbourn-Murray Water	VICDPI	Department of Primary Industries, Victoria
IAL	Irrigation Australia Ltd		
LWA	Land and Water Resources Research and Development Corporation		
NEC	National Centre for Engineering in Agriculture, University of Southern Queensland		

Research and Development Investments

Project ID	Project	Organisation	Researcher	Start Date	End Date
Program One: VALUE CHAIN					
ACSA1001	Mills Survey	ACSA	Peter Johnson	1-07-09	30-06-12
ACSA1001.I	Mills Survey-India	ACSA	Peter Johnson	1-07-09	30-06-10
CMSEI001	Investigation new SFC measurement in Australian Cotton	CSIRO	Stuart Gordon	1-07-09	30-06-10
CMSEI002	Relevance of classing grade on textile processing and quality	CSIRO	Rene Van der Sluijs	1-07-09	31-12-10
CMSEI003	Premium Cotton initiative 2009-10	CSIRO	Rene Van der Sluijs	1-07-09	30-06-10
CRC1019	Upgrade and evaluate modified lint cleaner	CSIRO	Kevin Bagshaw	1-07-10	30-06-11
CRC1004	Agronomic Management to Optimise Textile Performance	CRC	Michael Bange	1-07-09	30-06-12
CRC1007	Cotton Field to Fabric Training Course	CRC	Rene van der Sluijs	1-07-09	30-06-12
CRC1008	Technical Support of SiroMat in the Australian Market	CRC	Stuart Gordon	1-05-08	30-06-11

Project ID	Project	Organisation	Researcher	Start Date	End Date
CRCI009	Industrial Testing and Commercial Development of Moisture and Contamination Sensors	CRC	Stuart Gordon	1-07-09	30-06-12
CRDCI012	350B Grower compensation	CRDC	Growers	1-07-09	30-06-10
CRDCI013	P.Johnston "Australian Cotton Story"	CRDC	Peter Johnson	1-07-09	30-06-11
CRDCI014	FreeForm: Branding Project	CRDC	Peter Johnson	1-07-09	30-06-11
CTFT16A	Improving the Nep Levels in Australian Cotton	CSIRO	Rene van der Sluijs	1-07-09	30-06-10
NEC15	Energy study -Cotton Ginning	NEC	Guangnan Chen	1-06-08	30-09-09
TFT0002	Ginning BMP	CSIRO	Rene van der Sluijs	1-07-08	30-06-11
TFT0003	Classification of Cotton	CSIRO	Rene van der Sluijs	1-07-08	30-06-11
TFT0004	Commercialisation of Cottonscan	CSIRO	Geoff Naylor	1-06-08	2-12-10
TFT0903	Mills Survey II	CSIRO	Rene van der Sluijs	1-06-09	30-06-11
TFT0903.2	Mills Survey – additional fibre sampling	CSIRO	Rene van der Sluijs	1-06-09	30-06-10
R&D Investment Program One				\$1,185,266.00	
Program Two FARMING SYSTEMS					
02CRC011	PhD M Burns: Catchment scale risk assessment for agrochemicals	CRC	Mitchell Burns	1-01-08	31-12-10
03CRC003	PhD G Ali: Genetic Factors involved in pathogenicity of Thielaviopsis basicola towards cotton	CRC	Getachew Ali	1-07-07	30-06-10
03CRC005	Disease of Cotton IX	CRC	David Nehl	1-07-07	30-06-10
03CRC006	Linking cotton-pathogen molecular interactions and black root rot management	CRC	Joelle Coumons	1-07-07	30-06-10
03CSE005	Implications of Bt resistance in H. armigera	CSIRO	Rod Mahon	1-07-07	30-06-10
03CSP012	Soil impacts on the incidence and evaluation of Fusarium wilt	CSIRO	Bo Wang	1-07-07	30-06-10
03DAN001	IPM in Bollgard cotton – New tools and strategies II: A Farming Systems approach	NSW DPI	Robert Mensah	1-07-07	30-06-10
03DAQ003	Cotton Fusarium wilt management	QLD DPI	Linda Smith	1-07-07	30-06-10
03DAQ006	Silverleaf whitefly insecticide resistance monitoring 2007-2010	QLD DPI	Dave Murray	1-07-07	30-06-10
03UA002	Significance, mechanism and new management strategies of inducible tolerance	UA	Chelsea DuBois	1-07-07	31-12-10
04CRC008	Improving cotton nutrition diagnosis and N fertiliser use-efficiency	CRC	Ian Rochester	1-07-07	30-06-10
CSE0801	Genomics of Helicoverpa armigera insecticide resistance (PhD)	CSIRO	Claire Farnsworth	1-03-09	28-02-12
CAI001	Biosecurity Handbook, Greg Kauter, supporting the industries preparedness to deal with bio security threats	CA	Greg Kauter	1-07-09	30-06-10

Project ID	Project	Organisation	Researcher	Start Date	End Date
CCAI001	Helicoverpa egg collecting in cotton regions to support Bt and insecticide resistance monitoring	CCA	Fleur Anderson	1-09-09	31-08-12
CRCI001	The development of Sustainable Cotton Farming Systems for Coastal North Qld	CRC	Steve Yeates	1-07-09	30-06-12
CRCI002	The Ecology and Sustainable Management of Soil Born Fungal Diseases	CRC	Alison Seyb	1-07-09	30-06-12
CRCI003	Managing Weeds and Herbicides in a Genetically Modified Cotton Farming System	CRC	Graham Denney	1-07-09	30-06-12
CRCI005	Enhancing the efficiency of Bt refuge crops within a changing cotton environment	CRC	Mary Whitehouse	1-07-09	30-06-12
CRCI006	Dynamic Deficits – matching irrigation to Plant Requirements in a Variable Climate	CRC	Rose Brodrick	1-07-09	30-06-12
CRCI010	CCA Consultants Post Season Survey and Grower Context Survey	CRC	Fleur Anderson	1-07-09	30-06-12
CRCI012	Collective NRM and socio economic scenarios in cotton communities	CRC	Sarah Hood	1-07-09	1-08-12
CRCI014	Desktop Publishing of Thesis	CRC	Guy Roth	1-03-10	30-06-10
CRCI015	Economic-environmental water trade-offs in the Namoi under climate change and variability (PhD)	CRC	Alison Wilson	1-04-10	31-03-13
CRCI10	Benefits of establishing and managing native vegetation on cotton farms – Namoi Catchment	CRC	Rhiannon Smith	1-04-06	1-07-10
CRCI11	Is the source of mirids in cotton derived from local dispersal or long distance migration?	CRC	James Hereward	1-03-06	30-06-10
CRCI29	Assessing Limited Water Management Strategies in Cotton Farming Systems	CRC	Jose Payero	1-04-07	31-03-10
CRCI34	Promoting cotton BMP adoption – General Manager	CRC	Louise Adcock	1-09-07	31-08-09
CRCI38	Postgraduate: Todd Green – Ecology of Fleabane (<i>Conyza</i> spp)	CRC	Todd Green	1-01-07	31-10-10
CRCI39	Postgraduate: Meredith Errington – Nutrient redistribution within cotton plants	CRC	Meredith Errington	1-10-07	30-09-10
CRCI40	Postgraduate: John Bennett – Getting the best out of gypsum and lime to combat sodicity in the Macquarie and Lachlan valleys	CRC	John Bennett	5-03-07	5-03-10
CRCI46	Weed Management Strategies for Farming Systems with Herbicide Tolerant Cotton	CRC	Jeff Werth	1-07-08	30-06-11
CRCI49	Deep Drainage Under Irrigated Cotton – Surface and Groundwater Implications	CRC	Thusitha Gunawardena	1-07-08	30-06-11

Project ID	Project	Organisation	Researcher	Start Date	End Date
CRCI150	Maintaining Profitability and Soil Quality in Cotton Farming Systems III	CRC	Nilantha Hulugalle	1-07-08	30-06-11
CRCI151	Development of A Quantitative Set of Eniro Economic Stainability Indicators	CRC	Angus Crossan	1-07-08	30-07-11
CRCI154	Emerging Pests: Developing Knowledge for GVB and Aphids	CRC	Lewis Wilson	1-07-07	30-06-10
CRCI155	Management of Mirids and Stinkbugs in Bollard II	CRC	Moazzem Khan	1-07-08	30-06-11
CRCI156	Opportunities for Linking Research, Extension and BMP-Facilitation	CRC	Sandra Deutscher	1-07-08	30-06-11
CRDCI006	The Strategic Decision of BMP	CRDC	Stuart Higgins	1-08-09	31-08-10
CSE0002	Monitoring for resistance in BT toxins	CSIRO	Sharon Downes	1-07-08	30-06-11
CSE0003	Gene silencing technologies to control <i>H. armigera</i>	CSIRO	Rod Mahon	1-07-08	31-07-10
CSPI001	Whitefly study trip	CSIRO	Simone Heimoana	1-07-09	30-06-10
CSPI003	USDA Trip for BGII and pest management, Lewis Wilson	CSIRO	Lewis Wilson	1-05-10	31-07-10
DANI96	Helicoverpa spp. Insecticide Resistance	NSW DPI	Louise Rossiter	1-07-08	30-06-11
DANI97	Sustainable chemical control of Mirids, Aphids and TSM in cotton	NSW DPI	Grant Herron	1-07-08	30-06-11
DAQ0001	Developing the capacity to manage Cotton Viral Diseases	QLD DPI	Cherie Gambley	1-07-08	30-06-11
DAQ0002	Tobacco streak virus in cotton-scoping study	QLD DPI	Murray Sharman	1-07-08	30-06-11
DAQI001	Defining critical soil nutrient concentrations in soils supporting irrigated cotton in Nth NSW and Qld (GRDC DAQ00148-1)	GRDC	Mike Bell	1-07-09	30-09-12
DAQI002	Insecticide efficacy trials: Burdekin, Melina Miles.	QLD DPI	Melina Miles	1-04-10	30-06-10
LWA0003	Water Smart Cotton Farms in NSW – Rod Jackson	NPSI	Rod Jackson	1-07-08	30-06-11
QUT2	Benchmarking and reducing greenhouse gas emissions and improving resource use efficiency	QUT	Peter Grace	1-01-07	31-12-09
QUT3	Greenhouse Gas Field Measurement Equipment	QUT	Peter Grace	25-06-10	30-09-10
UQI001	Flight characteristics of Helicoverpa spp in relation to the efficiency of transgenic cotton refuges	UQ	Jason Callander	15-09-09	15-09-12
UQI002	Spray drift data and modelling needs – a one day workshop	UQ	Andrew Hewitt	10-10-09	14-10-09
USQ9	Postgraduate: Alison McCarthy – Optimal irrigation of cotton via real-time, adaptive control of large mobile irrigation machines	USQ	Alison McCarthy	5-03-07	5-03-10
R&D Investment Program Two				\$4,975,930.00	

Project ID	Project	Organisation	Researcher	Start Date	End Date
Program Three: HUMAN CAPACITY					
04LWA001	NPSI Phase 2 (Commissioned)	NPSI	Guy Roth	1-07-08	30-06-10
BGCI001	Building industry capacity for continual improvement of application and drift management	BGC	Bill Gordon	1-05-09	30-06-12
BGCI001A	Building industry capacity for continual improvement of application and drift management	BGC	Bill Gordon	1-11-09	30-06-12
CA0901	Cotton Australia – Future Leaders Course 2009-2010	CA	Adam Kay	1-10-08	31-08-10
CA0901.1	Travel Support: Kevin Bagshaw CSIRO future cotton leader program	CSIRO	Kevin Bagshaw	1-06-10	30-08-10
CA0901.2	Travel Support: Susan Maas CSIRO future cotton leader program	CSIRO	Susan Maas	1-06-10	31-08-10
CAI002	Development of Cotton map: herbicide sensitive awareness map, Greg Kauter	CA	Greg Kauter	1-07-09	30-06-10
CRCI011	Delivering Regional Extension in Qld Farming Systems – Darling Downs	CRC	Duncan Weir	1-07-09	30-06-12
CRCI013	Delivering Regional Extension to St George Dirranbandi	CRC	Dallas King	1-07-09	30-06-10
CRCI016	Primary Industry Centre for Scientific Education	CRC	David Russell	1-07-09	30-06-12
CRCI017	Sustaining Rural Communities Conference	CRC	Paula Jones	1-03-10	30-04-10
CRCI43	Delivering Regional Extension in NSW cotton farming systems	CRC	James Hill and Sally Morgan	25-06-07	30-06-10
CRCI47	Professional Development Manager Cotton – National Cotton Training Co-ordinator	CRC	Mark Hickman	1-07-05	30-06-11
CRCI48	Delivering regional Extension Services – Central Queensland	CRC	Susan Maas	1-07-08	30-06-11
CRDCI001	Field to Fabric Course – A Parkes	CRDC	Andrew Parkes	21-07-09	23-07-09
CRDCI002	Field to Fabric Course – M Carberry	CRDC	Michael Carberry	21-07-09	23-07-09
CRDCI003	Field to Fabric Course – B Gray	CRDC	Barbara Grey	21-07-09	23-07-09
CRDCI004	Field to Fabric Course – C Berry	CRDC	Chris Berry	21-07-09	23-07-09
CRDCI005	Field to Fabric Course – E McPherson	CRDC	Elle McPherson	21-07-09	23-07-09
CRDCI008	Piloting a Cotton Agribusiness Engagement Strategy to support development of an innovative agribusiness sector	CDI	Gordon Stone	1-07-09	30-06-10
CRDCI010	Big Day Out Management T.Leven	CRDC	Tracey Leven	1-03-10	30-03-10

Project ID	Project	Organisation	Researcher	Start Date	End Date
CRDC1011	Field to Fabric Course – 4 Recipients 2010	CRDC	Helen Dugdale	1-07-10	30-06-11
CRDC1015	Sponsorship of student to Euroscience forum P O'Connor	CRDC	Patrick O'Connor	1-07-10	31-07-10
CSEI001	ASSAB Conference sponsorship, Mary Whitehouse	CSIRO	Mary Whitehouse	1-04-10	10-05-10
CSPI002	Int. Congress of Plant Pathology and Fus. Italy	CSIRO	Bo Wang	1-07-09	31-07-09
DANI001	Global Biosecurity Conference 2010	NSW DPI	Chris Anderson	27-02-10	4-03-10
DANI002	Fusarium training workshop and Cotton Blue disease diagnostic survey	NSW DPI	Alison Seyb	28-02-10	13-03-10
DANI004	Travel: R.Mensah World Forum Conference Cambridge to present paper.	NSW DPI	Robert Mensah	1-06-10	30-08-10
EF1001	Cotton Industry Vision	CRDC	Sandy Teagle	7-07-09	28-02-10
FP0902	Farm Plus Pilot Program	Farmplus	Brendon Fox	1-01-09	30-11-09
RIRDC002	Farm Health and Safety – Joint Venture	RIRDC	Helen Moffett	1-07-08	30-06-12
RIRDC1001	Investing in Youth Undergraduate Studentship Program	RIRDC	Rohan Boehm	1-12-09	2-01-14
VDPI001	Support of the Australian Agricultural and Natural Resources Online (AANRO) Database	VIC DPI	Phillip Jones	1-07-08	30-09-10

R&D Investment Program Three \$950,861.00

Program Four: NATIONAL PROGRAM for SUSTAINABLE IRRIGATION

USQ5024	Review of precision irrigation technologies and their applications	USQ	Rod Smith	1-07-08	1-07-09
CIF5032	Farm dam management	CIF	Deborah Atkins	1-06-08	30-06-10
GMW5034	Channel evaporation mitigation	GMW	Mike Shulz	1-07-08	30-06-10
UCQ5070	Optimising delivery and benefits of aerated irrigation water	UCQ	David Midmore	1-07-08	30-06-10
QPI5161	Increasing the resilience of Eastern Australian irrigation farm businesses	DAQ	Daniel Rodriguez	1-11-08	30-10-11
POL5067	New technologies to reduce evaporation from large water storages	POLCRC	David Solomon	1-01-10	30-06-11
SRP5026	Soil management for irrigated agriculture	SRP	Bruce Cockroft	1-07-08	1-05-11
CSE5029	Effect of changing irrigation strategies on biodiversity	CSE	Sue McIntyre	1-09-08	31-08-11
CIF5121	Managing soil salinity for wine quality	CIF	Michael McCarthy	1-06-08	30-06-11
GHD5207	WA ground and surface water	GHD	Fionnuala Hannon	1-02-09	31-07-10
UNSW5127	Quantifying surface-ground water exchange	UNSW	Richard Acworth	1-07-08	30-06-11

Project ID	Project	Organisation	Researcher	Start Date	End Date
IAL4975	Irrigation Australia Ltd Conference sponsorship	IAL	Jolyon Burnett	1-07-07	30-06-10
DAN5027	Knowledge and tools to manage fertigation technologies	DAN	Michael Treeby	1-05-08	30-06-10
CIF5033	Adaptive learning through five strands of root-zone knowledge	CIF	Rich Stirzaker	1-07-08	30-05-10
DAN5162	Water Smart in cotton and grains NSW	DAN	Janelle Montgomery	31-10-08	31-10-10
WVG1001	Upskilling water managers	WVG	Georgia Thomas	1-10-09	1-10-10
RST5115	Knowledge Harvest	RST	Peter Day	7-07-08	30-06-10
IAL4779	NPSI-IAL travel fellowship	IAL	Jolyon Burnett	1-07-08	30-06-10
SRD1001	Scholarship Claire Williams – Flinders Uni	SRDC	Claire Williams	15-12-09	15-03-10
SRD1002	Scholarship Megan Sebben Flinders Uni	SRDC	Megan Sebben	1-01-10	31-03-10
UCQ1001	Scholarship Michael Law	UCQ	Michael Law	26-02-10	30-06-10
GHD1001	Future vision for irrigation research, development and extension	GHD	Jan Paul van Moort	9-03-10	30-04-10
R&D Investment Program Four				\$1,562,584.00	

Total R&D Investment Portfolio 2009–10 \$8,674,641.00

Appendix Five ACRONYMS AND TERMINOLOGY

AACC	Australian Agricultural Colleges Corporation	CMSE	CSIRO Materials Science and Engineering
AANRO	Australian Agricultural and Natural Resources Online Database	CPFFH&S	Cooperative Partnership for Farming and Fishing Health & Safety
ABARE	Australian Bureau of Agricultural and Resource Economics	CPRS	Carbon Pollution Reduction Scheme
ACAH&S	Australian Centre for Agricultural Health & Safety	CRC	Cooperative Research Centre
ACIC	Australian Cotton Industry Council	CRDC	Cotton Research and Development Corporation
ACIPA	Australian Centre for Intellectual Property in Agriculture	CRRDCC	Council of Rural Research and Development Corporations' Chairs
ACGRA	Australian Cotton Growers Research Association	CSD	Cotton Seed Distributors Ltd (a grower-owned cooperative)
ACRI	Australian Cotton Research Institute	CSIRO	Commonwealth Scientific and Industrial Research Organisation
ACSA	Australian Cotton Shippers Association	CVCB	Cooperative Venture for Capacity Building
AES	Aboriginal Employment Strategy	DAFF	Australian Government Department of Agriculture, Fisheries and Forestry
ai/ha	Active ingredient per hectare	DECCW	NSW Department of Environment, Climate Change and Water
ANAO	Australian National Audit Office	DEEDI	Queensland Department of Employment, Economic Development and Innovation
ANCID	Australian National Committee on Irrigation and Drainage	DERM	Queensland Department of Environment and Resource Management
APVMA	Australian Pesticides and Veterinary Medicines Authority	DOFD	Australian Government Department of Finance and Deregulation
ARLP	Australian Rural Leadership Program	EIQ	Environmental Impact Quotient
AWAF	Department of Agriculture and Food, Western Australia	e-Learning	On-line learning, training and education
AWM	Area Wide Management	EM	Electromagnetic conductivity
Bollgard II®	Cotton varieties contain two genes resistant to <i>Helicoverpa</i> spp.	EPOI	Environmental Performance Indicator
BMP	Best Management Practices program	ESD	Ecologically Sustainable Development
BRS	Bureau of Rural Sciences	EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
Bt	<i>Bacillus thuringiensis</i> (crystal protein gene expressed in INGARD® and Bollgard II® cotton varieties)	FH&SVJ	Farm Health and Safety Joint Venture
CA	Cotton Australia	F Rank	Measure of Fusarium wilt resistance
CAC Act	<i>Commonwealth Authorities and Companies Act 1997</i>	FRDC	Fisheries Research and Development Corporation
CCA	Crop Consultants Australia Inc. (formerly Cotton Consultants Australia Inc.)	GM	Genetically modified
CCRSPI	National Climate Change Research Strategy for Primary Industries		
Cotton CRC	Cotton Catchment Communities Cooperative Research Centre		
CMA	Catchment Management Authority		

GMAC	Genetic Manipulation Advisory Committee		(now the NSW Department of Environment, Climate Change and Water
GOA	Groundrig Operators Association		
GRDC	Grains Research and Development Corporation		
HAL	Horticulture Australia Ltd		
ha.	Hectare		
<i>Helicoverpa</i> spp.	Cotton's major insect pests (<i>H. armigera</i> and <i>H. punctigera</i>)		
Heliothis	Insect pest, more properly known as <i>Helicoverpa</i> spp. (see above)		
I&I NSW	Industry and Investment NSW		
IBP	Industry Biosecurity Plan		
ICAC	International Cotton Advisory Committee		
IP	Intellectual Property		
IDM	Integrated Disease Management		
Irrigation deficit	Millimetres of plant-available soil water removed at the time of irrigation		
INGARD®	Cotton varieties containing one gene of resistance to <i>Helicoverpa</i> spp. (ceased use in 2004)		
IPM	Integrated Pest Management		
IRMS	Insecticide Resistance Management Strategy		
ISO	International Organisation for Standardisation		
IWM	Integrated Weed Management		
IWUI	Irrigation Water Use Index		
KPI	Key performance indicator (or information)		
LCA	Life Cycle Assessment		
LWA	Land and Water Australia (ceased operations in 2009)		
MLA	Meat and Livestock Australia		
MP	Member of Parliament		
NCEA	National Centre for Engineering in Agriculture, University of Southern Queensland		
NFF	National Farmers' Federation		
NHT	Natural Heritage Trust (Australian Government)		
NIPI	National Insect Pest Initiative		
NPSI	National Program for Sustainable Irrigation		
NRM	Natural Resource Management		
NSW DPI	NSW Department of Primary Industries (now part of Industry and Investment NSW)		
NSW DNR	Department of Natural Resources, New South Wales		
		NUEI	Nitrogen Use Efficiency Index
		OGTR	Office of the Gene Technology Regulator
		OH&S	Occupational health and safety
		PICSE	National Primary Industry Centre for Science Education
		PISC	Primary Industries Standing Committee
		PIERD Act	Primary Industries and Energy Research and Development Act 1989
		Pima cotton	<i>Gossypium barbadense</i> . Related to Egyptian cotton, having extra long and fine staples. Limited Australian production.
		QDPI&F	Department of Primary Industries and Fisheries, Queensland (now the Department of Employment, Economic Development and Innovation)
		QFF	Queensland Farmers ' Federation
		QNRM&W	Department of Natural Resources and Water, Queensland (now the Department of Environment and Resource Management)
		QUT	Queensland University of Technology
		RDC	Rural Research and Development Corporation
		RIRDC	Rural Industries Research and Development Corporation
		RMP	Resistance Management Plan
		SFF	Sustainable Farm Families
		SJV	San Joaquin Valley (California): the industry benchmark in the international marketplace species
		spp.	
		SRDC	Sugar Research and Development Corporation
		TIMS Committee	Transgenic and Insect Management Strategy Committee
		'Upland' cotton	<i>Gossypium hirsutum</i> . Comprises the vast majority of the Australian cotton crop, with Pima cotton (see above) comprising the remainder
		Wincott	Women's Industry Network – Cotton
		WUE	Water use efficiency

Appendix Six LEGISLATIVE COMPLIANCE INDEX

Commonwealth Authorities and Companies Act 1997, section 9

A. REPORT OF OPERATIONS

Preliminary

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Constructed in the interests of users	all pages
Freedom from ambiguity and jargon	all pages
Appropriate tables, graphs etcetera	all pages
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The background of the entire page is a close-up photograph of light-colored, possibly white or cream, fabric. The fabric has a fine, woven texture. Several white, round buttons with four holes are visible, some in sharp focus and others blurred. A line of white stitching is also visible, running diagonally across the lower right portion of the image. The lighting is soft and even, highlighting the texture of the fabric.

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