Cotton
RESEARCH & DEVELOPMENT

COTTON RESEARCH AND DEVELOPMENT CORPORATION

Five Year Strategic Research and Development Plan
2003–2008

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29th April 2003

Senator the Hon Judith Troeth
Parliamentary Secretary to the Minister for
Agriculture Forestry and Fisheries
Parliament House
Canberra ACT 2600

Dear Senator Troeth

I have pleasure in submitting to you the Cotton Research and Development Corporation's new Strategic Plan for 2003–2008.

The Strategic Plan incorporates the National Research Priorities as announced by the Prime Minister in December 2002 and the Government's priorities for Rural Research and Development Corporations that you announced in March this year. The Corporation has also consulted with the Australian Cotton Growers Research Association to ensure industry priorities are also addressed.

The Corporation's strategic planning framework focuses on achieving economic, environmental and social outcomes. This reflects a Triple Bottom Line approach to planning. The structure of the previous five year plan, with eleven programs, has been reviewed and reduced to six in order to obtain more integrated approaches to research and development.

The current drought has more than halved Australian cotton production, and hence levy payments, this season. The problem is exacerbated by the fact that because of the three year averaging method used to limit Commonwealth contribution, the Corporation's already depressed income will be further depressed.

In reducing its expenditure to responsible levels, the Corporation has been forced to curtain much important ongoing research. The Corporation, along with the Australian Cotton Growers Research Association, looks forward to discussing this with you.

Yours sincerely

Bridget Jackson

Chair

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COTTON RESEARCH AND DEVELOPMENT CORPORATION ABN 71 054 238 316

Senator the Hon Judith Troeth
Senator for Victoria

PARLIAMENTARY SECRETARY TO THE MINISTER FOR AGRICULTURE, FISHERIES AND FORESTRY

Ms Bridget Jackson
Chair
Cotton Research and Development Corporation
PO Box 282
NARRABRI NSW 2390

Dear Ms Jackson

Thank you for your letter of 29 April 2003 submitting the Cotton Research and Development Corporation's (CRDC) 2003–04 Annual Operational Plan (AOP) for my approval. Thank you also for the Corporation's new five year Research and Development (R&D) Plan for 2003–08 which you presented to me at our meeting on 30 April 2003.

I am pleased to see that both the R&D Plan and the Annual Operational Plan have been developed in line with the Primary Industries and Energy Research and Development Act 1989 (the PIERD Act), and have the necessary outcome-outputs framework, which will enable you to effectively assess the Corporation's performance in accordance with the provisions of the Commonwealth Authorities and Companies Orders for the Report of Operations in your Annual Report.

I appreciated the opportunity to meet with you, Mr Schulzé, Mr Williams and Mr Fresser on 30 April and understand fully the budgeting difficulties faced by the CRDC, given reduced income due to the impact of the drought. Both the Annual Operational Plan and five year R&D Plan indicate that the CRDC is facing the challenge and I believe the result will be a stronger and more resilient Corporation when the seasons return to more normal patterns.

In this regard, I was pleased to see a refocus of views with the new R&D Plan, in particular the expansion of water-related research. I also note the proposed streamlining of the R&D programs from eleven to six and I am pleased to see the Corporation is putting these changes into effect with its 2003–2004 AOP.

I am appreciative of the work involved in preparing the Plans and I would like to thank the Corporation and its staff for their efforts in preparing the Plans. Accordingly, under sections 20 and 26 of the PIERD Act, I approve the CRDC's five-year R&D Plan for the period 2003–2008 and the 2003–2004 Annual Operating Plan respectively.

Yours sincerely

Judith Troeth

JUDITH TROETH

Parliament House, CANBERRA ACT 2600
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Cotton
RESEARCH & DEVELOPMENT

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Back cover: Original painting of cotton by Diane Balwin-Elsden purchased by the Board of the Cotton Research and Development Corporation to celebrate the relaunch of its Narrabri premises in 2002.

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Introduction

FROM THE CHAIR,
COTTON RESEARCH AND DEVELOPMENT CORPORATION

Since the Corporation's inception ten years ago, the Australian cotton industry has achieved a 126 per cent increase in production, while the acreage devoted to cotton has increased by only 50 per cent. This reflects significant increases in production and yields, which can be attributed almost entirely to improved cotton breeding and better crop management systems. Importantly, these improvements have occurred with a reduced impact on the environment.

The challenge for the future is to build on the research and development that has contributed to the industry's remarkable achievements. This will be critical if Australia is to maintain its competitiveness in the world market place. At the same time, greater effort must be directed to further minimise any adverse environmental impacts.

Integrated Pest Management strategies, developed largely with CRDC funding, have enabled growers to reduce reliance on traditional chemical pesticides. The landmark Cotton Best Management Practices program, developed by CRDC and implemented by Cotton Australia, has led Australian agriculture in the development and implementation of industry-wide environmental and risk management systems and is a tremendous example of producers' commitment to improved environmental outcomes.

CRDC's strategic planning framework focuses on achieving 'Triple Bottom Line' economic, environmental and social outcomes, reflected in its planning, implementation and reporting. The eleven programs in the previous five year plan have been reduced to six, in order to obtain a more integrated approach to research and development. The Corporation has continued to refine its performance indicators to ensure their relevance to the Government's National Research Priorities and the Australian Cotton Growers Research Association industry objectives.

Among the many challenges facing this vibrant industry are the need to continue to focus on both meeting and exceeding the needs of the international market and the development of systems that reduce the incidence of disease and pest damage. These challenges must be met in the face of reduced funding as a result of the extreme drought, which will reduce significantly both industry and government contributions to the Corporation's revenue. A high priority in the short term is to ensure that key research and extension personnel are not lost from the industry.

Bridget Jackson
20 April 2003

FROM THE CHAIR,
AUSTRALIAN COTTON GROWERS RESEARCH ASSOCIATION

The investment by Australian cotton growers in strategic, locally targeted research and development is one of the bedrocks upon which the success of the Australian cotton industry is founded. It has led to the development of a world leading industry, supported by internationally recognised scientists.

I am proud of the role the Australian Cotton Growers Research Association (ACGRA) has played in this development, initially as the body responsible for establishing and managing a research fund, and now as the body that advises CRDC on research issues.

I would also like to commend CRDC's role in the success of the Australian cotton industry. CRDC has encouraged and developed a close working relationship with ACGRA, so providing ACGRA with an unsurpassed degree of involvement in the consideration of research funding. The Association's involvement in the development of this strategic plan is of course more evidence of the desire of CRDC to ensure that cotton growers remain intimately involved in the direction of research and development. Further, CRDC's decision to base itself 'in the field' means that it is accessible to cotton growers, and is greatly appreciated.

It is also important to acknowledge the support that the cotton industry receives from the Commonwealth Government. The Research and Development Corporation model has built on the industry's earlier R&D efforts, and provides the cotton industry with an enhanced ability to address the many challenges that are faced when endeavouring to produce in a sustainable manner a high quality, competitive product.

I have no doubt that new challenges, not contemplated by this strategic plan, will emerge before the plan reaches its use-by date. Equally however, I have no doubt that that CRDC and ACGRA will be more than able to confront those challenges as they have in the past — together, professionally and successfully.

Glenn Fleischfresser

A glance at the Australian cotton industry

Every day, everyone wears cotton clothing. Cotton is the most widely produced natural fibre in the world and represents about 46 per cent of the world textile market. By contrast, in the world marketplace, wool accounts for 3 per cent, synthetics 51 per cent and other fibres like silk, hemp and mohair make up a small proportion.

Cotton seed is a by-product of the more valuable cotton fibre, and makes up about 15 per cent of the total financial returns to farmers. For every 227 kilogram bale of cotton lint, about 300 kilograms of fuzzy seed is produced. Cotton seed is a valued raw material for food oils for human consumption and high protein feed for livestock.

Although cotton was introduced to Australia with the First Fleet, it did not establish itself, even as a minor commercial crop, until the 1850s. It was not until the 1860s that cotton became an important dryland crop to clear the way for dairying and pasture renovation on Queensland farms. It was a low input, low return crop. The most dramatic change to cotton production was the completion of Keepit Dam on the Namoi River and the subsequent introduction of irrigation in northern NSW during the 1960/70s that led to the development of the cotton industry as it is today.

There are about 1200 cotton farmers in Australia. Seventy per cent of Australia's cotton is grown in NSW with the remainder grown in Queensland (Figure 1). Cotton growing is also being trialled in northern Australia.

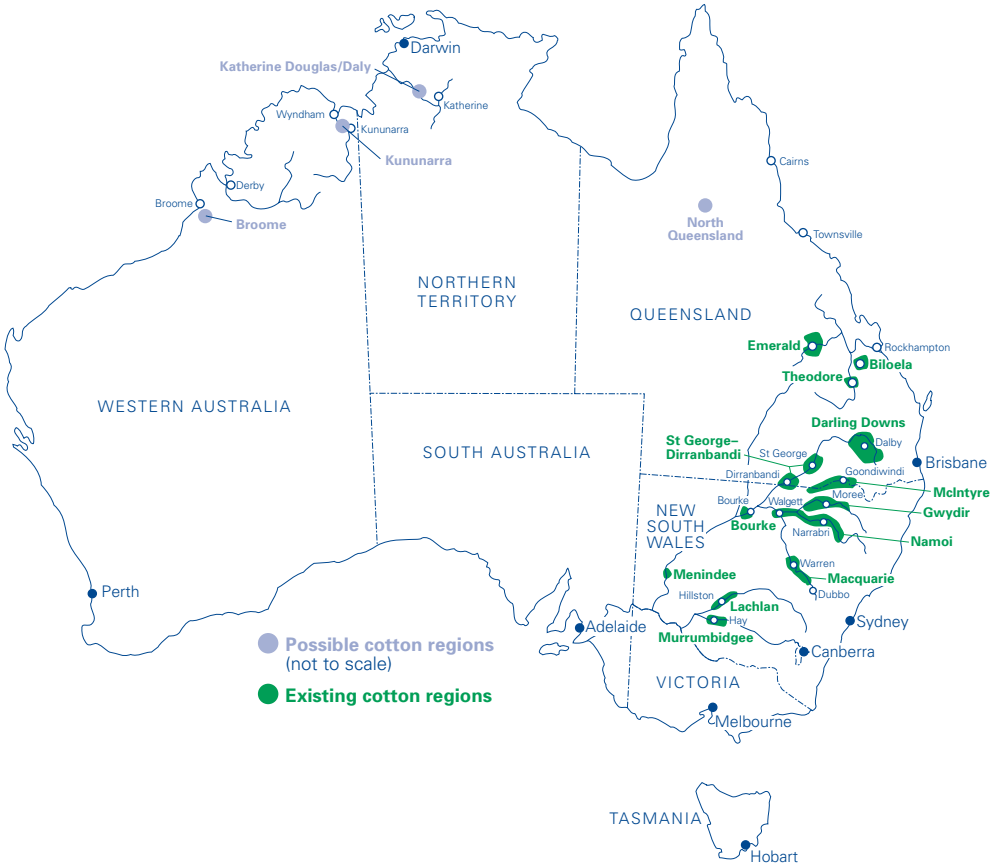


FIGURE 1 Cotton growing regions of Australia

Today, farms are typically 500–2000 hectares, highly mechanised, capital intensive, technologically sophisticated, require high levels of management expertise and about 80 per cent of farms are irrigated. About 400,000 hectares of irrigated cotton are grown in Australia depending on water availability. The area of rain grown or dryland cotton changes considerably from year to year depending on rain and prices. The area ranges from 5000–120,000 hectares, produced by up to 450 growers, with yields ranging from 200–1600 kilograms per hectare.

On a global scale Australia is a relatively small producer of cotton, growing about 3 per cent of the world's cotton, although Australia is the third largest exporter of cotton in the world. The largest producers are the USA, China, India, Pakistan and Uzbekistan.

Major buyers of Australian cotton are Indonesia, Japan, China, Thailand and South Korea. Australia has a reputation for producing high quality cotton. There is no government intervention in the growing or marketing of the crop. Since 1980, the value of Australian cotton produced annually has increased dramatically to about $1.4–1.6 billion per annum (Figure 2 opposite).

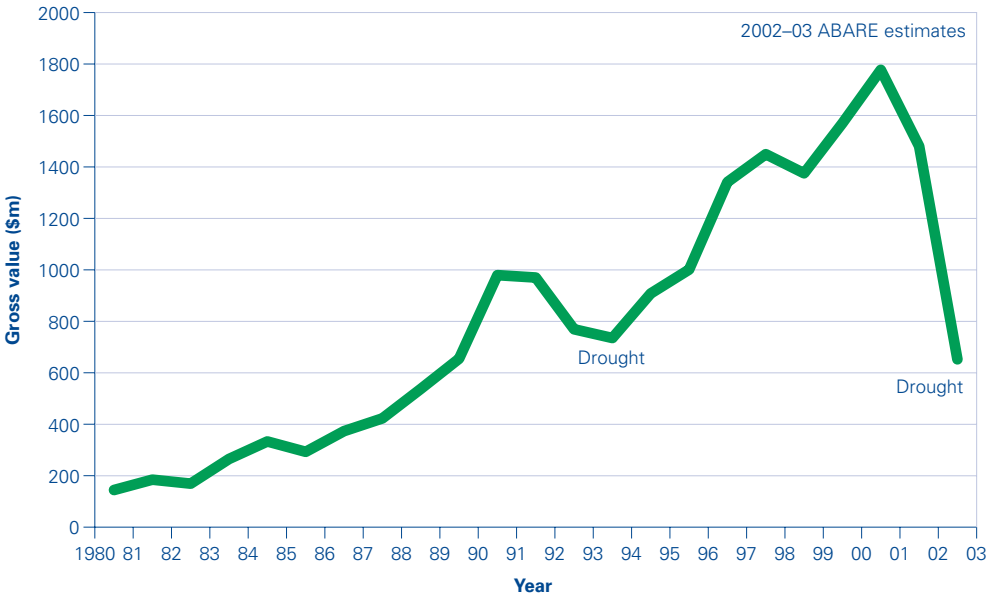


FIGURE 2: The gross value of Australian cotton (lint and seed value)

Since 1960, lint yields have steadily increased at about 30 kilograms of lint per hectare per year (Figure 3). Australian average yields are now the highest of any major cotton producing country in the world and yields have continued to edge upwards from 1200 kg/ha in the 1970s, through 1400 kg/ha in the 1980s to 1600 kg/ha in the 1990s. Research and development, combined with its practical implementation by Australian cotton growers, has under pinned these significant increases in production.

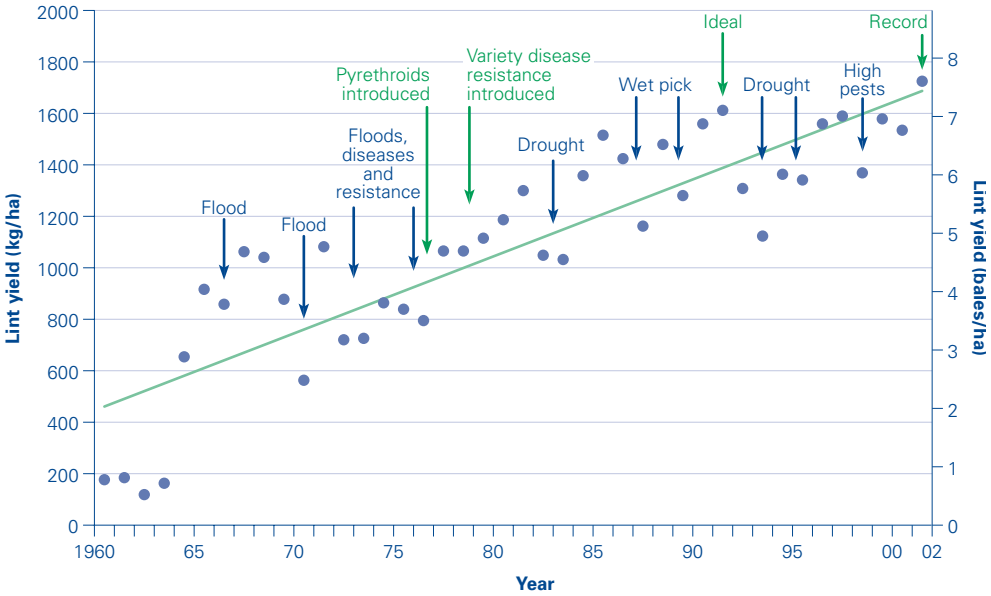


FIGURE 3: Australian average cotton lint yield: 1960–2002

The Corporation's strategic elements

VISION

A globally competitive and responsible cotton industry

MISSION

To invest and provide leadership in research, innovation, knowledge creation and transfer

OUTCOME

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

OUR KEY RESEARCH PARTNERS

- Australian Cotton CRC
- Commonwealth and State Agencies
- Cotton growers
- Cotton Consultants Association
- CSIRO
- Universities
- Rural Research & Development Corporations and Cooperative Research Centres
- Other agribusiness

OUR KEY STAKEHOLDERS

- Cotton growers and industry represented by the Australian Cotton Growers Research Association
- The Australian people represented by the Commonwealth Government

The Cotton Research and Development Corporation will implement its objectives and outcome using a triple bottom line framework delivering one integrated outcome via three outputs: Economic, Environmental and Social.

Addressing government and industry priorities

Following the announcement of the new National Research Priorities by the Prime Minister in December 2002, the Parliamentary Secretary for Agriculture, Fisheries and Forestry, Senator the Hon Judith Troeth, wrote to the Corporation in March 2003 to formally advise the Government's priorities for Rural Research and Development Corporations. The Corporation also consulted with the Australian Cotton Growers Research Association who provided an update on the cotton industry priorities and advice on the program structure and development of the strategies in this plan. The Corporation has developed its Strategic Plan in light of these National Research Priorities, Industry Priorities and the objectives of the Primary Industries and Energy Research and Development Act 1989. These relationships with the new program structure, Corporation outputs and outcome are detailed opposite.

Since its inception in 1990, the Corporation has been responding to industry and government priorities. Many of these past priorities, which formed the basis of previous CRDC's plans are consistent with the Government's new National Research Priorities. This means the Corporation is well positioned to deliver outcomes in the new national research priority areas and priorities for Rural Development Corporations.

RESEARCH PRIORITIES OF THE COMMONWEALTH GOVERNMENT

An environmentally sustainable Australia / Sustainable natural resource management

Sustainability of the natural resource base forms one of the three research and development Outputs in the Corporation's new Strategic Plan 2003–08, as in the previous Strategic Plan. The Corporation has worked for over ten years to transform the cotton industry's environmental performance and improve its sustainability. The structure of the Strategic Plan 2003–08 facilitates the continuation of this work through Programs one to five. In particular, the new Integrated Natural Resource Management Program will strengthen environmental links throughout the production process, thus enabling better environmental outcomes. Strengthening our understanding of soil health in the Farming Systems Program will improve soil management and minimise soil loss. Achieving efficient and sustainable water use will be a high priority for the Corporation during the life of this strategic plan.

During the course of the previous Strategic Plan, the Corporation introduced the Best Management Practice Program, which has contributed greatly to addressing the major environmental impacts of cotton growing such as pollution of waterways, chemical storage and handling, pesticide use and soil and water management. Under the new strategic plan, the Corporation intends to build on the success of the BMP program by improving the capacity to further address environmental issues, particularly those of water, salinity and biodiversity, and to integrate the management of cotton farms into the wider effort to maintain the environmental health of catchments. To that end, we will be seeking to further extend collaborative activities with relevant catchment management bodies and research agencies.

OBJECTS OF THE PRIMARY INDUSTRIES AND ENERGY RESEARCH AND DEVELOPMENT (PIERD) ACT 1989

- Increase economic, environmental or social benefits
- Achieve sustainable use and management of natural resources
- Make more effective use of human resources and skills
- Improve accountability for expenditure

NATIONAL RESEARCH PRIORITIES

- An environmentally sustainable Australia
- Promoting and maintaining good health
- Frontier technologies for building and transforming Australian industries; and
- Safeguarding Australia

GOVERNMENT PRIORITIES FOR RURAL R&D

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

COTTON INDUSTRY* PRIORITIES

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

*Australian Cotton Growers Research Association

COTTON RESEARCH AND DEVELOPMENT CORPORATION

Program 1: People and Knowledge

Program 2: Integrated Natural Resource Management

Program 3: Crop Protection

Program 4: Farming Systems

Program 5: Breeding & Biotechnology

Program 6: Value Chain

OUTPUT 1
Economic
Profitability and international competitiveness

OUTPUT 2
Environmental
Sustainable production systems and catchments

OUTPUT 3
Social
Empowered people and communities

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

Promoting and maintaining good health / Maintaining and improving confidence in the integrity of Australian agricultural food products

Much of the work funded in the past by the Corporation has led to reduced pesticide use. This is important to the outcome of this priority as well as the natural resource management priorities. The future should see further reductions in pesticide use with developments in biotechnology and integrated pest/weed management techniques, which is an important focus of Programs three and five.

The Corporation funded the development of a Managing Cotton Farm Safety manual, which is now being used by Farmsafe Australia in New South Wales and Queensland. The cotton industry is well ahead of many other rural industries in implementing improved occupational farm health and safety and in the future CRDC will fully evaluate the effectiveness of this Program. In doing so, it very much addresses the National Research Priority goal of Preventive Healthcare.

Cottonseed oil is a food by-product and is less valuable than the cotton lint. Therefore, this research priority is of less importance to the Corporation. As a saturated oil, cottonseed oil has lost much of its market share to healthier oils such as olive oil and canola. The industry and other experts have advised that cottonseed oil can only regain lost market share if constituent oils were modified to make them "healthier"; for example, with higher oleic and stearic cotton seed oils. Research in Program five is well advanced and the Corporation is examining the potential for commercial release of these healthier oils.

Frontier technologies for building and transforming Australian industries / Use of frontier technologies

The cotton industry is the only major agricultural industry in Australia that has implemented the commercial application of biotechnology in the form of insect tolerant and herbicide tolerant varieties of cotton. The Corporation has been measuring the performance of INGARD cotton, which contains a single gene that controls two key pests, for six years. The results clearly show that this technology enables cotton farmers to make major reductions in pesticide use. The Corporation has supported the implementation of this technology through advice, assistance and funding. This frontier technology carries with it the need to transform how the crop is grown. Management of transgenic crops will be addressed through the Crop Protection and Farming Systems programs. Further reductions of insecticide use across the industry are expected, with consequent environmental, health and economic benefits.

The Corporation has been investing in a range of biotechnology research such as the development of cotton with healthier cottonseed oil, improved fibre development and finding genetic markers to assist plant breeding. The science of biotechnology is a rapidly expanding and complex field and the Corporation has to be particularly vigilant that its investments are well targeted to meet the future needs of the industry. To assist in forward planning, the Corporation will be commissioning a review of the Biotechnology and Plant Breeding Program in late 2003.

The Corporation gives weight to the priority of advanced materials. Over the past decade, the Corporation's research led to the development of Colana, a new fabric combining wool and cotton. An Australian company now holds the patent for this product. The Corporation will continue to explore further opportunities of smarter fabric materials. Research into new fibre measurement instrumentation is at the patenting stage.

Smart information use and improved data management will be possible as technology improves. Delivery of knowledge via decision support systems, on line and using multi media will from part of the Corporations planning in Program one on communication with stakeholders during the life of this plan.

Safeguarding Australia / Protecting Australia from invasive diseases and pests

Within this National Research Priority, one priority goal is of importance to the work of the Corporation: Protecting Australia from invasive diseases and pests. Threats can come from within and outside Australia and the cotton industry has experienced this first hand. The cotton industry has already experienced the impact of an introduced, invasive pest, the Silverleaf Whitefly, thought to have been introduced to Australia about ten years ago, which has become a problem in some northern cotton growing areas in central Queensland. Understanding how to manage this pest has required a significant collaborative investment by CRDC, GRDC and Horticulture Australia and will be addressed through Program three using new technologies and integrated approaches.

The disease, fusarium wilt, is an example of a disease that has evolved from within Australia and is now one of the major threats to the industry. The Corporation will be developing management solutions through the Crop Protection Program and the Biotechnology and Plant Breeding Program as well as fostering researcher and grower interactions on this important issue via regular workshops.

In addition, CRDC contributes, on behalf of the cotton industry, to Plant Health Australia as part of the national effort to keep pests and diseases out of Australia.

Improving competitiveness through a whole–of–industry approach / Improved trade and market access

The nature of the cotton industry value chain means these research priorities are interlinked. To address these priorities CRDC has created a new Value Chain Program to deliver a whole of industry approach, including marketing. The Corporation's 'Field-to-Fabric' research program involves whole-of-industry input through growers, researchers, ginners, marketers and spinners. It aims to identify the various impacts on fabric quality throughout the whole value chain, as well as opportunities to improve fibre quality, which in turn will deliver higher relative returns to Australian farmers in the world market place.

Over fifty per cent of the Australian cotton area has now been audited under the industry's Best Management Practice program. Apart from the environmental benefits this provides, it opens opportunities for Australian cotton marketers to create new markets for cotton produced using sustainable natural resource management techniques. The industry will examine fibre quality management systems as well as improvements to the ginning and classing of cotton.

The Corporation will continue to assist the Australian Cotton Industry Council to develop market studies to support the World Trade Organisation free trade negotiations. Exploring new marketing opportunities will be an important priority.

Creating an innovative culture

The Corporation has created a new Program, People and Knowledge to accord with its output of empowered people and communities. The Australian cotton industry has a strong culture of innovation and rapid adoption of research outcomes. Australian cotton farmers are extremely fast adopters of innovations and are willing to share information and technological improvements. The Cotton Extension Team facilitates this, which is a crucial link between researchers, consultants and farmers. A continually improving culture of innovation and increased skill level of scientists, extension officers, technical officers, advisers, administrators and growers will provide significant benefits to the industry and regional communities.

COTTON INDUSTRY OBJECTIVES (ACGRA)

Invest in the skills, strengths and occupational health and safety of human resources in the cotton industry and its communities

The Corporation plans to address this priority through Program one, which accords with the Corporation's Output three, empowered people and communities. Through its investment in research and extension the Corporation has assisted research providers to build teams of highly skilled researchers, extension officers, technical assistants, and others. Additionally, the rate of adoption of innovations by producers, ginners and others in the industry is second to none. The challenge is to keep up the momentum in a time of reduced funding from all sources. The Corporation will invest strategically in all six Programs and particularly in Program one to meet this industry objective.

Improve the sustainability of the cotton industry and its catchments

The Corporation plans to address this priority through Program two and four, which accords with the Corporation's Output two, sustainable production systems and catchments. The industry has widened its objectives by including the catchments in this priority and the Corporation has responded by creating Program two, Integrated Natural Resource Management and Program four, Farming Systems to provide integrated sustainability outcomes on farms and in the catchments.

Improve the profitability of the cotton industry

The Corporation plans to address this priority through Program three, four, five and six, which accords with the Corporation's Output one, profitability and international competitiveness. The Corporation expects to lower input costs to producers through its Crop Protection Program, biotechnology and breeding program, and farming systems program. New market opportunities, and fibre quality improvements will be delivered through the new Value Chain Program.

Create and support a strong, focused and committed research program

The Board and staff of the Corporation will continue to facilitate communication between growers, researchers and industry to ensure that researchers remain focused and deliver relevant outcomes. This will be achieved by holding seminars and reviews of research as required, and to invest in Program one accordingly. In addition, the Corporation is a core partner and investor in the Australian Cotton CRC, which has been very effective in facilitating this industry priority. In the future, CRDC will broaden its range of research providers and seek multidisciplinary approaches and integrated outcomes.

Further details on how the Corporation is addressing Government and Industry priorities is shown in the table below.

Government's National Research Priorities						
An Environmentally Sustainable Australia	Promoting and Maintaining Good Health	Frontier Technologies for Building and Transforming Australian Industries	Safeguarding Australia			
Government's priorities for Rural Research and Development Corporations						
Sustainable natural resource management	Maintaining and improving confidence in the integrity of Australian agricultural food products	Use of frontier technologies	Protecting Australia from invasive diseases and pests	Improving competitiveness through a whole-of-industry approach	Improved trade and market access	Creating an innovative culture
CRDC programs and strategies addressing these priorities						
Program 2 Strategy 1–5	Program 1 Strategy 6	Program 3 Strategy 5	Program 3 Strategy 1–5	Program 6 Strategy 1–5	Program 5 Strategy 4	Program 1 Strategy 1–5,7
Program 4 Strategy 1–3	Program 3 Strategy 1,2	Program 4 Strategy 4,5			Program 6 Strategy 5	
Program 5 Strategy 4	Program 5 Strategy 1–3					
	Program 6 Strategy 3,4					

Summary of our operations, measures of success, and outputs/outcomes

TRIPLE BOTTOM LINE APPROACH

The Corporation's strategic planning framework focuses on economic, environmental and social outcomes. This reflects a 'Triple Bottom Line' approach to planning, implementation and reporting. This strategic plan for the next five years has been streamlined so as to adopt a more holistic, integrated and systematic approach to research and development. The previous structure of eleven programs has been reviewed and integrated to six programs. The rationale behind this is it will improve linkages with the Australian Cotton Growers Research Association and deliver enhanced economic, environmental and social outcomes to the industry and the broader community.

CORPORATE OPERATIONS

The Corporation enters the 2003–2008 cycle under the influence of the worst drought in recorded history. Cotton production is forecast to fall to 1.4 million bales for the 2002/03 crop. As a comparison, the production in the two previous years was 3.2 million bales (2002) and 3.6 million bales (2001).

The reduced crop size will have a significant negative impact on both industry levy and Commonwealth contribution revenue streams. Revenue for 2003–2004, the first year of the strategic plan, is forecasted at $8.3 million, a fall from a forecast of $13.5 million for 2002–2003. Continued low production in the forthcoming year(s) will only compound on the Corporation's revenue and financial position Whilst cotton industry levies are directly impacted by low production, Commonwealth contributions will also be significantly capped through the triggering of formulas within the PIERD Act, 1989.Thus, revenue is not expected to return to levels above $14 million until 2006–2007.

As a consequence of these events, the Corporation plans to reduce its expenditure and also utilise cash reserves. Total expenditure for 2003–2004 is budgeted at $12.8 million, some $3.6 million less than the estimated actual for 2002–2003. The chart below highlights the allocation of this expenditure across each of the Corporation's outputs.

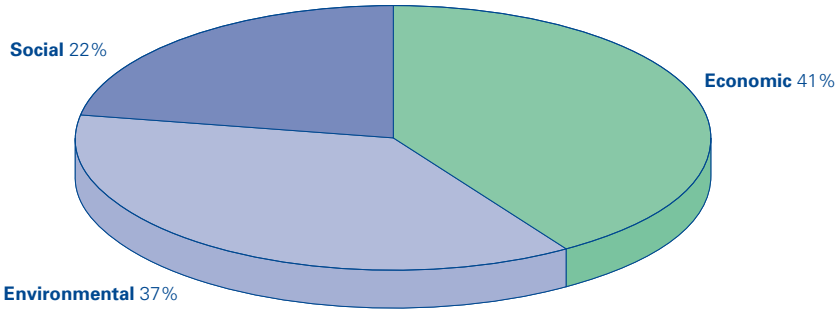


CHART 1: Expenditure by outputs (2003–2004)

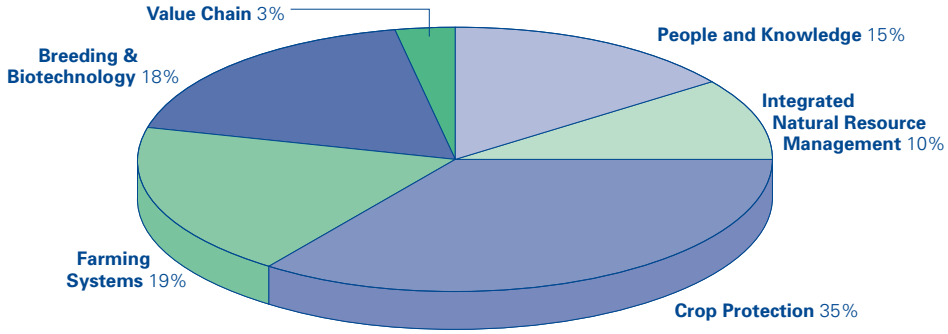


CHART 2: Research expenditure by program (2003–2004)

In 2003–2004 research expenditure is forecast at $11.3 million. Each of the 140 projects has been allocated to one of the six new programs and expenditure by program is provided in Chart 2. During 2003–2008, the Corporation plans to reduce its investment in crop protection and expand its investment in other program areas.

Corporation expenditure to 2008 will ultimately be a function of how well the industry recovers from the current drought. Forecasting cotton production for 2003–2008 is dependent on many variables and highly subject to change. Given the uncertainty of these external factors, the challenge for the Corporation will be to stabilise research expenditure, whilst ensuring key research and extension personnel are not lost from the industry, whilst continuing to address industry and government priorities,.

COLLABORATION

The Australian Cotton Cooperative Research Centre has played an important role in seeking integration and coordination of effort, which is a valuable adjunct to CRDC's responsibilities. The term of the current Australian Cotton Cooperative Research Centre (ACCRC) of which CRDC is a core partner contributing $350,000 cash plus in-kind per annum, expires in June 2006. The Corporation will work with the other ACCRC partners to ensure this vibrant research and extension continues. CRDC, together with other partners, will develop a new CRC bid in 2004.

OUTCOME

The Corporation will work in partnership with industry, government, research providers and the community over the next five years to achieve its corporate outcome of:

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

The Corporation will do this by:

Investing and providing leadership in research, innovation, knowledge creation and transfer for the Australian cotton industry.

To implement the 2003–2008 Strategic Plan CRDC will:

- make greater use of commissioned R&D by initiating projects
- seek multidisciplinary approaches and integrated outcomes
- increase co-investment and partnerships
- sharpen its evaluation of projects
- use a triple bottom line framework for reporting outcomes
- broaden its range of research providers
- enhance its communications with industry and the community

A summary of the relationships between programs, triple bottom line outputs and the CRDC's outcome statement

Program →	Output →	Measure of success →	Outcome
1. People and Knowledge 2. Integrated Natural Resource Management 3. Crop Protection 4. Farming Systems 5. Breeding & Biotechnology 6. Value Chain	**Economic** Profitability and international competitiveness	• Evidence that tools and knowledge products are contributing • Employment of people in research and development • Improved relative economic returns of cotton crops • Increased returns per megalitre of water • Increased yields per hectare and per megalitre of water • Evidence of management options and farming practices that reduce costs or improve profitability • Evidence that new cotton varieties are increasing yield, improving fibre quality and potential returns • Improved fibre quality to reduce financial discounts received by growers • Increased market opportunities evidenced by market analysis of pricing demand for Australian cotton in world market	A more sustainable, profitable and competitive cotton industry, providing increased environmental, economic and social benefits to regional communities and the nation
1. People and Knowledge 2. Integrated Natural Resource Management 3. Crop Protection 4. Farming Systems 5. Breeding & Biotechnology 6. Value Chain	**Environmental** Sustainable production systems and catchments	• Reduced chemical inputs • Improved water use efficiency • Increased adoption of BMP • Broader environmental coverage of BMP and recognition in the market place • EMS evaluated as a farm management tool • Improved trends in landscape and catchment indicators such as salinity, water quality and biodiversity • Benchmark soil health and improved nutrient recovery • Published refereed science on environmental impacts of new transgenic technology. • Benchmarked greenhouse gas emissions, energy use and climate change impacts	A more sustainable, profitable and competitive cotton industry, providing increased environmental, economic and social benefits to regional and the nation
1. People and Knowledge 2. Integrated Natural Resource Management 3. Crop Protection 4. Farming Systems 5. Breeding & Biotechnology 6. Value Chain	**Social** Empowered people and communities	• Improved skills and qualifications of people at all levels of the industry • Scholarships to students • Study exchanges and conference support for people at all levels of the industry • Improved OH&S performance in workplaces and reduced health and injury risks • Employment of people in R&D including age, gender trends, and location • More women in key industry roles • Capacity building activities with industry, schools, universities and community groups that improve social capital • Evidence of proactive stewardship of transgenic and conventional technology • Collaborative links and partnerships established to improve knowledge exchange into and out of the industry • High quality cotton (lint and seed) that meets market needs and consumer preference • Improved perception of cotton production by the community	A more sustainable, profitable and competitive cotton industry, providing increased environmental, economic and social benefits to regional and the nation

The Corporation's programs

PROGRAM 1: PEOPLE AND KNOWLEDGE

BACKGROUND

The Cotton Research and Development Corporation's investments in people and their capacity to access and use knowledge has been one of the keys to the success of the Australian cotton industry. Supporting people to conduct the research and transfer the research outcomes remains a high priority for the Cotton Research and Development Corporation. Businesses invest in capital for the future, and our capital is knowledge generated by our people. A continually improving culture of innovation and increased skill level of scientists, advisers and growers will provide significant benefits to the industry and regional communities.

OBJECTIVE/OUTPUT

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

STRATEGIES

1. Support and coordinate a highly trained, efficient and effective Cotton Extension Team
2. Foster the professional development of innovative and highly trained researchers, extension and technical officers, administrators, consultants and growers
3. Foster the development of opportunities for women in the cotton industry
4. Continue to develop a variety of effective decision support systems that support the implementation of research and extension outcomes and shorten the time to adoption

5. Support the on-going development of information packages and tools that consolidate and disseminate research outcomes
6. Promote safe, healthy workplaces through the adoption of appropriate Occupational Health and Safety (OH&S) work practices
7. Facilitate effective coordination and partnerships with research and development providers, industry and community organisations

MEASURES OF SUCCESS

- Evaluation of outcomes of activities conducted by the extension team
- Evidence of improved skills and qualifications of researchers, extension and technical personnel, administrators, consultants and growers
- Women in key industry roles
- Evidence that the use of decision support systems is leading to the adoption of research outcomes and improved practices
- Evidence that the use of information packages and tools is leading to the adoption of research outcomes and improved practices
- The OH&S performance of industry workplaces is improving
- Implementation of outcomes in partnership with a variety of research and development providers

OUTCOME

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

PROGRAM 2: INTEGRATED NATURAL RESOURCE MANAGEMENT

BACKGROUND

The Australian cotton industry is a world leader in terms of production efficiency. In the 1990s the Cotton Research and Development Corporation made significant investments aimed at reducing the environmental impacts of pesticides, which culminated in the flagship Cotton Best Management Practices Program and the subsequent reduction of pesticides now evident in the rivers. The Government has recently identified sustainable natural resource management as a National Research Priority. CRDC will improve the delivery of science and information by supporting a regionally driven and integrated approach to natural resource management, sustainable agricultural practices and catchment outcomes. This program will have many links to the farming systems program.

OBJECTIVE/OUTPUT

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

STRATEGIES

1. Incorporate a broader range of environmental issues in the Cotton BMP program, and facilitate their adoption
2. Investigate and evaluate environmental management systems as an industry-led approach to improved natural resource management

3. Support multi-disciplinary approaches to developing farm management strategies that complement catchment and landscape outcomes in relation to salinity, water quality and quantity, and biodiversity
4. Facilitate the necessary environmental impact research for any new transgenic traits introduced into cotton varieties
5. Investigate the potential impact of climate change on cotton production, benchmark the industry's contribution to greenhouse gas emissions, energy use, and develop integrated management strategies to reduce emissions

MEASURES OF SUCCESS

- Increased adoption and broader environmental coverage of the Cotton BMP program
- An evaluation of environmental management systems as a farm and natural resource management tool
- Improved trends in landscape and catchment indicators such as salinity, water quality and biodiversity. Project and funding links with other catchment and landscape programs related to biophysical targets and sustainability. Improved perception of cotton production by the community
- Publication of refereed environmental impact research in scientific journals related to new transgenic traits
- Benchmarked greenhouse gas emissions, energy use and potential climate change impacts

OUTCOME

Increased ecosystem health, community well being and economic wealth of cotton growing regions and a reduction in the negative environmental impacts of cotton production systems.

PROGRAM 3: CROP PROTECTION

BACKGROUND

The Australian cotton industry has successfully introduced transgenic Bt cotton varieties and integrated pest management practices, which combined have allowed total chemical insecticide inputs to be substantially reduced (by between 43 and 82 per cent in INGARD® Bt cotton and by between 10 and 25 per cent in conventional cotton). Early indications with transgenic herbicide tolerant cotton suggest that it will help to reduce residual herbicides inputs (a 14 per cent reduction was measured in Roundup Ready® cotton crops in 2001/2002). These trends are expected to continue with the introduction of Bollgard II® Bt cotton in 2003 and Roundup Ready Flex® in 2008. New tools such as the IPM guidelines, WeedPAK and integrated disease management guidelines are now available to growers. Management of the key diseases Fusarium Wilt and Black Root Rot remain a major challenge for the industry. Further increases in the use of transgenic cotton varieties is expected to need new research as it will lead to an increased management focus on non-Lepidopteran pests and could lead to the evolution of different weed spectra requiring new management strategies. Resistance management, integrated pest, weed and disease management and area wide management strategies will remain high priorities for the Corporation.

SUB–PROGRAMS

- Insect management
- Weed management
- Disease management

OBJECTIVE/OUTPUT

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

STRATEGIES

1. Improve integrated non-chemical and chemical management of insect and mite pests
2. Improve integrated non-chemical and chemical management of weeds
3. Develop practices and technologies that reduce the spread and impact of cotton diseases
4. Ensure the development of resistance is minimised through the design and implementation of resistance management strategies for both insecticides and transgenic technologies
5. Ensure the benefits of transgenic crop technology are maximised through responsible management based on sound scientific risk assessment

MEASURES OF SUCCESS

- Evaluations on the adoption and outcomes of integrated practices, products and technologies, which improve returns, use less chemicals, reduce on and off site environmental impacts as well as any social outcomes
- Reduced distribution, presence and impact of diseases
- Monitor resistance levels with an aim to either avoid or keep resistance levels in pests and weeds at manageable levels
- Transgenic crop surveys and reports on performance, management and risk assessment

OUTCOME

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

PROGRAM 4: FARMING SYSTEMS

BACKGROUND

Farming systems are dynamic and continue to change in response to ecological and economic influences. There are many individual components of the farm system and this program will seek integrated crop management outcomes that improve profitability and sustainability. Fundamental research on cotton agronomy and plant physiology for both conventional and transgenic varieties will continue. Over the next five years a greater emphasis will be placed on improving and integrating our understanding of soil health, crop nutrition, sodicity/salinity management, crop rotations and improving water use efficiency. Better integrated outcomes will be developed.

OBJECTIVE/OUTPUT

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

STRATEGIES

1. Improve water use efficiency on farms using existing and new infrastructure, new tools and technologies
2. Understand salinity, sodicity and deep drainage on farms and develop appropriate farm management strategies to minimise these potential negative processes
3. Strengthen our understanding of soil health and improve crop nutrition management

4. Increase profitability with better whole farm management strategies and innovative precision agricultural systems
5. Continue fundamental research on cotton agronomy and plant physiology and explore the interactions of different components for both conventional and transgenic varieties

MEASURES OF SUCCESS

- Increased yield per hectare and per megalitre of water
- Improved economic returns to farmers
- Improved water use efficiency on farms
- Adoption of integrated management options for salinity and sodicity
- Benchmark of soil health characteristics and optimise crop nutrition management
- Data on changed farming practices including the economic, environmental or social benefits
- Publication of cotton research related to crop physiology and transfer of agronomic knowledge into other research and extension project outcomes

OUTCOME

A more sustainable and profitable cotton farming system.

PROGRAM 5: BREEDING AND BIOTECHNOLOGY

BACKGROUND

The CSIRO Cotton Breeding Team continues to provide the Australian cotton industry with new varieties displaying higher yield and quality as well as improved insect and disease tolerance and herbicide resistance. The industry's return on investment into crop improvement through plant breeding has been impressive and the contribution made through biotechnology is expected to extend this further by 2008. Selecting the right biotechnology investments will be an area of increasing complexity.

SUB–PROGRAMS

- Plant Breeding
- Biotechnology

OBJECTIVE/OUTPUT

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

STRATEGIES

1. Develop regionally adapted cotton varieties exhibiting improved yield, quality, insect and disease resistance and herbicide tolerance
2. Targeted, innovative biotechnology focused on solving production and quality constraints confronting the Australian cotton industry

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

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

MEASURES OF SUCCESS

- Evidence that new cotton varieties are increasing yields and potential returns to the industry
- Evidence that Australian cotton varieties are meeting the needs of our major textile and oilseed markets
- Evidence that new varieties can produce higher yields with lower inputs of chemicals and improved water use efficiency
- Evidence that CRDC's biotechnology investments are delivering industry or community benefits
- Evidence of the reduced time to introduce genes into cotton varieties
- Market reports on the demand for Australian cotton lint and seed

OUTCOME

Continually improving cotton varieties.

PROGRAM 6: VALUE CHAIN

BACKGROUND

Australian cotton enjoys a reputation for being a high quality consistent product. It has the potential to produce good staple length, a tight micronaire range, good strength and uniformity, and has low levels of contamination. However, Australian cotton faces many competitive challenges in the world market place. This program focuses on the quality of cotton from "field to fabric" and has links to the breeding and farming systems programs. That is, growing in the field, picking, ginning and spinning. All these processes can affect the quality of cotton and this program focuses on adding value to the entire chain of production and marketing. Identifying and exploring new research and marketing opportunities with the industry will be a high priority.

OBJECTIVE/OUTPUT

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

STRATEGIES

1. **Genetic**: A breeding program that releases varieties with high quality fibre characteristics, which satisfy consumer demand trends. To investigate the use of biotechnology to enhance other traits, for example, nutritionally improved cottonseed oil
2. **Production**: To promote agronomic and management practices, including the Cotton BMP program, which preserve and protect optimal fibre quality characteristics

3. **Processing**: Ginning improvements resulting from research to reduce nep generation and to preserve desirable fibre qualities
4. **Classification**: The development of more accurate and repeatable technology of fibre measurement for neps, fineness, maturity and other fibre characteristics. Support changes to the traditional classing system, which better identifies and rewards superior fibre characteristics
5. **Marketing**: To support efforts to develop new markets and high premiums for Australian raw cotton as well as value adding cotton in Australia

MEASURES OF SUCCESS

- Release of varieties with appropriate fibre and seed characteristics
- Evidence of improved practices that preserve fibre quality. Extension of the Cotton BMP program to post farm gate issues
- Improved ginning practice measured by ginning data
- Proportion of the crop objectively measured by HVI increased. Release of new fibre measurement technology
- Number of unsold stocks accumulated and increased relative premium of Australian cotton compared to competitors. Demonstration of value added developments in Australia

OUTCOME

High quality consumer preferred Australian cotton in the world market place.

About the Cotton Research and Development Corporation

Based in Narrabri, NSW, the heart of one of Australia's major cotton-growing areas, the Cotton Research and Development Corporation is unique among the rural Research and Development Corporations as it is based in a rural area rather than a capital city. The Narrabri district is also the home of a key industry research facility, the Australian Cotton Research Institute. The Institute is a collaborative research site and headquarters of the Australian Cotton Cooperative Research Centre, of which the CRDC is a core partner.

The Cotton Research and Development Corporation began operations on 1 October, 1990 by way of a regulation made under section 8 of the *Primary Industries and Energy Research and Development (PIERD) Act 1989*. 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*.

The industry levy was increased by 50 cents in 2002, raising the levy to $2.25 per bale (227 kilograms ex-gin) of cotton. A matching contribution from the Commonwealth Government is provided up to a maximum of 0.5 per cent of the gross value of production, or up to 50 per cent of expenditure, or not exceeding those from industry. Royalties from the sale of domestic and international planting seed and interest on investments make up the balance of the Corporation's income.

THE OBJECTS OF THE COTTON RESEARCH AND DEVELOPMENT CORPORATION ARE:

To make provision for the funding and administration of research and development relating to the cotton industry with a view to:

a) increasing the economic, environmental and social benefits to members of primary industries and to the community in general by improving the production, processing, storage, transport or marketing of the products of the cotton industry; and

b) achieving the sustainable use and sustainable management of natural resources; and

c) making more effective use of the resources and skills of the community in general and the scientific community in particular; and

d) improving accountability for expenditure upon research and development activities in relation to the cotton industry.

THE COTTON RESEARCH AND DEVELOPMENT CORPORATION CONDUCTS ITS BUSINESS AND FUNCTIONS BY:

- 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;
- preparing an Annual Operational Plan for each financial year;
- coordinating and funding R&D activities consistent with current planning documents;
- 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; and
- facilitating the dissemination, adoption and commercialisation of research and development results in relation to the cotton industry.

ACCOUNTABILITY

The Corporation is accountable to the Australian people through the Commonwealth Government and to the cotton industry through its industry representative body, the Australian Cotton Growers Research Association (ACGRA).

The Corporation is accountable to the Commonwealth Parliament through the Minister for Agriculture, Fisheries and Forestry – Australia, the Hon. Warren Truss MP. The Minister has delegated responsibility for the Rural Research and Development Corporations to the Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, Senator the Hon. Judith Troeth. The Corporation has long enjoyed a robust working relationship with the Commonwealth Government and the officers of the Department of Agriculture, Fisheries and Forestry.

The Corporation is accountable to the Australian cotton industry through the Australian Cotton Growers Research Association, which is the legislated gazetted representative industry organisation. The Chair of CRDC must, as soon as practicable after the annual report has been compiled provide copies to ACGRA and make arrangements to attend a meeting of the ACGRA or its executive to present the report and take questions. The CRDC Board members and staff have frequent informal meetings with members of ACGRA and also enjoy a robust working relationship.

Our stakeholders set broad objectives, which the Corporation addresses through this five year Strategic Plan and an Annual Operating Plan. In August 1998 the Corporation became subject to the *Commonwealth Authorities and Companies (CAC) Act 1997* which provided new levels of accountability as well as a new planning and reporting framework. Hence, these plans use the outcome/outputs framework required under the CAC Act.

CORPORATE GOVERNANCE

The CRDC Board is responsible for the performance of the Corporation. The Corporation has a nine-member Board, of which six are nominated by an independent Selection Committee established by the legislation, which includes members of ACGRA. Appointment to the Board is subject to Ministerial approval. The Minister nominates and appoints the Chair and Government Director. The Board selects the Executive Director who becomes its ninth member. Directors are selected from across the industry, business and research communities and together they bring expertise in cotton production, processing, marketing, science, research and development, business management, technology transfer, conservation and management of natural resources.

The Cotton Research and Development Corporation is committed to the highest levels of corporate governance. This commitment has been written into the Statement of Principles for the Board, Management and Staff of the Corporation.

OUR PRINCIPLES

The following principles embody a set of values, which underlie our decisions, actions and relationships.

The Board, Management and Staff of the Cotton Research and Development Corporation:

1. Are committed to excellence and productivity;
2. Are committed to providing the highest levels of accountability to stakeholders;
3. Will act legally, ethically, professionally and responsibly in the performance of their duties;
4. Strive to maximise return on investment of industry and public funds invested through our Corporation;
5. Strive to make a difference in improving the knowledge base for improving cotton production in Australia;
6. 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;
7. Value the contribution, knowledge and expertise of the people within our organisation and that of our contracted consultants, external program coordinators and research providers;
8. Promote active, honest and effective communication;
9. Are committed to the future of rural and regional Australia;
10. Comply with and promote best practice in corporate governance; and,
11. Are committed to meet all statutory obligations and accountability requirements in a comprehensive and timely manner.

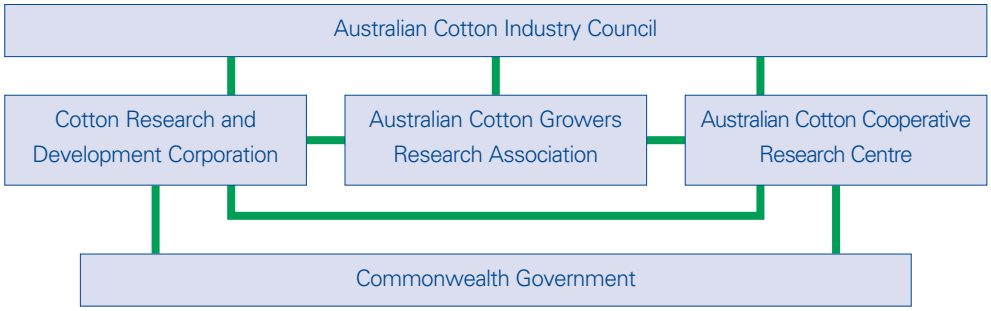
About the Australian Cotton Growers Research Association

The Australian Cotton Growers Research Association (ACGRA), founded in 1972, is the grower organisation prescribed in the legislation establishing the Cotton Research and Development Corporation (CRDC) as the body responsible for providing the perspective of cotton growers on the allocation of research funds. ACGRA also nominates the membership of the selection panel for the CRDC Board to the Minister, and is the industry organisation to which CRDC reports and is accountable.

The membership of ACGRA consists of the regional Cotton Grower Associations, most cotton processing organisations, and the suppliers of planting seed.

ACGRA has established sub-committees aligned with the research programs of CRDC. Each of these sub-committees has identified research needs and a set of research priorities for each program, and annually reviews research funding submissions against those needs and priorities.

The relationship between ACGRA and the Cotton Research and Development Corporation and the Australian Cotton Cooperative Research Centre is shown below.



Glossary

ACGRA	Australian Cotton Growers Research Association
ACCRC	Australian Cotton Cooperative Research Centre (also Cotton CRC)
AFFA	Agriculture Fisheries and Forestry – Australia
bale	227 kilograms of cotton lint fibre
BMP	Best Management Practice — environmental management program
Bt cotton	*Bacillus thuringiensis* is the bacteria which produces a protein expressed in INGARD® and Bollgard® cotton
CAC Act	Commonwealth Authorities and Companies Act 1997
CRC	Cooperative Research Centre
CRDC	Cotton Research and Development Corporation
CSIRO	Commonwealth Scientific and Industrial Research Organisation
fuzzy seed	Cotton seed after ginning, which still has a small amount of very short lint
ginning	The process by which cotton seed is removed from the lint
ha	Hectare(s)
HVI	High Volume Instrument
IPM	Integrated Pest Management
kg	Kilogram(s)
lint	Cotton fibre
nep	A knot or entanglement of cotton fibres
OH&S	Occupational health and safety
PIERD Act	Primary Industries and Energy Research and Development Act 1989
R&D	Research and development
sodicity	Soil with high sodium content
transgenic	The incorporation of a novel gene from another species

Providing investment and leadership in research, innovation, knowledge creation and transfer

Cotton
RESEARCH & DEVELOPMENT