



2000-2001
Annual Report

Cotton Research and Development Corporation

crdc





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Cotton Research and Development Corporation, 2001

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COTTON RESEARCH AND DEVELOPMENT CORPORATION

LETTER OF TRANSMITTAL

Friday, October 5, 2001

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

Dear Senator Troeth,

It is with pleasure I submit the Corporation's Annual Report 2000-2001, prepared in accordance with the provisions of section 28 of the *Primary Industries and Energy Research and Development Act 1989*, and of part 1, section 4 of the *Commonwealth Authorities and Companies Act 1997*.

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

Yours Sincerely,

A handwritten signature in black ink, appearing to read "Bridget Jackson".

Bridget Jackson,
CHAIR

CHAIR'S REPORT



As we enter the 21st Century, the cotton industry and its research base are riding the "third wave" – a period of new challenges which must be tackled cooperatively.

During the 1950s cotton production in Australia was practically non-existent, even though the crop had been grown since the time of the First Fleet. The modern industry began in 1961 when two Californian growers planted a commercial crop at Wee Waa on the Namoi River, sparking the "first wave". Prior to 1980 Australian cotton producers were completely dependent on American varieties. The "second wave" came with the development of the CSIRO's cotton breeding program, enabling the gradual introduction of new varieties tailored to Australian conditions. By the 1990s Australian varieties dominated the market and were delivering improved yields, fibre quality and agronomic characteristics. The Australian cultivars enabled the industry to expand significantly and rapidly. In the last 20 years the area planted to cotton has tripled while production has grown from 435,000 bales in 1980 to 3.4 million bales in 2001 – an increase of 700 per cent. This would not have happened without a strong and coordinated R&D effort.

Cotton production now belongs squarely and fairly in the "new economy". For example, on a field scale, insect populations and soil/water status are monitored using hand held devices

which are later uploaded into larger databases. On a regional basis, entire districts are covered by industry-owned electronically accessible automatic weather stations to maintain accurate records and confirm conditions at any given moment. And all of this data is brought together and analysed in the farm office to enable growers make the right decisions at the right time to maximise their production efficiency and to minimise their effect on the environment. The efficient utilisation of new technology has enabled growers and marketers to remain competitive on a global scale despite the fact that our major competitors are heavily subsidised by their governments.

Now, the cotton industry is riding the "third wave". As we enter the 21st century, more R&D effort is being turned to issues of natural resource management and sustainability on a micro and macro scale. This requires a different way of thinking and working. Farmers and researchers need to be able to work in groups to deal with environmental issues on a regional or landscape scale.

Already this is happening, with the development of some 35 Area Wide Management groups in the cotton valleys of the eastern states. The purpose of these farmer groups is to exchange real-time information on insect populations, to maximise the use of beneficial insects, and to minimise the use of "hard" chemicals. It is the next step

on from Integrated Pest Management, and it is very much a joint learning and investigation process between producers, and extension and research personnel.

The industry is also working as a whole on the issues of managing any potential build-up of resistance to transgenic cottons and to chemicals. The effect of this effort (coordinated through the industry's peak organisation, the Australia Cotton Industry Council) has been the development of new crop rotations and crop mixes, which, in themselves, have major ramifications for soil and water management and for farming systems generally.

The research industry is also operating successfully in multidisciplinary teams and on a larger scale. For instance, the CRDC is acting with the Australian Cotton Cooperative Research Centre, the relevant NSW and Queensland Departments, CSIRO, Land and Water Australia and others to scope and undertake a major study to understand relationships affecting the water balance in deep clays in the Northern Murray Darling Basin. The industry has identified this need to measure the deep drainage characteristics of cotton soils to improve our understanding of the water balance. This is even though cotton irrigators are some of the most efficient water users in the world on a farm scale.

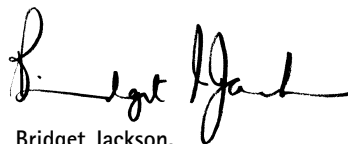
Two major problems frame the new research methods.

There is an increasing need for better communication, across disciplines, between the research and farming industries, and between the cotton industry and the wider community.

More time must be spent in coordinating a systems approach to problems. This often means that researchers are frustrated at the time that is lost to the research itself, and growers likewise spend more time off-farm in meetings and travel. There is a need to have a careful look at these issues if we are to get the most out of the R & D dollar. Meanwhile, the CRDC has expanded its complement of staff during the second half of 2001 in an effort to achieve continuity and improved coordination.

Secondly, it is much more difficult to identify and measure the outcomes of research carried out on a landscape scale. It will become increasingly difficult for us to review and justify this sort of research without the development of new indicators.

Throughout the pages of this Report you will find more examples of the improvements being made in the cotton industry to enhance sustainability, profitability and society. The Cotton Research and Development Corporation funds a comprehensive and integrated research program, from basic research improving the knowledge base through to applying science in the field and the development of leading edge technology. The benefits of this investment are clear, for the industry, the communities that have prospered because of it and for the nation as a whole. The ongoing program will only make things better for all.



Bridget Jackson,

*Chair, Cotton Research
and Development Corporation*

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SUMMARY

The Cotton Research and Development Corporation is a partnership between the Federal Government and the Australian cotton industry. The Corporation was established under Federal legislation and is accountable to the Parliament and the industry. *For more information about our accountability structures see 'Legislation' page 6.*

We invest in research, development and technology transfer to advance the domestic cotton industry for the good of the nation. The Corporation encourages and assists funded-researchers to communicate directly with the industry. We provide financial and technical assistance to the National Cotton Extension Team to aid the practical implementation of new technology and information. *For more information about research achievements see the 'Year in Review: Corporate Performance' on page 30.*

We are located in Narrabri, New South Wales, in the heart of one of Australia's major cotton producing areas, the Namoi Valley. CRDC-funded research is undertaken in every mainland state and territory in Australia, involving 4 divisions of the CSIRO, 5 State

Government Departments, 10 universities, 1 Cooperative Research Centre and a number of private organisations. *For more information about our research partners see 'Research by funded organisation' on page 28 and the Research Program, page 104.*

Our research program is aimed at delivering a more sustainable, profitable and competitive cotton industry providing increased economic, environmental and social benefits to rural and regional communities and the nation. *For more information see 'Planning Frameworks' page 29.*

During the 2000–01 reporting year the Corporation invested more than \$13 million directly into research projects and related research and development activities. We are funded through a levy on production (per bale), a matching Commonwealth contribution, royalties on seed sales of CSIRO-bred varieties and from interest earned on invested reserves. *For more information about the CRDC's funding arrangements, go to 'Corporate Financial Overview', page 25.*



Overview

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OVERVIEW

Vision: A SUSTAINABLE AND ENVIRONMENTALLY RESPONSIBLE COTTON INDUSTRY

Mission: TO ENHANCE THE CONTRIBUTION THAT RESEARCH AND DEVELOPMENT MAKES TO THE AUSTRALIAN COTTON INDUSTRY FOR THE BENEFIT OF THE PEOPLE OF AUSTRALIA

Outcome: A MORE SUSTAINABLE, PROFITABLE AND COMPETITIVE COTTON INDUSTRY PROVIDING INCREASED ENVIRONMENTAL, ECONOMIC AND SOCIAL BENEFITS TO REGIONAL COMMUNITIES AND THE NATION

History

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

Significant changes have occurred in the industry as a direct result of a comprehensive and focussed research program. Australian cotton production has more than doubled since the early 1990s, due to major industry expansion and increasing crop yields. The expansion has been assisted by improved knowledge of crop management for a range of climatic conditions as well as the ongoing development of varieties suited to those conditions. Varietal development also delivered yield and fibre quality improvements, as did a better understanding of total farming systems and techniques. The introduction of Integrated Pest Management strategies is enabling growers to reduce reliance on traditional chemical pesticides while the industry's landmark Best Management Practices program is leading Australian agriculture in the development and implementation of industry-wide environmental and risk management systems.

The Corporation is a major contributor to the publicly-funded research effort for the cotton industry, and often CRDC input is used to leverage monies from other funding sources in both the public and private sectors. The Corporation sees this as an extremely positive outcome for the industry and the community as limited research budgets can be effectively extended as far as possible. The use of joint funding arrangements where appropriate also

helps to build partnerships between research, government and industry organisations.

The concept of partnership is an important one for the CRDC. A partnership between the Federal Government and the Australian cotton industry, the Corporation recognises the value of having strong lines of communication. This ensures industry, community and national priorities are addressed, areas of need are understood and gaps within the research program are filled. Partnerships across the research community and industry in general ensure information is shared freely wherever possible and duplication within the overall research and development effort is avoided.

Apart from the investment in and management of its research program, the Corporation provides a range of products and services. A key role for the CRDC is to act as a formal and informal information source for stakeholders and client groups. This is facilitated through accessibility in person or by telephone, facsimile or e-mail; general industry media activities as well as through the Corporation's website (www.crdc.com.au). Researchers are encouraged to be actively involved in the dissemination of research results and are assisted by the CRDC-supported National Cotton Extension Team. Where necessary the Corporation funds and coordinates the development of technical and non-technical documents, guides and other information tools. Another important role for the Corporation is to coordinate workshops, seminars and field days for a range of purposes including research reviews and progression, information sharing and technology transfer to industry. The CRDC

produces a range of publications which include both general and specific information about Corporate activities and operations and the results of the ongoing research effort.

The Corporation takes a coordinating role within the cotton industry to oversee research efforts, to ensure important areas of research are addressed and to facilitate the extension of research outcomes to the industry. Frequent and detailed communication with industry and research organisations helps to identify gaps or overlaps in the research program, and the development of strategies to gain maximum benefit for each dollar invested.

Based in the heart of one of Australia's major cotton-growing areas, the CRDC is unique among the rural Research and Development Corporations as it is located in a rural area rather than a capital city. With headquarters in Narrabri, North West New South Wales, the Corporation and its management and staff are part of a cotton community and fully aware of the entire range of industry and community issues. 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. Being positioned physically within the industry enables the Corporation to easily develop and maintain important relationships with cotton growers, researchers, processors and members of the general community.

Figure 1 Organisations within the Cotton Industry

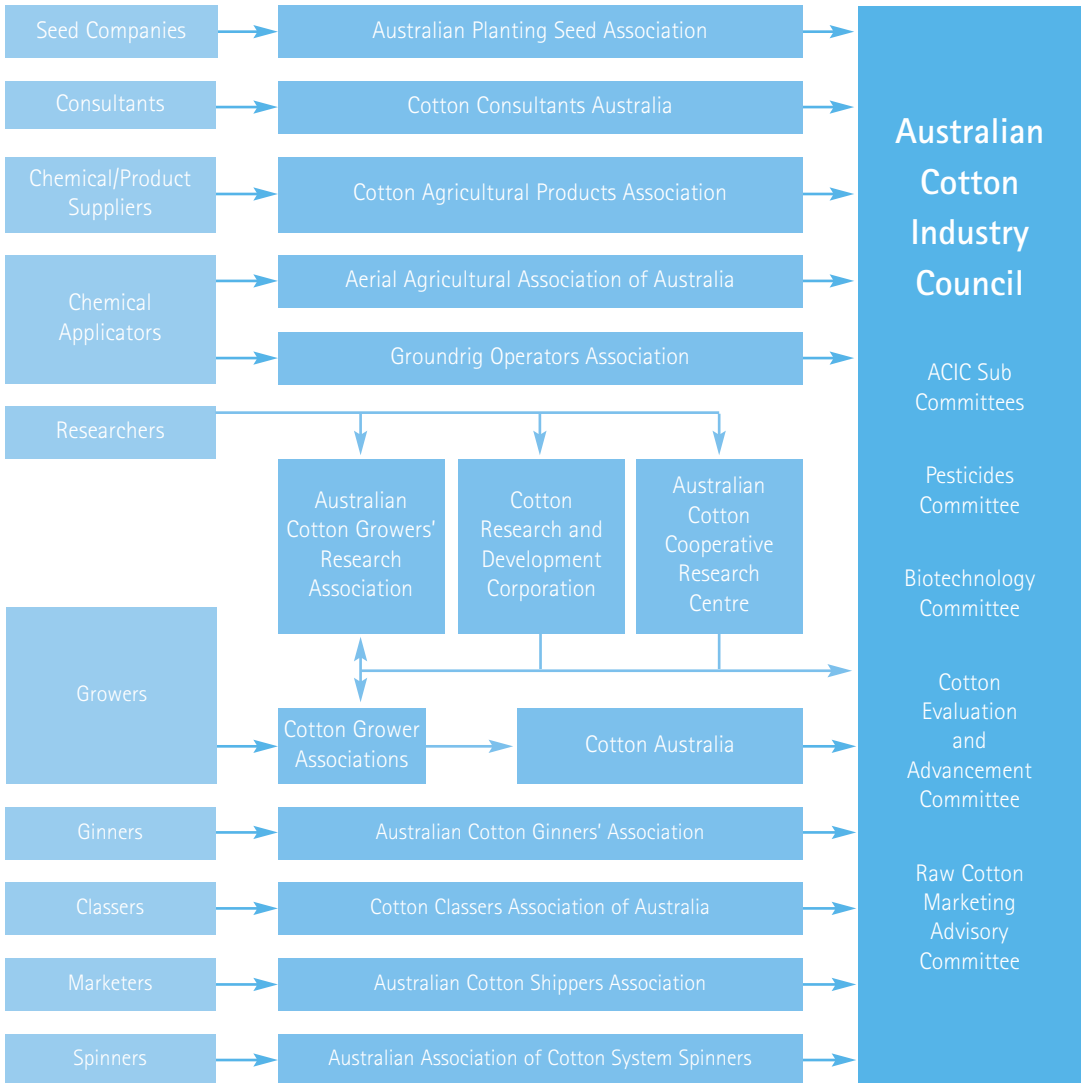
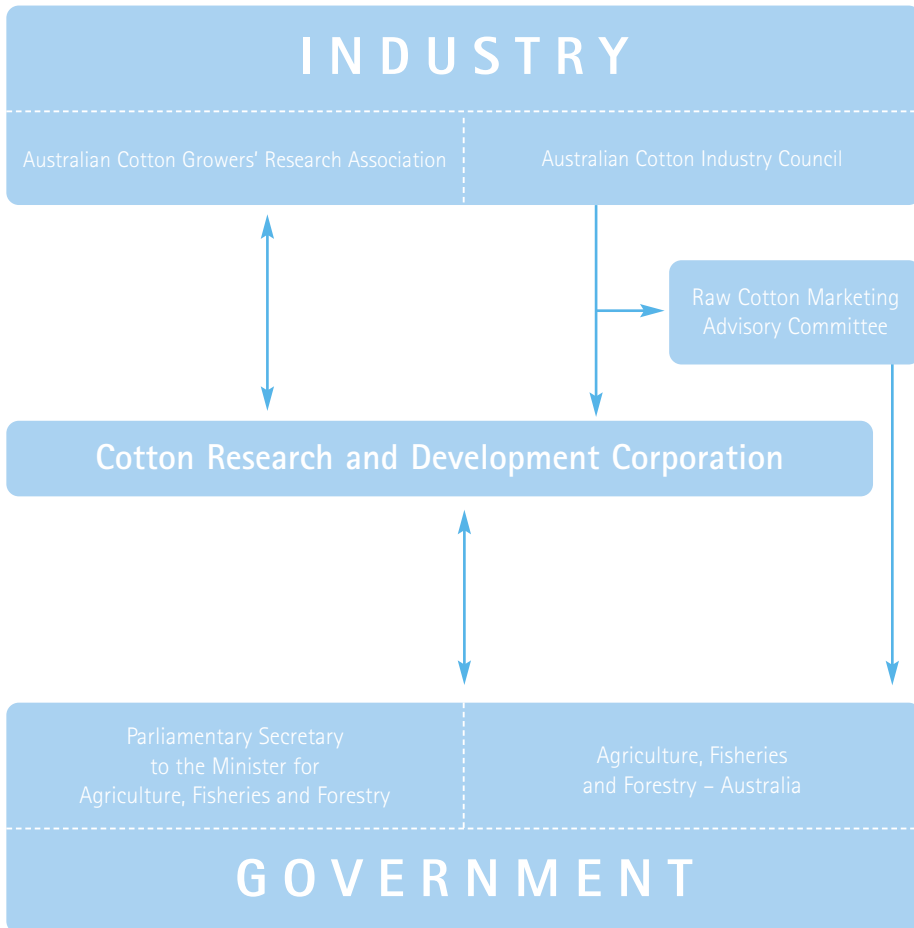


Figure 2 Linking Industry with Government

NB: Lines with an arrow at each end denote accountability linkages. Lines with a single arrow denote information/coordination links.

The CRDC is a member of the Australian Cotton Industry Council, the peak body for the cotton industry. The Industry Council is not a stakeholder of the Corporation.

Legislation

The Cotton Research and Development Corporation began operations on October 1, 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*. Accountability and reporting requirements are set out in the *Commonwealth Authorities and Companies (CAC) Act 1997*.

Objects

Under Section 3 of the PIERD Act, the objects of the Act are to make provision for the funding and administration of research and development relating to primary industries with a view to:

- a) Increase economic, environmental and social benefits to the cotton industry and the community in general by improving production, processing, storage, transport or marketing of cotton
- b) Achieve sustainable use and sustainable management of natural resources
- c) Make more effective use of the resources and skills of the community in general and the scientific community in particular
- d) Improve accountability for expenditure upon research and development activities in relation to the cotton industry

Functions

As set out in Section 11 of the PIERD Act, the legislative functions of the Corporation include:

- 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;
- coordination and funding of 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.

Powers

Described in Section 12 of the PIERD Act, and subject to the stipulations of the Act, the Corporation has the power to do all things necessary and convenient to be done for, and in connection with, the performance of its function including but not restricted to:

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

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

Ministers

The Corporation is accountable to Federal Parliament through the Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, Senator the Hon. Judith Troeth.

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) Plans* and any variations;
- approving the Corporation's *Annual Operating Plans* and any variations;
- appointing a person as Presiding Member of the Corporation's Selection Committee, and other members of that Committee; and
- transferring to the Corporation any assets held by the Commonwealth that the Minister considers appropriate and which would assist the performance and function of the Corporation.

The Corporation has long enjoyed a robust working relationship with the Federal Government, including the Parliamentary

Secretary Senator Troeth, the Minister for Agriculture, Fisheries and Forestry the Hon Warren Truss MP and previous Ministers, and the officers of the Department of Agriculture, Fisheries and Forestry – Australia.

Stakeholders

The Corporation is accountable to the Australian people through the Federal Government and to the cotton industry through its industry representative body, the Australian Cotton Growers' Research Association. In August 1998 the Corporation became subject to the *Commonwealth Authorities and Companies (CAC) Act 1997* which provided new levels of accountability as well as a new planning and reporting framework. Subsequently the Board has gradually revised its *Strategic (Five Year) Plan 1998–2003* into the Outcome/Outputs framework required under the new framework. Although this process formally concluded when Ministerial approval for the Corporation's fully revised *Strategic Plan* was granted on July 5, 2001, the CRDC's *Portfolio Budget Statement 2000–01* and *Annual Operating Plan 2000–01* were both fully compliant with the framework requirements and were approved on this basis.

Our dual accountability to Government and industry does not create difficulties or conflicts because our stakeholders share the same goal – to ensure the economic and ecological sustainability of the Australian cotton industry. The Corporation's stakeholders set broad objectives which the Corporation addresses through the *Strategic (Five Year) Plan* and the *Annual Operating Plan*. The Corporation has

used these objectives as a basis for the development of its Outcome and the identification of necessary key Outputs.

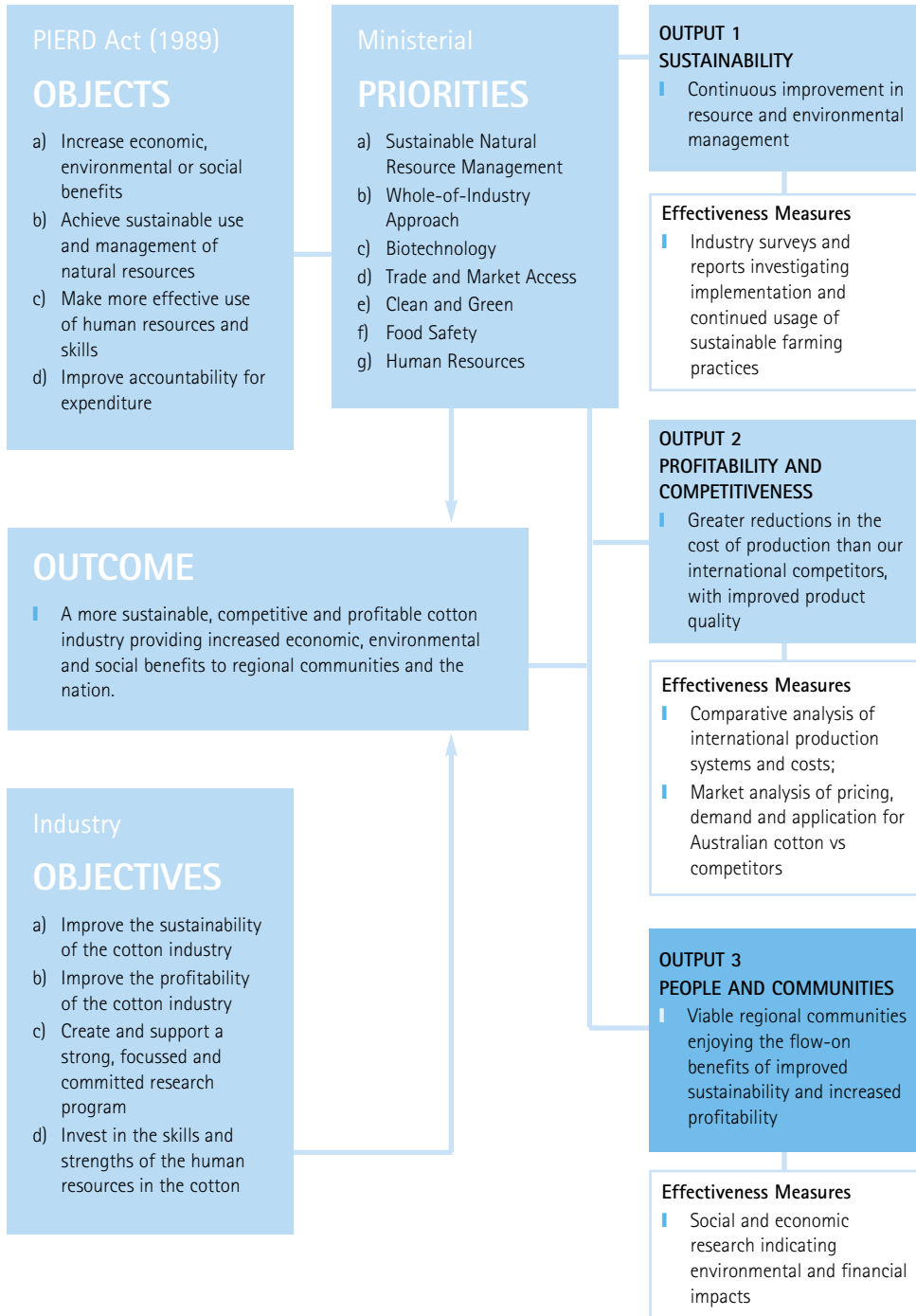
Outcome and Outputs

After taking into account Government and industry objectives and priorities, the Corporation has developed a framework based on a single Outcome, three Outputs and eight broad strategies. The Corporation's Outcome is consistent with the Agriculture, Fisheries and Forestry – Australia portfolio Outcome of increasing the profitability, competitiveness and sustainability of Australian agricultural, food, fisheries and forestry industries. Due to the integrated nature of the CRDC's research program, each of the 11 research areas may contribute to more than one strategy and more than one Output.

Statutory and Industry Objectives

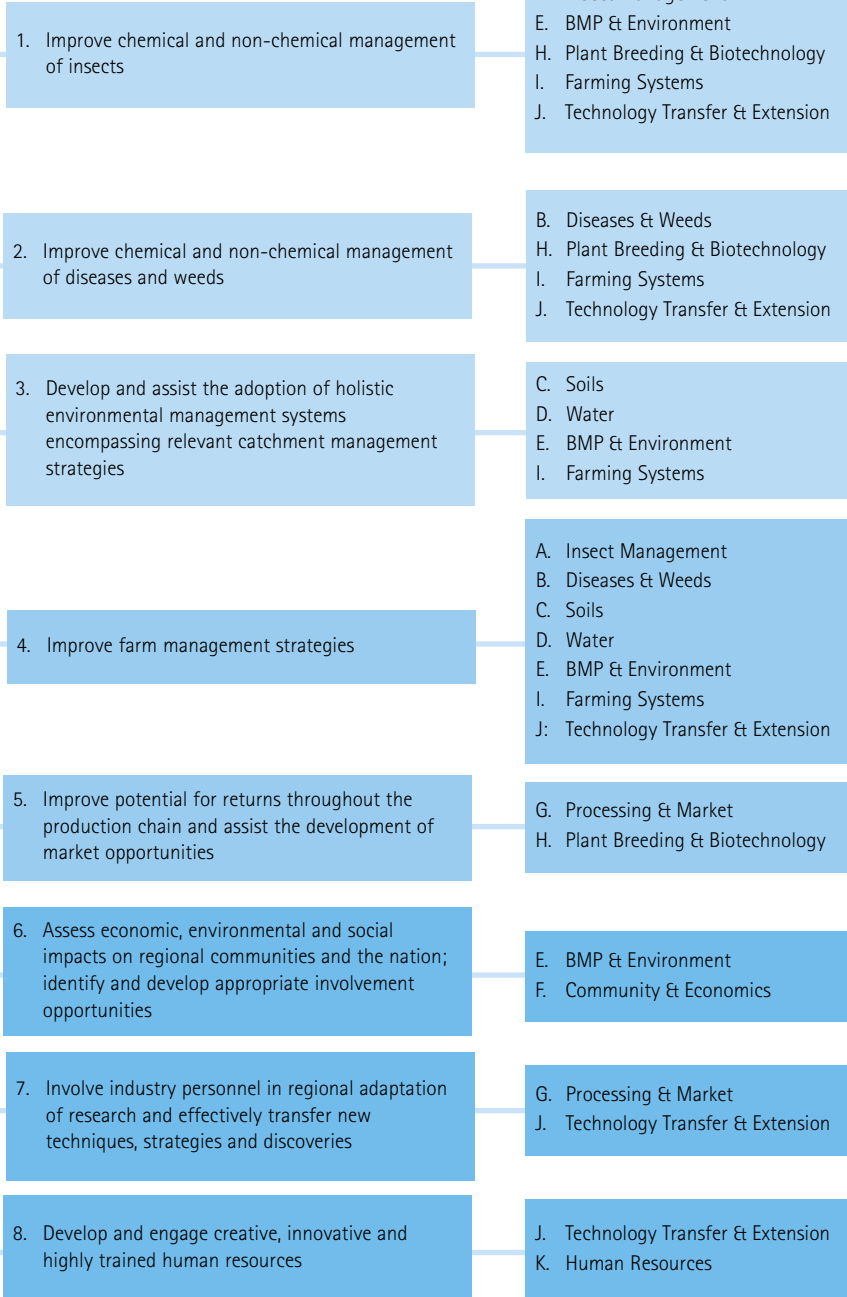
Statutory Object (Section 3, <i>PIERD Act 1989</i>)	Industry Objective (<i>ACGRA Strategic Plan</i>)
<p>a) Increase economic, environmental and social benefits to the cotton industry and the community in general by improving production, processing, storage, transport or marketing of cotton</p>	<ul style="list-style-type: none"> ■ Improve the sustainability of the cotton industry ■ Improve the profitability of the cotton industry
<p>CRDC Linkage: The ideals of these objectives have been written into the Corporation's Outcome statement, and thus provide a foundation and guide for the entire research program. The three Outputs 'Sustainability', 'Profitability and Competitiveness' and 'People and Communities' provide explicit linkages through to planned and actual activities.</p>	
<p>b) Achieve sustainable use and sustainable management of natural resources</p>	<ul style="list-style-type: none"> ■ Improve the sustainability of the cotton industry
<p>CRDC Linkage: Ideals written into the Outcome statement and form an integral part of the Corporation's research program. The 'Sustainability' Output relates primarily to ensuring a long-term future of the Australian cotton industry by protecting, maintaining and enhancing the natural resource base. Almost half of the research budget is directed towards this Output.</p>	
<p>c) Make more effective use of the resources and skills of the community in general and the scientific community in particular</p>	<ul style="list-style-type: none"> ■ Create and support a strong, focussed and committed research program ■ Invest in the skills and strengths of the human resource in the cotton industry
<p>CRDC Linkage: Ideals of the objectives written into the Outcome statement and addressed more explicitly through the 'People and Communities' Output. The Corporation consults widely regarding its research priorities, encourages timely technology transfer to industry and invests in programs to strengthen human and capital resources. Being positioned within the cotton industry and a regional community allows us to easily identify resources required by the industry and appropriately skilled personnel to call upon.</p>	
<p>d) Improve accountability for expenditure upon research and development activities in relation to the cotton industry</p>	
<p>CRDC Linkage: Addressed as part of the overall management strategy of the Corporation, through compliance with legislative reporting and accountability requirements. The Corporation's 'Statement of Principles' (page 12, CRDC Strategic Plan 1998-2003: Outcome/Outputs Revision 2001) include several statements which outline our commitment to accountability and good corporate governance.</p>	

Figure 3 Strategic Plan Flow Chart



STRATEGIES

RESEARCH PROGRAMS



Addressing Priorities

In December 1999 the Minister for Agriculture, Fisheries and Forestry the Hon. Warren Truss MP wrote to the Corporation to outline the Federal Government's revised priorities for rural research and development. The priorities were reiterated in May 2001 in a letter to the Corporation from the Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, Senator the Hon. Judith Troeth.

Reflecting the opportunities that exist, the challenges which are faced and the changing operational environment, the Federal Government's priorities include:

- integrating sustainable use of natural resources into farming and land use practices;
- taking a whole-of-industry approach to production, processing and marketing;
- developing biotechnology, but being mindful of consumer concerns;
- being involved in trade and market access negotiations;
- maintaining and enhancing Australia's clean and green image;
- addressing consumer food safety concerns; and,
- cultivating creativity and innovation among the industry's human resources.

The Corporation reviewed the Strategic (Five Year) Plan 1998-2003 in the light of these objectives and has used them to build on and enhance the research program where necessary and appropriate.

R&D Priority CRDC Framework and activities

Sustainable natural resource management

'Sustainability' is a key Output for the Corporation, and improving sustainability, particularly of natural resources, is a core activity. Almost half of the research budget is directed towards 'Sustainability' and this is seen as the highest priority for the industry. A central part of this effort has been the development and transfer to industry of sustainable field production systems which incorporate improved management of natural resources and the minimisation of negative impacts on neighbours, or on neighbouring or downstream environments.

Whole-of-industry approach

The Australian cotton industry operates in a free market environment and each link in the production chain is fully exposed to the signals of the world market. This means the industry as a whole has a strong grasp of consumer needs in terms of quantity, fibre quality, reliability of supply and other issues. The Corporation keeps abreast of these issues through its involvement in the Australian Cotton Industry Council, and through the CRDC's role as secretariat to the Raw Cotton Marketing Advisory Committee which allows it to maintain good communication links with processing, marketing and shipping organisations.

Following a growing awareness that the industry needs greater understanding of the impacts of production and processing on final fabric quality, the CRDC has initiated a major 'field-to-fabric' research program.

Biotechnology

Cotton is Australia's leading agricultural industry in terms of the commercialisation and field-application of modern biotechnology techniques. The first industry to have commercial access to genetically-modified crop varieties, growers are well aware of the importance of this technology. The introduction of the transgenic varieties followed extensive research and testing, regulatory approval processes and the development of industry-led resistance management protocols. The new varieties featured built-in protection against a key cotton pest and their introduction facilitated the adoption of new methods of crop management. These methods are delivering a broad range of benefits to the industry and the community, including improved pest management involving reduced usage of broad spectrum and residual chemicals. Support for the development of new transgenic and conventional varieties is continuing.

Trade and market access

A range of trade barriers distort the world cotton market. Unlike growers in the world's largest cotton producing nations, Australian farmers do not receive government assistance in the form of income support or trade restriction. A CRDC report on the issue *Trade Barriers and Cotton Markets: Implications for Australian Producers* strengthens the case of ongoing liberalisation of world trade in cotton. The Corporation also recognises that trade barriers are increasingly non-tariff based. However, the industry-wide Best Management Practices program is believed to be a key tool to demonstrate to international markets adherence to world's best practice and commitment to sustainable production.

Clean and green image

The Corporation has the ongoing task of developing and revising the industry's leading Best Management Practices (BMP) Program which provides growers with flexible guidelines for identifying on-farm risks and practical advice on how to manage those risks and constantly improve practices. The accompanying establishment of a rigorous audit process gauges the efforts and progress of growers and will provide benchmarks for ongoing assessment of the BMP program and its impact on the industry.

Food safety

Cotton seed oil is used in a variety of food applications including margarines, blended vegetable cooking oils and in commercial deep fryers. The Corporation is supporting the development of new cotton varieties which produce healthier oils that could lead to significant import replacement. This development is being conducted with respect to the necessary regulatory guidelines from the appropriate gene technology and food safety authorities.

Human Resources

The Corporation has written its commitment to the human resources of the industry into its Outcome statement and highlighted this through the selection of 'People and Communities' as a key Output. 'Human Resources' is also a research program, ensuring this area has appropriate focus and expenditure. The CRDC looks to deliver human resource benefits to rural and regional communities through the facilitation of and support for a dynamic and successful rural industry providing significant opportunities for employment. The Corporation also provides direct training opportunities for people already in and looking to enter the industry.



Year in Review

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HIGHLIGHTS

Pest Management: Area Wide Management delivers

Area Wide Management strategies involve coordinating insect pest control measures on a regional rather than farm level. By working together with the goal of maximising the effectiveness of Integrated Pest Management strategies, members of the 35 Area Wide Management grower groups now operating throughout the cotton industry are realising reduced applications and volumes of broad-spectrum traditional pesticides. Benchmarking studies comparing the economic performance of Integrated Pest Management versus conventional fields are also revealing improved profit margins.

The momentum for Area Wide Management in Australia has been growing for some time, particularly as Integrated Pest Management strategies gain widespread acceptance and adoption. In 1997/98 a regional management program was developed for the Emerald Irrigation Area. In 1998 the CRDC and the Grains RDC began jointly funding a pilot study project on the Darling Downs in southern Queensland. More than 200 farmers were involved in the study which established grower groups at Brookstead and Jimbour. This project resulted in a change in the level of knowledge in the industry, promoted a change in attitude regarding insects in the crop and ultimately

saw a change in practice. Area Wide Management primarily targets a key pest of cotton and many grain crops, *Helicoverpa armigera*, but on a holistic level the target is enhancing biodiversity within the farming system.

The widespread adoption of Area Wide Management in cotton and other cropping systems is likely to change farming systems as different crops are incorporated for either pest trap crops or beneficial insect nurseries. Consultants and agronomists will look to assess the impact of beneficial insects across the system, and the management of trap crops may become as important as the management of the major crops. Central to the success of any Area Wide Management program is communication – between the participating growers and between individual growers, the crop management consultants and field staff.

Technology Transfer and Extension: Research into the field

A number of key appointments have been made to the National Cotton Extension Team during the year. The position of National Cotton Extension Team Coordinator was filled in February. This position, funded by the Corporation and based at the Australian Cotton Research Institute near Narrabri, oversees the entire industry extension program

and coordinates the cotton-related activities of Industry Development Officers, District Agronomists, Water Use Efficiency Officers and other industry personnel working as part of the extension team. The coordinated approach to technology transfer afforded by this position and the Cotton CRC extension network is seen as a central part of ensuring success.

In addition to the National Coordinator, the Corporation funds a number of other positions including Industry Development Officers in the Macquarie, Upper Namoi, Macintyre, Central Queensland and Dirranbandi/St George production areas. A Development Officer for the southern regions was appointed late in the reporting year to offer technical assistance to growers in this developing area. Additionally the Corporation has funded a position of trainee Industry Development Officer which has now also been filled. This position allows a potential Development Officer to gain a grounding in research extension and grower support before taking up a field position, potentially in an area isolated from other researchers and extension officers. This position has already proven itself a success with the industry's first trainee ready to move into a maternity-leave created vacancy after several months of training.

The coming year will see the launch of a new training program for growers. Since 1998 the CRDC has been funding a training coordinator to improve the levels of knowledge and adoption in the industry of Integrated Pest Management. Starting in the fourth quarter 2001 will be pilot courses to field test course

design and content. Ultimately the courses will be nationally accredited, enabling widespread delivery and funding assistance for growers to undertake them.

Processing and Market: Field to Fabric program

To facilitate improved communication and research coordination the CRDC has implemented a field-to-fabric processing 'pipeline' to assess the effect of field, variety and gin variables on yarn and fabric quality. Maximising understanding of fibre characteristics has an immediate impact on the quality throughout the processing chain increasing the value the original fibre. The pipeline encompasses a number of research projects, while the main objective is to understand how these variables impact on the final fabric. Ultimately it is envisaged a prediction mechanism will be created so fibre performance can be reliably increased along the production chain.

The foundations of this pipeline were laid by a previous CRDC-funded project 'Cotton ginning with an emphasis on cotton quality'. This project was a joint effort by Dr Grant Roberts from the National Centre for Engineering in Agriculture (NCEA) in Toowoomba and Dr Patricia Bel-Berger from the United States Department of Agriculture's Southern Regional Research Centre (Cotton Fibre Quality Research) in New Orleans. The project is believed to be the first time in the world that raw cotton has been tracked and quality tested on such a large scale as it moves through the production chain. The international collaboration enabled quality testing of lint,

yarn and fabric and provided a comparison with US varieties.

Significant interest from the industry in the results of the fibre quality research has encouraged the Corporation to lift the funding-support in this field by more than \$120,000 in the 2000-01 financial year. This high level of funding is continuing for the 2001-02 year.

The pipeline program has built and is enhancing linkages between production researchers and those in the processing sectors including the NCEA, the CSIRO Division of Textile and Fibre Technology in Geelong, the International Fibre Centre in Melbourne. Technical input also comes from commercial industry players.

Water: Improving Efficiency

The Corporation is maintaining a focus on issues surrounding the water balance and is continuing involvement with the Australian Cotton CRC to progress research in this area. The process of developing an integrated and coordinated approach across several funding bodies began in October 1999 when the CRDC and the Cotton CRC convened a workshop to focus on the water balance and evaluate the science being used to solve known problems. A follow up meeting in May 2000 of funding bodies considered the workshop outcomes and agreed on the key elements of a coordinated research program.

From these meetings a structure for ongoing research efforts in the Northern Murray Darling Basin has been established. The program has attracted interest and

involvement from a range of funding and research organisations including the Cotton CRC, CRDC, Land and Water Australia, Grains Research and Development Corporation, Natural Heritage Trust, Murray Darling Basin Commission, Queensland Department of Natural Resources, New South Wales Department of Land and Water Conservation, CSIRO, NSW Agriculture and the Queensland Department of Primary Industries.

The initial focus of the research under the program has been on closing the water balance. While many elements of the system are well known and can be measured and monitored, there is a gap regarding 'deep drainage', water that is lost under the field. To date this phenomena has been estimated but not measured. Without the tools to properly measure deep drainage it is impossible to predict or manage the issue. A scoping study is underway to highlight what is known about deep drainage, the gaps in existing models and future areas for research. From this work will flow an ability to assess the water balance on farm and landscape scales, and thus the capability to assess the impact of irrigation systems and various irrigation management strategies on catchment hydrology.

The report from a scoping study investigating drip irrigation systems and the potential for application in cotton farming operations has been in demand since its release late in 2000. While the capital expense of drip irrigation in broadacre situations is prohibitive for many growers, drip is a preferred irrigation option for some depending on soil type and field gradient, and also in areas where new

irrigation development is being contemplated. Drip irrigation is an efficient and precise method of delivering moisture directly to the root zone. Drip systems can also be used as a delivery mechanism for fertilisers.

A similar scoping study is now being undertaken into sprinkler irrigation systems and their suitability for cotton.

Best Management Practices and Environment: Moving into a new phase

Quickly after the introduction of the cotton industry's leading Best Management Practice program growers started asking about how progress through the program would be measured. At the request of industry the Corporation set about establishing an appropriate audit process which would be flexible and simple to meet the needs of the wide range of growers in the industry, while also able to withstand the scrutiny of regulators, consumers of Australian cotton and the broader community.

January 1, 2001 saw the audit program enter a new phase when the Cotton Industry BMP Audit Office began operations. Initially operating with funding support from the Corporation, the Audit Office will ultimately be a fully self-sustaining and independent body administering the Best Management Practices Audit Program. The winter of 2001 has seen demand for audits increase substantially and the CRDC is continuing to undertake training of new auditors to meet the demand.

The past year also saw the release of the second edition of the Best Management

Practices Manual. The new edition is more user friendly and incorporates new information on pesticide storage and handling, human safety and dryland cotton production. New modules are continuing to be developed including occupational health and safety, land and water management and vegetation and biodiversity. The Best Management Practices program provides growers with a flexible means to help manage farming operations and minimise environmental risks associated with pesticide use. It also serves as a foundation for the gradual development of a comprehensive environmental management program.

Diseases and Weeds: Fusarium Wilt threat continues

Detections of the cotton disease Fusarium Wilt slowed during the reporting year. While the season did not suit disease outbreaks, growers showed that they were taking the threat very seriously and farm hygiene protocols were either introduced or tightened further across the industry. A farm hygiene module was also incorporated into the second edition of the Best Management Practices Manual. Caused by a soil-borne fungus, Fusarium Wilt and a number of other major diseases of cotton can be spread by the movement of vehicles, equipment and people. The strategy of 'Come Clean – Go Clean' aims to prevent the spread of disease by washing down vehicles and equipment before entering new fields or areas, and after leaving them. Many properties have invested in special facilities, including high pressure spray units, foot baths and evaporation pans, for the purpose of cleaning equipment. Farm hygiene strategies have

received strong response, particularly in areas where the disease has not been detected.

The introduction of farm hygiene has been just one of the strategies the Corporation has been pursuing in the battle against Fusarium Wilt. In the medium term investigations of microbiological control agents are continuing. Larger scale field trials during the past year delivered encouraging results from this technology, prompting the Board to support further trials during the 2001/02 season in order to obtain more data, evaluate new formulations and support possible registration with the National Registration Authority for Agricultural and Veterinary Chemicals.

Another medium term strategy is breeding Fusarium tolerance into elite varieties. The Corporation-supported CSIRO plant breeding team has delivered a long list of varieties to the market during the past decade, improving fibre quality and a range of agronomic characteristics. Currently some varieties are more susceptible to the disease than others, but no variety offers complete tolerance to high incidence of the fungus.

As a long-term strategy the Corporation has invested in research using biotechnology to find solutions. One strand of this work is examining the genetics of the disease and resistance to it, while a second strand is examining Australia native cotton species for genes which would confer resistance to commercial varieties. Sturt's Desert Rose has been identified as a potential source for this gene. As Australian native cottons and commercial varieties will not interbreed naturally, biotechnological techniques will be

required to transfer this gene. Even if the transfer is successful, delivering an elite variety to the market will require many years of conventional plant breeding, glasshouse and field testing, and finally regulatory approval.

Farming Systems and Agronomy: High interest in alternative row configurations

In March 2001 more than 200 people attended a conference on alternative row crop configurations and technologies. Organised by the Corporation in conjunction with the Australian Cotton Growers' Research Association, the event featured a field tour through properties in the Hillston area and a seminar held in Griffith. The Narrow Row Cotton Conference came at the culmination of ultra narrow row research and was a demonstration of support from the Corporation for the developing and potential areas in southern NSW. Narrow row and alternatives to the standard configurations of northern production centres are popular in the cooler climate areas because of their potential for shorter growing seasons. The combination of crop configuration and short season varieties means cotton production in Australia could see significant expansion in areas presently thought to be too cool. And often the crop management and varietal research outputs achieved in these areas have application in traditional areas by improving practices and increasing the options available to growers.

Pest Management: Unique facility commissioned

The need for accurate and reliable data about spray application technology, and the expense and difficulty of field testing led the Corporation to look for alternatives. In conjunction with the Centre for Pesticide Application Safety at the University of Queensland, Gatton campus, the Corporation commissioned the establishment of a wind tunnel test facility. This facility is unique in Australia and one of only two wind tunnels in the world that are set up to specifically study spray application technology with active pesticide ingredients. Although the facility received significant funding from the CRDC, it is a public facility and has attracted interest from other agricultural industries and equipment manufacturers. The Corporation's investment in this facility is seen to be the path of a longer-term strategic approach to improve the quality of information available to growers and spray contractors. The facility will also see the developers of improved spray nozzles and atomisers come to Australia to test and refine their designs. This will mean Australian growers will get faster access to new technology. This is already happening with several new nozzle designs undergoing testing by the Centre for Pesticide Application Safety.

Processing and Market: Trade distortions examined

Research undertaken by Canberra's Centre for International Economics puts dollar figures on an issue the industry feels the effect of every day – that production subsidies and trade

barriers in competing cotton producing nations cost the Australian industry a lot of money. According to the *Trade Distortions and Cotton Markets: Implications for Australian producers* report, global removal of price and income support would add an estimated A\$177 million to the net income of the Australian cotton industry.

Production subsidies and export incentives insulate producers from market signals and free market forces. As a result more cotton floods an already adequately supplied market, driving world prices down. World cotton prices have plummeted to the lowest levels seen in more than a decade and yet major increases in production will occur in the USA, China, and Brazil. The US and China are the major source of distortions in the world cotton market and producers in these countries receive 76 per cent of the total assistance to growers around the world. The International Cotton Advisory Committee estimates more than half of the world's cotton production benefits from direct price and income support programs.

Plant Breeding and Biotechnology: Building on strength

The highly successful Corporation-supported CSIRO breeding program continues to deliver new varieties to the market. CSIRO-bred varieties are commercialised nationally and internationally exclusively by the industry-owned, not-for-profit organisation Cotton Seed Distributors and its subsidiary Cotton Seed International. Last year Australian growers had access to three new CSD Ingard® (transgenic) and two new conventional

varieties, as well as a new transgenic line offering a degree of tolerance to the herbicide Roundup®. The new Roundup Ready® varieties expand the weed control options available for growers and fit in with current industry moves to controlled traffic and reduced-tillage operations. These varieties allow growers to control weed infestations by applying the knock-down herbicide Roundup to fields after seedlings emerge. This negates the need to apply residual herbicides before emergence and potentially reduces the need for costly manual 'chipping' or cultivation.

Four new CSIRO-bred conventional varieties and three new transgenic have been released for the coming season, offering improved disease tolerance and fibre characteristics.

Pest Management: Publication of *Insect Management in Cotton Pocket Guide*

Completed and published mid-year, the *Insect Management in Cotton Pocket Guide* is designed to be a useful field reference for the identification and management of key cotton pests and beneficial insects within the context of sound Integrated Pest Management and resistance management principles. Written for a non-technical audience, the Guide has received positive support from industry and should encourage further uptake of the principles of Integrated Pest Management, insect management which uses natural processes to assist the control of pests. This is helping to reduce the reliance and use of traditional broad-spectrum pesticides within the industry as growers see the value in

appropriately timed intervention with more selective chemistry to control problem pest populations. Copies are available from the CRDC office in Narrabri.

Industry Overview

The 2000/01 season saw more than 500,000 hectares planted to cotton for only the second time in the history of the industry. Production increased to 3.4 million bales, an industry record. Despite some fluctuations in the area sown to cotton, production during the last few years has stabilised at 3 million bales or more a year. The gradual increase in bale production is due to improvements in varietal performance and crop management strategies.

The weather proved as variable as ever during the 2000/01 season. Heavy rain and flooding affected major production areas in New South Wales early in the growing cycle, while the Darling Downs was affected by extremely dry conditions. Very hot weather throughout summer allowed crops to compensate for a cool start and finish strongly. The hot conditions also contributed to reduced incidences of certain crop diseases.

Insect pressures were average, although some areas had significant problems with secondary pests, particularly aphids. Changes in pest management strategies including the introduction of Integrated Pest Management and the use of transgenic cottons are altering the insect complexes seen in the field during the year. The Corporation is keeping a close eye on these developments and funds research as necessary.

The Raw Cotton Marketing Advisory Committee (RCMAC) expects both area and production to fall for the 2001/02 season.

The reduction is due to continuing low world prices for cotton as well as uncertainty about the availability of water following the 'reform' processes in both Queensland and New South Wales.

The Australian Bureau of Agricultural and Resource Economics (ABARE) anticipates world prices will remain low for the rest of year and into 2002. However, an assumed strengthening of the world economy in 2002 would increase demand for cotton towards the end of the season and help to lift prices.

Figure 4 Australian Cotton Production ('000 Bales)

Source: RCMAC

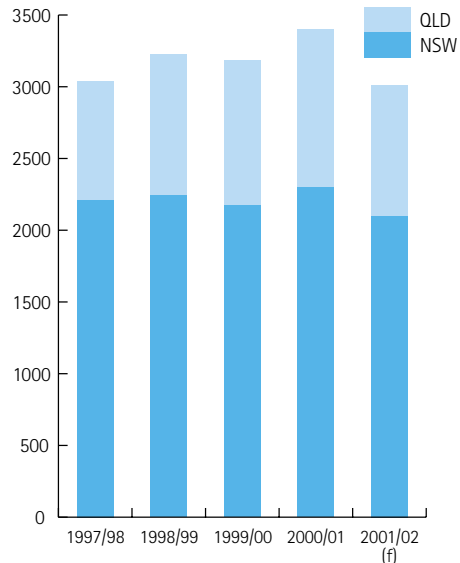


Figure 5 Production Area 1997/98–2001/02
 ('000 Hectares) *Source: RCMAC*

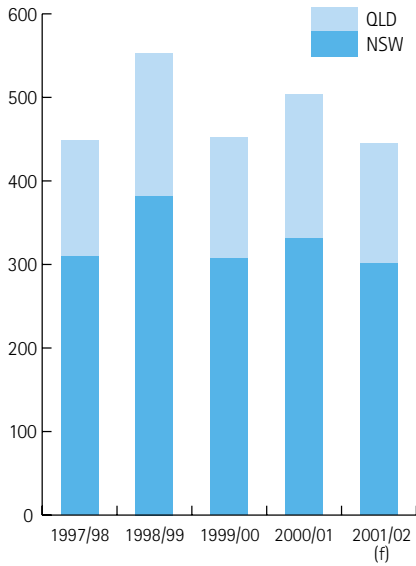
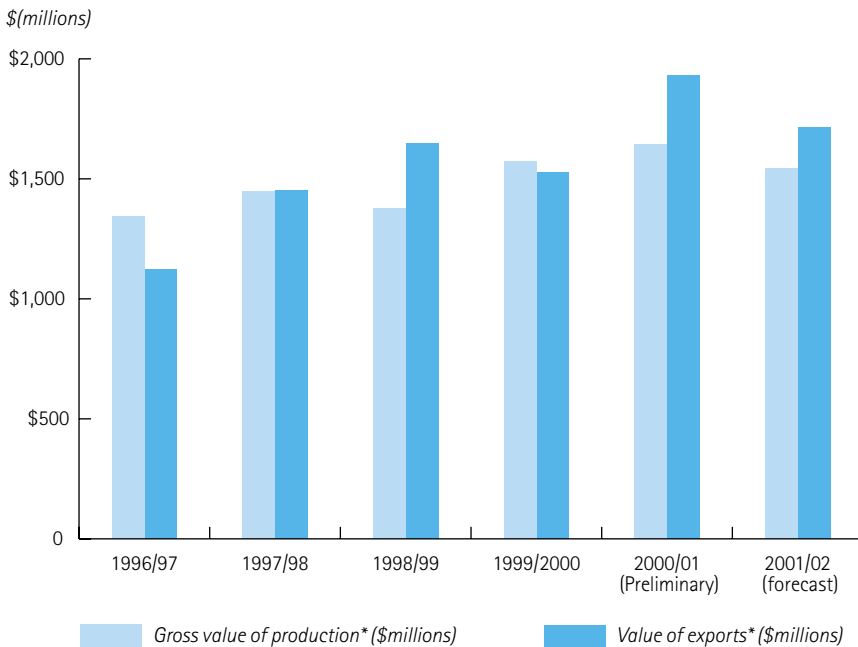


Figure 6 Value of Production



*Note: *includes cotton lint and seed*

Source: ABARE

Corporate Financial Overview

Revenue

The Cotton Research and Development Corporation is the major organisation investing in publicly-funded cotton-related research and development in Australia. The Corporation invests in and manages a comprehensive and integrated research, development and extension program of more than 185 projects (during 2000/01) with a direct expenditure through research grant payments of \$12.5 million.

The CRDC does not receive any departmental or administered appropriations from the Federal Government. Corporate revenue comes from a number of sources including:

- an industry contribution through a levy on production, currently \$1.75 per 227kg (500 pound) bale ex gin. The setting and collection of this levy is enabled by the *Cotton Levy Act 1982* and the *Primary Industries and Energy Research and Development Act 1989*;
- a contribution from the Federal Government which matches the industry contribution up to a maximum value of 0.5 per cent of the gross value of production;
- royalties on the domestic and international sale of planting seed from varieties developed through the CSIRO breeding program; and
- interest on invested reserves.

Table 1 Total Revenue (\$'000) Estimated PBS 2000-01 vs Actual 2000-01

	Revenues from Independent Sources			Total Revenue from Independent Sources
	Cotton Industry Contribution – Monies from industry levies	Commonwealth Contribution	Royalties and Interest – Monies from other sources	
Estimated PBS 2000-01	5,250	6,985	1,289	13,524
Actual 2000-01	6,930	6,774	1,847	15,551
Estimated PBS 2001-02	5,600	7,619	1,536	14,755

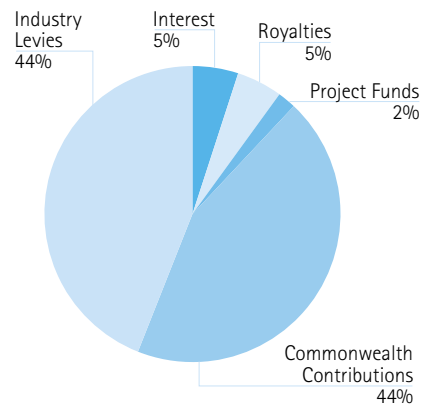
Revenue for the reporting year was \$15.5 million, \$2 million more than had been anticipated. The bulk of this amount is due to increased revenue from industry. Corporate income from industry relates to the harvests of two seasons. Cotton is a summer crop which is picked from about late March to May depending on the season and the location. Initial processing of raw cotton (ginning) takes place from the start of picking through to July and possibly into August in the later areas. The research levy for cotton is calculated per bale ex gin and is collected by the ginning companies before being forwarded to the Federal Government. The 1999–2000 crop was larger than had been anticipated during the Corporation's planning and budgeting processes. The large crop also meant more cotton was ginned after the start of the 2000–01 financial year, increasing levy receipts for the reporting year. As well the CRDC received larger than anticipated revenues through royalties on seed sales and interest on investments.

Corporation financial policy is to carry invested reserves to the approximate value of 70 per cent of one year's research and development expenditure. The strategy for these reserves is to utilise a range of short-, medium- and long-term investments, and the interest earned contributes significantly to the Corporation's accounts. Reserves are used to supplement the Corporation's income as necessary. The net surplus for the reporting year has been transferred into reserves. The Corporation anticipates using reserves to fund a budgeted operating deficit in 2001–02. The balance

ensure long-term projects could be completed in the event of crop failure.

Income from royalties provides a significant revenue stream for the CRDC. The Australian breeding program, conducted by the CSIRO with funding support from the CRDC, is a major success story for the industry. The commercialisation of varieties bred to suit prevailing conditions for each of the major production areas in Australia, while also maximising yield and fibre quality has been well supported by growers and CSIRO-bred varieties account for about 70 per cent of cotton grown in Australia. The CRDC has a royalty sharing agreement with the CSIRO.

Figure 7 CRDC Revenue by Source, 2000–2001



Expenditure

Corporate expenditure for the 2000-2001 year was \$13.9 million, an increase of almost 15 per cent from the year before. Expenditures on research and development grants and activities, corporate support and management and administration have remained stable.

The proportion of the budget directed to each of the Outputs is also similar to the 1999-2000 year.

During the reporting year four divisions of the CSIRO, five State Government Departments, 10 universities, one Cooperative Research Centre and a number of private organisations undertook CRDC funded-research. CRDC-funded research occurs in every mainland Australian State and Territory.

The majority of CRDC expenditure is directed to addressing on-farm production issues, and insect management remains the largest research program. The Diseases and Weeds program saw the largest increase in funding, from \$968,000 in 1999-2000 to more than \$1.9 million or 16 per cent of the research budget in 2000-01. Funding for Technology Transfer and Extension increased by 44 per cent, while, the Soils, Processing and Market and Insect Management Programs all increased by about 30 per cent from the year before.

Figure 8 Corporate Expenditure, 2000-2001

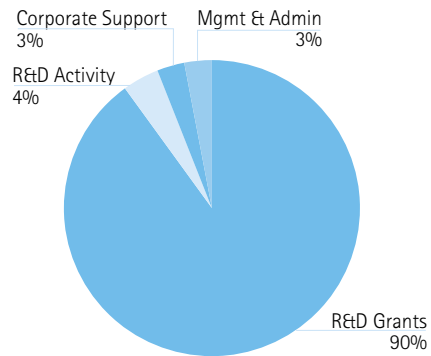


Figure 9 CRDC Expenditure Contributions to Outputs, 2000-2001

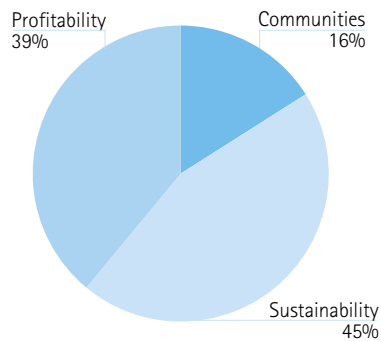


Figure 10 CRDC Research by Funded Organisations, 2000–2001

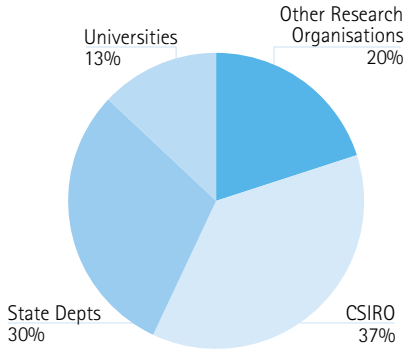


Figure 11 CRDC Research Expenditure by Funding Program, 2000–2001

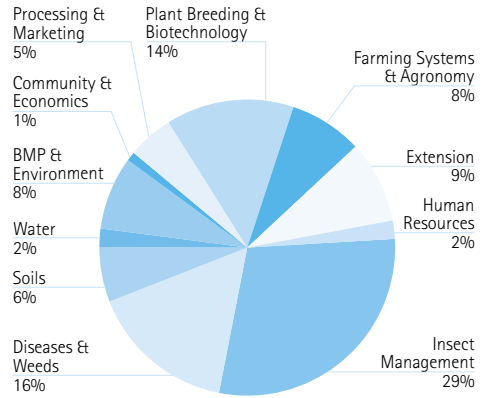
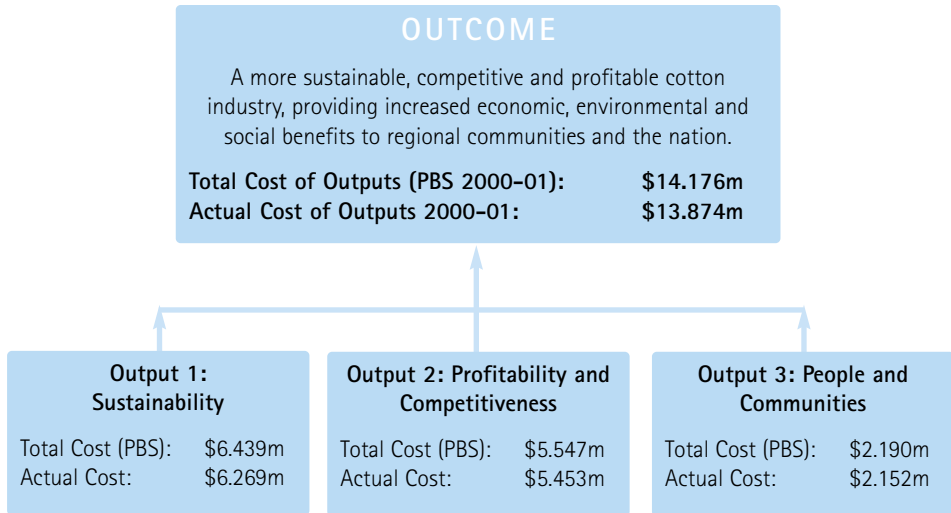


Figure 12 Outcome and Output Groups



Looking Ahead

Revenue in the 2001–02 year is expected to be \$14.8 million, a 5 per cent reduction from 2000–01. Total expenditure is expected to rise to \$15.5 million, up 12 per cent on 2000–01, while research expenditure is estimated to grow by 9 per cent to \$14.6 million.

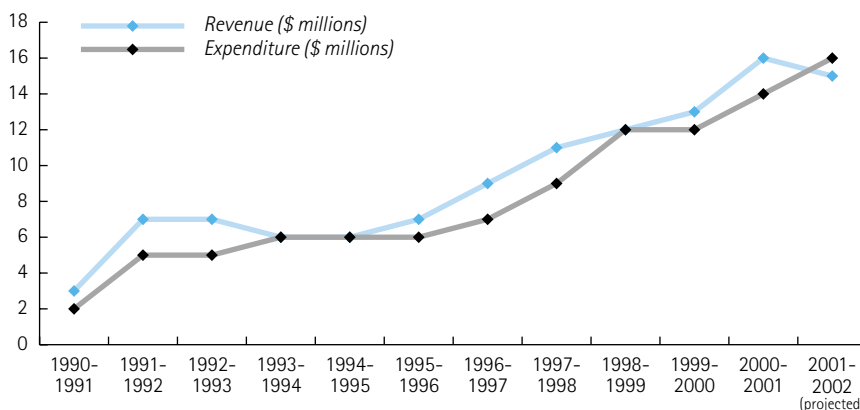
Planning Framework

The Corporation's *Portfolio Budget Statement* for the 2000–01 financial year presents a range of sub-outputs for each Output Group. The *Annual Report* will draw on this format to enable readers to easily identify contributions to the major Outputs and the Outcome. However a review of the *Strategic Plan* and *Portfolio Budget Statement 2000–01* for the purposes of drawing up the *Annual Operating Plan 2000–01* demonstrated that the research program listed as 'Joint RRDC Activities' should be incorporated into existing research categories. As this collaborative research would most likely focus on water use efficiency in

agriculture, a decision was made to transfer allocations for this program to the Water research program. This transfer does not affect the projected contributions to the major Outputs as the Water and RRDC programs were estimated to have the same percentage contribution levels.

Review of the *Strategic Plan, Portfolio Budget Statement 2000–01* and *Annual Operating Plan 2000–01* in preparation for the 2001–02 planning procedure highlighted further improvements which could be made to simplify the Corporation's planning and reporting documents. The new framework has identified key strategies for each major Output. The research sub-programs and even individual projects may contribute to more than one Output and possibly to all three. The CRDC believes that ultimately it will be easier and more effective to measure progress by evaluating the momentum of the broader research program in terms of the strategies and major Outputs than try to judge development on the micro-scale.

Figure 13 CRDC Revenue and Expenditure June 1990–June 2002



CORPORATE PERFORMANCE

Output Group 1: Sustainability

Research and development providing knowledge and products that promote continuous improvement in resource and environmental management.

The need to secure the long-term future of the Australian cotton industry by protecting, maintaining and enhancing the natural resource base lies at the heart of the Corporation's research program. Almost half of the budget is directed towards achieving this Output, which reflects the high priority given to natural resource and environmental management by our stakeholders. The Sustainability Output addresses legislative objectives of increasing environmental or social benefits and achieving sustainable use and management of natural resources. It encompasses a number of the Federal Government's rural R&D priorities including the integration of sustainable resource management into farming and land use practices, maintaining and enhancing Australia's clean and green image and the development of biotechnology while being mindful of consumer concerns.

Under the revised Strategic Plan the Corporation has identified three strategies to help improve industry sustainability.

These are to:

- I Strategy 1. Improve chemical and non-chemical management of pests and beneficial insects
- I Strategy 2. Improve chemical and non-chemical management of diseases and weeds
- I Strategy 3. Develop and assist the adoption of holistic environmental management systems encompassing relevant catchment management strategies

Seven of the Corporation's eleven research programs are considered to have a direct impact on the achievement of the Sustainability Output, including Insect Management, Diseases and Weeds, Soils, Water, Best Management Practices and Environment, Plant Breeding and Biotechnology, and Farming Systems and Agronomy. The Technology Transfer and Extension program provides support in terms of delivering research to industry. The Corporation estimates \$6.3 million or 45.2 per cent of the budget was spent on improving sustainability during the reporting year, including \$5.6 million in direct research grants and \$271,000 in other research and development activities such as workshops and seminars.

Strategy 1: Improve the chemical and non-chemical management of pests and beneficial insects

Within the community there are growing concerns about agricultural chemicals and the potential impacts on human and animal health, the environment and particularly riverine ecosystems. Through a historical reliance on aerial application the cotton industry is a highly visible user of chemical pesticides and often faces social and media scrutiny. While growers see and feel this social pressure, they are also faced with a crop which is susceptible to insect damage throughout its long growing season and a need to produce a saleable commodity.

Into this environment has come Integrated Pest Management, insect management strategies which represent a new way of thinking for the industry. Integrated Pest Management uses alternatives to chemical pest control wherever possible and strives to enhance natural control processes such as predation of pest insects. In the past broad-spectrum pesticides have been used to control pest outbreaks, but the chemicals also impacted populations of non-pest species. Integrated Pest Management avoids broad-spectrum and residual pesticides wherever possible, instead looking to use new and more selective chemistry if necessary. Due to this use of selective and less disruptive pesticides, Integrated Pest Management is also referred to as a 'soft' approach to pest control. These strategies are also being used to help prevent the development of resistance to pesticides. Additionally, reducing usage of broad-spectrum, residual pesticides is helping to

lower contamination of soil, in turn lowering the risk of contaminants moving off-farm in sediment in run-off water, particularly during heavy rain events. Combining fewer applications of residual chemicals with a general lowering of the overall pesticide load on the environment will assist the Corporation achieve its target of reduced pesticide contamination in the riverine environment.

The development of flexible and practical Integrated Pest Management has been a long and involved process involving five research programs. This process is a prime example of the level of coordination between researchers that the Corporation can achieve. Underlying the new strategies is an improved knowledge base, developed under the Insect Management program. A better understanding of pests and potential controls including beneficial insects and spiders, parasites and viruses allowed investigations of techniques to enhance natural processes. The development and commercial introduction of transgenic varieties, or Ingard® cotton, has been a catalyst for the introduction of these new pest management strategies. Ingard varieties produce a protein which is toxic to the key pest of cotton in Australia, the heliothis caterpillar, but which does not affect other insects, animals or humans. In order to protect the technology it is of paramount importance to prevent the development of resistant pest populations. Research under the Insect Management and Farming Systems program has enabled the creation and implementation of a range of resistance management strategies which are a central part of Integrated Pest Management. Following the

proper resistance management strategies is a label condition of Ingard cotton, but growers of conventional cotton and other crops have adopted some or all of the strategies to improve their farming system. A major part of resistance management is the destruction through cultivation of pupae in the soil during winter, especially following an Ingard crop. This 'pupae busting' is targeted at larvae which may have survived on an Ingard plant due to a genetic resistance, but it has been shown to have a dramatic effect on the populations of heliothis during early spring.

Research under Insect Management and Farming Systems has also been fundamental to the development of other aspects of Integrated Pest Management including the use of food sprays to attract and support populations of beneficial species, and the strategic planting of trap or nursery crops. Trap crops are designed to be more attractive to pests than the cotton, and draw the pests away. Nursery crops encourage the development of beneficial insects which can then move into the cotton to feed on pests.

The incorporation of Integrated Pest Management into the Best Management Practices program has encouraged widespread adoption of these strategies. The Technology Transfer and Extension team is supporting growers and crop consultants as they move to implement the new techniques.

While Integrated Pest Management is making significant inroads into the pesticide usage of the industry, and is certainly reducing the amount of broad-spectrum chemical being applied, chemical pesticides will continue to be an important control mechanism. To this end

the Corporation is continuing to investigate application technologies. A key achievement during the report year has been the completion of a unique and sophisticated wind tunnel facility at the Centre for Pesticide Application Safety, University of Queensland, Gatton. The facility is one of only two wind tunnels in the world that are set up to specifically study spray application technology with active pesticide ingredients. Although the facility received significant funding from the CRDC, it is a public facility and has attracted interest from other agricultural industries and equipment manufacturers. The Corporation's investment in this facility is seen as the path of a longer-term strategic approach to improve the quality of information available to growers and spray contractors. The facility will also see the developers of improved spray nozzles and atomisers come to Australia to test and refine their designs. This will mean Australian growers will get faster access to new technology.

The past few years has seen a shift away from aerial application to ground-based spray rigs. Ground rigs offer more precision and can significantly reduce the volume of pesticide applied through techniques such as band spraying. The Corporation has previously assisted this development through the development of ground rig specific application guidelines and seed funding for the fledgling Groundrig Operators Association. Further development of ground rig specific guidelines occurred during the reporting year, as did a revision of the SprayPAK booklet which will be published late in 2001.

Strategy 2: Improve the chemical and non-chemical management of diseases and weeds

The management of diseases and weeds is important within the farming systems because these problems can impact severely on the viability of the industry. The control of diseases and weeds must be conducted in a manner which does not have negative impacts on the long-term health of the soil, minimises potential contamination of water and does not adversely affect the environment, neighbours or downstream communities. This strategy relies explicitly on research being undertaken in the Diseases and Weeds, Plant Breeding and Biotechnology, Farming Systems and Agronomy and Technology Transfer and Extension programs. It is also influenced by, or influences, work in Soils, Water and Best Management Practices and Environment.

The causes of several of the major diseases of cotton are related to the soil. Just like diseases in humans, prevention is better than cure, and hygiene plays a key role in prevention. During the 1999-2000 growing season the industry saw a rapid and unexpected increase in the spread and detection of Fusarium Wilt. This disease is caused by a soil-borne fungus, *Fusarium oxysporum*, which research has shown can be spread from field to field, farm to farm and valley to valley in mud and dirt on machinery, equipment, vehicles and footwear. Other diseases can also be spread in this way. Due to the significant threat to the industry posed by Fusarium Wilt, the 2000-01 year saw the widespread adoption of farm hygiene practices. Many properties have invested in special facilities, including high-pressure spray

units, foot baths and evaporation pans, for the purpose of cleaning equipment. During the year new detections of Fusarium Wilt slowed dramatically, due in part to the implementation of hygiene strategies. A farm hygiene module was incorporated into the second edition of the Best Management Practices Manual to assist adoption by industry.

The Corporation is continuing to take a multi-pronged approach in the search for a solution to Fusarium Wilt. Investigations are continuing into potential biocontrol agents which may be able to alleviate problems in severely affected fields. Growers are being advised to avoid rotation crops which build up the disease within the soil and to remove weeds that host the disease. On another front the CRDC has invested in traditional and novel biotechnology approaches. The CSIRO Australian breeding program has identified a number of existing varieties that offer some tolerance to the disease, and also varieties that are more susceptible to it. The identification of these traits will assist in the development of new varieties, although researchers estimate it could be up to 10 years before elite cotton varieties have a high level of resistance to Fusarium. Meanwhile, other CSIRO scientists are studying the genetic responses of cotton plants exposed to the Fusarium fungus to identify combinations of genes that provide resistance. Increasing the level of knowledge about the plant's defence mechanisms will assist plant breeders to breed these characteristics into new cotton varieties. A third line of attack being followed by CSIRO researchers is the investigation of resistance in Australian native cottons. Australia has a

number of native cotton species and preliminary studies have shown that some are resistant to *Fusarium*. However, native cottons and commercial cottons are genetically different and will not interbreed naturally. Part of the research aims to find out the best way to transfer the resistance genes from the wild species to cultivated cottons.

The breeding program is seen as a key to effective management of disease threats in the long-term. In the past the program has had considerable success in developing varieties that are resistant to diseases of cotton. Two recent examples of diseases that have been held in check by the development of varietal resistance are Verticillium Wilt and Bacterial Blight. Both of these diseases caused considerable damage in past years.

Plant Breeding and Biotechnology has also played a key role in the delivery to market during the past year of a new tool for weed management. Roundup Ready^{®1} Cotton is the second line of transgenic varieties to be approved for use in the Australian cotton industry. While the first line, Ingard[®] Cotton, enabled the plant to produce a protein which was toxic to the industry's key insect pest, the Roundup Ready trait confers to the plant a degree of tolerance to the herbicide Roundup[®]. The new varieties expand the weed control options available for growers, and fit in with current industry moves to controlled traffic and reduced-tillage operations. They allow growers to control weed infestations by applying the knockdown herbicide Roundup to fields after seedlings emerge. This negates the need to apply residual herbicides before emergence and in turn reduces the risk of

herbicides moving off-target in contaminated sediments during storm run-off events. While seed supplies of Roundup Ready cotton were limited, the responses from growers who did have access were very positive. The technology is likely to have the greatest impact in areas severely affected by the troublesome weed, Nutgrass.

The Farming Systems and Agronomy research program also plays a crucial role in the overall management of diseases and weeds, because management of these problems needs to be conducted on a whole-farm basis. The severity of the cotton disease Black Root Rot is related to the number of cotton crops grown on infected fields. Management options for this disease are limited which adds to the importance of ongoing research. The disease-like syndrome Bunchy Top continues to appear in cotton crops following its identification two years ago. Research has linked this syndrome to a pathogen carried by the Cotton Aphid. A solution to this problem is likely to encompass management strategies for the insect and plant breeding to deliver further varietal resistance.

The success of Integrated Pest Management has spurred the industry and the Corporation to examine similar concepts for disease and weed management. These strategies will be developed and refined in the coming year and beyond.

1 Roundup, Roundup Ready and Ingard are trademarks of Monsanto Corporation.

Strategy 3: Develop and assist the adoption of holistic environmental management systems encompassing relevant catchment management strategies

This strategy is aimed squarely at addressing the Federal Government's research priority, and the *Primary Industries and Energy Research and Development Act 1989* Object of achieving sustainable natural resource management. Research activities conducted under this strategy will also assist the industry to increase environmental and social benefits and will help to build a reputation for clean and green cotton production. The marketing and processing sectors have already identified a potential market advantage due to the industry's growing environmental management credentials, and these credentials should enable the industry to avoid environmentally-based non-tariff trade barriers.

This strategy involves research being undertaken in the Soils, Water, Best Management Practices and Environment and Farming Systems and Agronomy research programs.

The industry's leading Best Management Practices Program is a flagship for environmental management in Australian agriculture, and several other agricultural industries in Australia are looking at the cotton system as a basis for their own programs. The Best Management Practices Program has delivered to growers a flexible system for the identification of potential environmental and operational risks, as well as assisting the development of action plans to manage those

risks. A process rather than an outcome, the Program focuses on continual improvement as the goal. The introduction and adoption of Best Management Practices has helped to improve practices across the board within the production sector of the industry.

A survey of 62 growers was conducted between March and July 2000. This survey showed a high level of awareness for the Best Management Practices Program and 100 per cent of growers had a copy of the Best Management Practices Manual. Of these growers, 77 per cent had completed the self-assessment components of at least one of the modules, and 55 per cent had implemented action plans addressing pesticide management issues. These percentages will have increased during the past year as the Best Management Practices Program implementation effort, coordinated and conducted by the grower organisation Cotton Australia, continues.

The Best Management Practices Manual is the core resource of the Program. The Manual provides practical and adaptable information and advice for growers to address specific issues of farm management and potential off-farm impacts. The Corporation has been continuing to support the progression of the Best Management Practices Program by funding the ongoing development of the Manual. In October 2000 a second edition of the Manual was released to industry, updating the first edition which was published in 1997. The new edition is more user friendly than the first and incorporates new information on pesticide storage and handling, human safety and dryland cotton production.

Additional modules are continuing to be developed for the Program in response to the increasing amount of regulation affecting Australian agriculture. A key project during the reporting year has been the development of a Best Management Practices Occupational Health and Safety Module. This project is being undertaken by the Australian Agricultural Health Unit at Moree and includes a training program for growers as well as the module itself. During the second half of 2001 pilot groups will continue to test and help to refine the module, before the materials are published and released to the industry late in the year.

Modules are also being developed to cover Land and Water Management and Petrochemical Storage and Handling. Additionally, a number of issues are being scoped as likely subjects for modules in the future, including vegetation and biodiversity, waste management, noise management and air quality. The coming year will also see preliminary work investigating the possibilities for expanding the Best Management Practices Program to cover harvesting, ginning and transport operations.

During the year the Corporation received the final report from a joint Murray Darling Basin Commission, Australian Cotton Growers' Research Association and CRDC funded study which investigated the potential evolution of the Best Management Practices Program into an internationally-certifiable environmental management system. Discussions are continuing between the project partners to identify how to progress the recommendations made in the report. Any moves towards the implementation of higher level environmental

management systems within the cotton industry will only be made after extensive consultation with the industry and through a gradual introductory process.

Shortly after the Best Management Practices Program was first launched to industry, grower feedback indicated the need for a way to measure progress along the path of continual improvement. As a result the Corporation was tasked to develop an audit program which would be flexible to meet the needs of the wide range of growers in the industry, while also being able to withstand the scrutiny of regulators, consumers of Australian cotton and the broader community. The completion of a pilot study involving some 34 grower representing all valleys and a broad range of farming operations saw the end of the initial development phase of the audit program. In January 2000 the Audit program began full operations. A year later the administrative operations related to the Audit Program transferred from the CRDC to the newly established Cotton Industry BMP Audit Office. The Corporation is underwriting the operations of the Audit Office until 2002 and it is hoped the Office will be self-sustaining in the long-term. The CRDC retains stewardship of the Best Management Practices Audit Program to enable further development, provide a mechanism for complaints and suggestions and to ensure the Audit Program is rigorous and credible.

As of August 2001, 130 growers have joined to Audit Program, about 10 per cent of the industry. Another 30 audits were expected to be conducted up to the start of the summer growing season. Traditionally the demand for

audits declines during the period from October to March.

Resource management remains a key component of any environmental management system. A strong research effort is required to provide a solid foundation for the development of resource management guidelines. For the CRDC, base research on natural resources is conducted in the Soils and Water Research programs and that information is then fed into the broader Farming Systems and Best Management Practices and Environment programs.

Cotton soils are not prone to salinity although in the irrigated cotton growing areas of northern NSW and south-eastern Queensland incipient salinity is apparent. These problems are often related to irrigation structures such as storages and channels. One ongoing Corporation-funded project is using electromagnetic sensing equipment to assess soils on-farm and identify likely problems with existing or proposed irrigation developments. The project, which is being jointly funded by the CRDC, the Australian Cotton Cooperative Research Centre, NSW Salt Action and the National Heritage Trust, is building up a database of soil types and electrical conductivity readings in a number of cotton growing valleys. By looking at the issues from field, district and regional scales, the project aims to involve a range of community groups in assessing the current situation and ultimately improving irrigated cotton farming systems. The project is already having an impact on the industry as growers have been able to identify the root causes of some irrigation-related problems, such as leaking

storages, and take appropriate action to manage them.

Water is a precious commodity and work continues to improve water management and irrigation efficiency. The past year has seen the development of an exciting new support tool to help growers manage their irrigation practices to improve water use efficiency. Taking a very practical approach, the tool is based on utilising existing irrigation equipment and enhancing the irrigation system without significant capital outlay. The next phase for maximising the benefits of this new tool will be to incorporate it into research being conducted under the Farming Systems program, and to deliver it to the Technology Transfer and Extension Team for implementation in industry.

Performance Measures – Sustainability

Estimated Total Cost (PBS 2000-01):	\$6.439m*
Estimated Actual Total Cost:	\$6.269m*

The Quality performance measure (as per the CRDC Portfolio Budget Statement 2000-01) for all Contributing Outputs stated that projects were assessed and performance reviewed by industry (Australian Cotton Growers' Research Association – ACGRA). Each year the ACGRA reviews all project applications and continuing reports, and subsequently makes recommendations, prior to the Corporation Board's project evaluation and budget meeting.

Workshops and Conferences

- Australian Cotton Conference, Brisbane, August 2000
- International Cotton Advisory Committee Plenary Meeting, Cairns, November 2000
- Farming Systems Forum, Dalby, Qld, December 2000
- Narrow Row Cotton Conference, Griffith, March 2001
- Northern Murray Darling Basin Catchment Management Workshop, Narrabri, May 2001
- Aphid Review, Narrabri, June 2001
- Beneficials Review, Narrabri
- Fusarium Working Group Meeting
- Water Use Efficiency Workshops

Publications

- *Insect Management in Cotton Pocket Guide*, November 2000, (produced in conjunction with the Australian Cotton CRC)
- *Insecticide Resistance Management Strategy Charts and Guidelines*, September 2000, (produced in conjunction with the Australian Cotton CRC)

Table 2 Performance Information for Output 1 – Sustainability

CONTRIBUTING OUTPUT	RESEARCH PROGRAM	PERFORMANCE INFORMATION
1.1 Development of sustainable Integrated Pest Management systems	Insect Management	Quantity: 18 new (↑7),*** 29 continuing [†] Price: \$2.522 million**, 99% of PBS estimate
1.2 Development of sustainable control measures for diseases and weeds	Diseases and Weeds	Quantity: 12 new projects (↑6), 7 continuing [†] Price: \$0.850 million, 108% of PBS estimate
1.3 Release of new varieties with effective host resistance	Plant Breeding and Biotechnology	Quantity: 10 new projects (↑3), 12 continuing (↑1) [†] Price: \$0.783 million, 92% of PBS estimate
1.4 Develop whole-of-farm and Area Wide Management systems	Farming Systems and Agronomy	Quantity: 3 new projects, 8 continuing [†] Price: \$0.517 million, 89% of PBS estimate
1.5 Develop stewardship in soil management to better protect long-term soil quality and "health"	Soils	Quantity: 7 new projects (↑5), 5 continuing (↑1) [†] Price: \$0.685 million, 110% of PBS estimate
1.6 Develop stewardship in water management to better protect this resource in the long-term	Water	Quantity: 5 new projects (↑4), 2 continuing [†] Price: \$0.227 million, 102% of PBS estimate
1.7 Joint research and development activities to better protect resources	Collaborative RRDC Activities (integrated into other research programs)	–
1.8 Development and implementation of environmental management systems	Best Management Practices and the Environment	Quantity: 9 new projects (↑6), 8 continuing (↓1) [†] Price: \$0.685 million, 88% of PBS estimate

* includes an allocation for Management and Administration and Corporate Support.

[†] All projects from the research program, no pro rata adjustment.

** Total Contribution to Output.

*** Deviation from PBS projection.

Output Group 2: Profitability and Competitiveness

*Research, Development and Technology
Transfer to increase farming efficiency,
improve pest control and reduce costs
throughout the production chain.*

While the future of the cotton industry in Australia will depend heavily on the long-term sustainability of the resource base, continued production will also depend on the crop being a viable option for farmers. The two main components of this Output are farm profitability and industry competitiveness. Growers can influence the profitability of their businesses by maintaining costs and improving yield and/or quality; or by maintaining yields/quality and decreasing costs. Farm management strategies vary and so do the related costs and production. High cost strategies may not deliver greater profit margins than lower cost strategies, although they may present a lower real or perceived risk for growers. The second 'leg' of the profitability equation involves maintaining or enhancing international competitiveness and improving market opportunities. Australian cotton is sold on the world market and, unlike some major competitors, is not subject to any form of price protection. Ensuring and maintaining market access, improving quality to attract premium prices, and meeting the quality requirements of major customers of Australian cotton are key concerns for the Corporation. While cotton producing nations

compete on the world market, cotton as a fibre is competing against other fibres, natural and synthetic. Cotton remains the world's favourite fibre, but its market share has been eroded substantially since the introduction of synthetics which are cost efficient and extremely uniform. Increasing the overall quality of Australian cotton, including reducing impurities and improving uniformity, will assist the overall competitiveness of the industry.

The Corporation's activities under this Output address the statutory objective of increasing economic benefits for the industry and the general community in general. The broad range of research, development and technology transfer covers a number of the Federal Government's priorities for Rural Research and Development Corporations including taking a whole-of-industry approach, using biotechnology but being mindful of community concerns, being involved in trade and market access negotiations, maintaining and enhancing Australia's clean and green image, and food safety.

Under the revised Strategic Plan the Corporation has identified two strategies to assist the industry improve profitability and increase competitiveness. These are:

- Strategy 4. Improve farm management strategies
- Strategy 5. Improve potential returns throughout the production chain and assist the development of market opportunities.

Eight of the CRDC's research programs are considered to have a direct impact on the progress towards this Output. These programs are Insect Management, Diseases and Weeds,

Soils, Water, Best Management Practices and Environment, Processing and Market, Plant Breeding and Biotechnology, and Farming Systems and Agronomy. As with the Sustainability Output, the Technology Transfer and Extension program also provides support for the other activities to deliver technology to the industry. More than \$5.4 million or 39.3 per cent of the Corporation's budget was directed to improving profitability and competitiveness during the reporting year, including \$4.9 million in through direct research grants and \$236,000 through other research and development activities.

Strategy 4: Improve Farm Management Strategies

This strategy focuses on changes that can be made on farm to maintain or increase profitability. This strategy is integrated with much of the work of the Sustainability Output, as a key factor in business viability is ensuring long-term profitability. In fact all of the research programs that contribute to the Sustainability Output also contribute to Profitability and Competitiveness. All of these research programs relate to on-farm production systems and activities.

The Cotton Comparative Analysis 1999-2000 Crop conducted by Boyce Chartered Accountants shows that during the last five years the average cost of production was just over \$2700 per hectare or \$353 per bale. While costs for the 1999-2000 year were slightly above average, yields were also higher and the average production cost per bale was \$340. The average price for each bale was \$429, with the five year average price being \$475.

One area with significant scope for improving profitability is insect management. Insect control is the largest budget area for most cotton growers, and the price of chemicals has increased substantially during the last 10 years. However, comparative data taken during the last three seasons shows growers can save money by using an appropriate Integrated Pest Management system, without a negative impact on yield. Data from the 1998/99 season, a year that saw unusually high insect pest pressures, shows that by using 'softer' spray regimes growers could reduce the number of applications by about a third. Although the average cost is higher for each spray under the soft strategy, the reduced number of sprays meant growers were still coming out in front and achieving average gross margins \$300-400 higher per hectare. For any given yield there was up to \$700 per hectare difference in gross margin, with those fields managed under an IPM system showing better returns. To date all of the analyses have shown the same trend – Integrated Pest Management strategies produce greater returns on investment than conventional pest management regimes. These results are not dependent on the use of transgenic varieties, nor are they restricted to any particular cotton growing area.

As discussed under the Sustainability Output, maximum benefits of an Integrated Pest Management system can be gained when the principles are applied over a large area, through Area Wide Management. The increased communications between growers within Area Wide Management groups is allowing benefits to be more visible, for the

group members as well as others in the industry.

As the threats to the production system from diseases and weeds are seen to have a greater impact on farm viability and profitability, the Corporation estimates 60 per cent of the research budget in this area contributes to the Profitability Output. This is demonstrated well by the situation with Fusarium Wilt. This disease causes high mortality rates among seedlings. The effect on the crop is devastating and can mean entire fields need to be removed from cotton production – impacting heavily on overall farm profitability. As yet there is no solution to Fusarium Wilt, although, as discussed previously, the Corporation is tackling this disease through a number of approaches.

On-farm weed management can also impact on profitability. Within the field weeds compete with the crop for valuable nutrients and water, and at the end of the season can increase the amount of debris and trash in the cotton which impacts on the price the grower receives. Weeds can also act as a host for diseases and build up the levels of pathogens within the soil, or as a host for pest insects. The introduction of Roundup Ready® cotton has expanded the range of control mechanisms available to the grower. In the past weed management has relied on residual herbicides applied before planting to allow clean establishment of the crop. During the season weeds in the furrows can be destroyed by cultivation, but those close to the cotton plants need manual 'chipping'. Chipping is an intensive process where crews of people use hoes to remove weeds within the crop. The

costs of using such a labour force are becoming prohibitive. By contrast, Roundup Ready cotton enables growers to apply herbicide after the seedlings have emerged. These cotton varieties have a degree of tolerance to the herbicide glyphosate, commonly known as Roundup®. Roundup is a knock-down herbicide, rather than a residual one, and breaks down quickly following application. Roundup Ready cottons will allow growers to control weeds in and between rows in one go, potentially reducing costs as well as reducing the current reliance on and use of more residual herbicides. Other herbicide-tolerant varieties are being developed and the breeding program will play a significant part in bringing the new cultivars to the market.

The Australian breeding program has played, and continues to play, a major role in lifting the profitability of the industry by increasing average yields. During the past ten years yields have been gradually improving as new varieties have been released. As well as increased yields, these varieties offer improved fibre and crop management characteristics. A focus within the breeding program to develop varieties suited to a range of climatic conditions has allowed the industry to expand substantially, adding to the profitability of the industry as a whole. Improving fibre quality is a major consideration in terms of enhancing market opportunities and being competitive in the global cotton market.

Yield and fibre quality is also related to the general farming systems. Crop management can have a significant effect on harvested yields and on the costs of production. As could be expected yield is closely tied to gross

margins. According to the *Cotton Comparative Analysis 1999–2000 Crop*, the top 20 per cent of growers in the analysis produced more bales of cotton from the same cost base. The report suggests growers should look to improve revenue by increasing yields rather than search for dramatic cost cutting measures. In the analysis, the top 20 per cent of growers achieved 67 per cent higher land productivity than the average, as measured by yield, or \$458 per hectare.

Farming systems are based on the complex interactions between the resources available. Some of these resources can be easily manipulated, while others can not. The condition and health of the soil has a major influence on the vitality of the crop. The availability and quality of water is a telling factor in yield. And crop management also needs to take into account any potential environmental risks.

The development of alternative row configurations has been conducted through the Farming Systems research program. Narrow row systems increase the plant density and shorten the growing season. Each plant has less fruit, but generally yields are equivalent to the standard one-metre row configuration. Narrow and ultra narrow row systems have proven popular in cooler climate areas such as Southern NSW where growing seasons are shorter than in the traditional areas. Narrow row systems save on some of the input costs, including weed control because the dense canopy shades the soil and prevent weeds from growing. However, a number of issues regarding harvesting of narrow row crops have been identified as

requiring further commercial advancement before the technology could be more widely adopted. The crop management and varietal research outputs achieved in alternative row configurations often have application in traditional areas by improving practices and increasing the options available to growers.

The National Cotton Extension Team plays a vital role in trialing and transferring new knowledge and strategies to the industry.

Strategy 5: Improve potential returns throughout the production chain and assist the development of market opportunities

The post-farm gate sectors of the cotton industry have developed in a free-market environment and are subject to a lot of competition. This competition means the organisations involved look for their own ways of obtaining commercial advantage and do not look to the industry to fund innovation. Australian cotton is sold on the world market without any price or income support for producers or marketers. As a result, the Australian industry is very well aware of the needs of its domestic and international buyers and the opportunities that exist for market expansion. Within this environment the Corporation sees its role in providing general support – by improving fibre quality to meet the needs of consumers, and assisting the industry and Government to fully understand the international marketplace to encourage better negotiation.

A key achievement under this strategy during the year was the release and launch of a new study into the source of distortions in the

cotton market. The report *Trade Distortions and Cotton Markets: Implications for Australian producers*, shows the price Australia cotton producers receive is heavily influenced by the income support and trade barriers enforced by the world's major producers. Research and analysis undertaken by Canberra's Centre for International Economics for the report demonstrates that global removal of price and income support would add an estimated A\$177 million to the net income of the Australian cotton industry.

Production subsidies and export incentives insulate producers from market signals and free market forces. As a result more cotton floods an already adequately supplied market, driving world prices down. World cotton prices have plummeted to the lowest levels seen in more than a decade and yet major increases in production will occur in the USA, China, and Brazil. The US and China are the major source of distortions in the world cotton market and producers in these countries receive 76 per cent of the total assistance to growers around the world. The International Cotton Advisory Committee estimates that more than half of the world's cotton production benefits from direct price and income support programs.

To effectively compete in such a tilted environment, the Australian industry has to be better and smarter in the way it produces cotton. In an effort to increase understanding of the factors affecting final fabric quality, the Corporation is funding a major whole-of-industry program investigating the entire production chain. The field-to-fabric program will primarily assess the effect of field, variety

and gin variables on yarn and fabric quality. Maximising understanding of fibre characteristics could have an immediate impact on the quality throughout the processing chain, increasing the value of the original fibre. The pipeline encompasses a number of research projects, while the main objective is to understand how these variables impact on the final fabric. It is possible that some very simple changes will have a dramatic effect on quality. Ultimately it is envisaged a prediction mechanism will be created so fibre performance can be reliably increased along the production chain.

The foundations of this pipeline were laid by a previous CRDC-funded project 'Cotton ginning with an emphasis on cotton quality'. This project was a joint effort by Dr Grant Roberts from the National Centre for Engineering in Agriculture (NCEA) in Toowoomba and Dr Patricia Bel-Berger from the United States Department of Agriculture's Southern Regional Research Centre (Cotton Fibre Quality Research) in New Orleans. The project is believed to be the first time in the world that raw cotton has been tracked and quality tested on such a large scale as it moves through the production chain. The international collaboration enabled quality testing of lint, yarn and fabric and provided a comparison with US varieties.

Significant interest from the industry in the results of the fibre quality research has encouraged the Corporation to lift the funding-support in this field by more than \$120,000 in the 2000-01 financial year. This

high level of funding is continuing for the 2001–02 year.

The pipeline program has built and is enhancing linkages between production researchers and those in the processing sectors including the NCEA, the CSIRO Division of Textile and Fibre Technology in Geelong and the International Fibre Centre in Melbourne. Technical input also comes from commercial industry players.

Performance Measures – Profitability and Competitiveness

Estimated Total Cost (PBS 2000-01):	\$5.547m*
Estimated Actual Total Cost:	\$5.453m*

The Quality performance measure (as per the CRDC Portfolio Budget Statement 2000-01) for all Contributing Outputs stated that projects were assessed and performance reviewed by industry (Australian Cotton Growers' Research Association – ACGRA). Each year the ACGRA reviews all project applications and continuing reports, and subsequently makes recommendations, prior to the Corporation Board's project evaluation and budget meeting.

Workshops and Conference

- Australian Cotton Conference, Brisbane, August 2000
- International Cotton Advisory Committee Plenary Meeting, Cairns, November 2000
- Farming Systems Forum, Dalby, December 2000
- Narrow Row Cotton Conference, Griffith, March 2001
- Weeds Program Meeting, Narrabri, May 2001
- Fusarium Working Group Meeting

Publications

- *Insect Management in Cotton Pocket Guide*, November 2000 (produced in conjunction with the Australian Cotton CRC)
- *Trade Distortions and Cotton Markets: Implications for Australian Producers*, April 2001

Table 3 Performance Information for Output 2 – Profitability and Competitiveness

CONTRIBUTING OUTPUT	RESEARCH PROGRAM	PERFORMANCE INFORMATION
2.1 More cost effective pest management	Insect Management	Quantity: 18 new (↑7),*** 29 continuing [†] Price: \$1.681 million,** 99% of PBS estimate
2.2 More cost effective management of diseases and weeds	Diseases and Weeds	Quantity: 12 new projects (↑6), 7 continuing Price: \$1.275 million, 108% of PBS estimate
2.3 Introduction of new varieties with improved characteristics	Plant Breeding and Biotechnology	Quantity: 10 new projects (↑3), 12 continuing (↑1) Price: \$1.174 million, 92% of PBS estimate
2.4 Improved product quality to better address market quality needs	Processing and Market	Quantity: 7 new projects (↑3), 2 continuing (↑1) Price: \$0.496 million, 100% of PBS estimate
2.5 More cost-effective production systems and whole-of-farm programs	Farming Systems and Agronomy	Quantity: 3 new projects, 8 continuing Price: \$0.517 million, 89% of PBS estimate
2.6 Maintenance of soil quality and nutrition	Soils	Quantity: 7 new projects (↑5), 5 continuing (↑1) Price: \$0.171 million, 110% of PBS estimate
2.7 Efficient use of water to maximise returns	Water	Quantity: 5 new projects (↑4), 2 continuing Price: \$0.025 million, 102% of PBS estimate
2.8 Improved activities in whole-of-farm systems and shared problems	Collaborative RRDC Activities (integrated into other research programs)	–
2.9 Ensuring Best Management practices does not have negative impacts on farm profitability	Best Management Practices and the Environment	Quantity: 9 new projects (↑6), 8 continuing (↓1) Price: \$0.114 million, 88% of PBS estimate

* includes an allocation for Management and Administration and Corporate Support.

[†] All projects from the research program, no pro rata adjustment.

** Total Contribution to Output.

*** Deviation from PBS projection.

Output Group 3: People and Communities

Research, Development and Technology Transfer to ensure maximum benefit for the industry and the community.

Human resources form the foundation for all innovation. Creativity within and surrounding the research program is a human process, one which will happen most effectively if researchers are well supported within their activities.

This Output is addressing the Statutory objective of making more effective use of human resources and skills, and the Federal Government's priority of encouraging creativity and innovation within the industry's human resources. The Output is aiming to encourage and support viable regional communities enjoying the flow-on benefits of improved sustainability and increased profitability.

Three strategies have been identified under the revised Strategic Plan to address this Output. They are:

- I Strategy 6: Assess economic, environmental and social impacts on regional communities and the nation; identify and develop appropriate involvement opportunities
- I Strategy 7: Involve industry personnel in regional adaptation of research, and effectively transfer new techniques, strategies and discoveries

- I Strategy 8: Develop and engage creative, innovative and highly trained human resources.

More than \$2 million was spent directly on this Output during the reporting year, 15.5 per cent of the Corporation's research budget, including \$1.9 million directly through research grants and an additional \$93,000 in other research and development activities. The Corporation estimates contributions to this Output are drawn from five research programs including Best Management Practices and Environment, Community and Economics, Processing and Market, Technology Transfer and Extension, and Human Resources.

Strategy 6: Assess economic, environmental and social impacts on regional communities and the nation; identify and develop appropriate involvement opportunities

This strategy focuses on measuring the downstream impact of the Corporation's activities, and will provide key data of the Corporation's progress towards its Outcome.

Often the impact of research may only become apparent several years after the work concludes. There is also a difficulty because of the nature of the impact – particularly the social and environmental aspects. The Corporation is continuing to investigate and develop appropriate tools to collect and analysis this information.

Previously conducted studies will provide the baseline data. This includes the Benchmarking Survey of the cotton industry undertaken by the CRC for Sustainable Cotton Production

(the predecessor of the Australian Cotton CRC) for the 1996/97 season. The Corporation published the results of this survey in August 2000. A second benchmarking survey, which is aiming to identify changes in practices, should be completed and published by December 2001.

Ten years ago the first environmental audit of the cotton industry was coordinated by the Australian Cotton Foundation (now Cotton Australia). This audit highlighted a number of environmental issues facing the cotton industry and was one of the influences which led to the development of the Best Management Practices program. The CRDC and Cotton Australia are now in the process of jointly planning for the second environmental audit of the Australian cotton industry. This audit, expected to be completed by July 2002, will deliver some much needed detail about the overall effect of the Best Management Practices program on the operations and environmental impact of the cotton industry.

In 1976 the Industries Assistance Commission estimated at least 50 per cent of the benefits of rural research and development were captured by the target industry, with the remaining benefits being distributed across other industries and to the general community. A 1995 inquiry by the Industry Commission concluded the 'spillover' benefits of rural research and development were generally larger than would occur in other industry-related R&D programs. Spillovers are the indirect consequences of economic activity that are not fully accounted for in prices/costs of a free market system; they can be positive or negative. In relation to rural research and

development spillovers include contributions to regional development and employment, maintenance of scientific infrastructure, the development of a pool of trained researchers and stability in the production of commodities to consumers. By contrast, public goods are also a result of rural research and development but are a common property that does not provide direct or exclusive returns to private individuals or organisations. Public goods include fundamental knowledge flowing from basic research, research to improve the management of natural resources and improvements in occupational health and safety.

There is little doubt that the cotton industry has a significant effect on rural and regional communities, and not just those located in cotton areas. Cotton is a major employer in the areas where it is grown, contributing greatly to the economies of a wide range of rural towns from Emerald in Central Queensland through to Hillston in Southern NSW. According to the Boyce Chartered Accountants *Cotton Comparative Analysis 1999–2000 Crop*, during the 1999–2000 season surveyed growers employed on average one permanent field staff member for every 188 hectares of cotton. Extrapolated across the entire industry this equals almost 2400 full-time jobs. In 2000–01 more than 500,000 hectares of cotton were planted according to the Raw Cotton Marketing Advisory Committee, adding more than 250 permanent jobs to the industry. This figure does not include administration or office staff, or contractors and consultants. In the CRDC Annual Report 1998–99 the Corporation estimated cotton production

provides the equivalent of 10,000 full-time on-farm jobs each year, approximately 20 times the labour requirements of rainfed wheat.

The Boyce analysis does point to an increasing number of farms who are looking to outsource a range of farm operations to contractors, based on priority agreements. The growing use of contractors, particularly in those operational areas involving expensive or specialised equipment, introduces a range of productivity gains into the industry, reduces the risk of over-capitalisation by growers and spreads the resultant economic activity over a wider base.

Anecdotal evidence from Cotton Consultants Australia Inc., the professional association of cotton consultants and agronomists, suggests most if not all cotton growers in Australia use external advisers during the year. These advisers include paid consultants, representatives of chemical companies or product resellers, industry development officers and/or the extension staff from state departments of agriculture. This support network for growers in turn requires a range of business and professional support services, creating further business and employment opportunities in rural towns. The increased economic activity in these towns helps to establish a positive cycle encouraging further development and growth. Invariably these towns also contribute to the economies of larger regional centres, and the benefits flow through to the national economy.

Employment is also generated through post-farm gate activities including ginning, bale storage, marketing and shipping, as well as in downstream industries using cotton products and processing by-products. Employment is

not the only measure of the impact on communities of the cotton industry but it is a very good one. The industry has a requirement for a wide range of workers covering a broad array of skills and disciplines. The potential for employment is a key driver within society in general and the lack of job prospects are often cited as a factor in the decline of rural communities. By enhancing the sustainability, profitability and potential for growth of the industry, the Corporation aims to contribute to the long-term viability of rural and regional Australia.

The industry is also seeing positive results due to changes in natural resource and farm management. In 1998-99 the cotton industry captured news headlines regarding the contamination of beef cattle through spray drift of the pesticide Endosulfan. This unacceptable situation saw the grower organisation Cotton Australia dramatically increase its efforts in terms of training growers in Best Management Practices and Spray and Drift Management Plans. The Corporation assisted by providing financial support for the accelerated program, improving the extension to industry of Best Management Practices in regard to spray application and providing seed-funding for the establishment of a Groundrig Operators Association. The industry's endeavours were rewarded in the 1999-2000 season when only one beast out of more than 14,000 head of cattle tested showed residues above half of the Maximum Residue Level. This result was repeated in the 2000-01 season, demonstrating a significant shift in attitudes and practices regarding the application of chemicals.

The shift has also been seen in the decline in endosulfan levels measured in the rivers of the Central and North Western regions of New South Wales. The NSW Department of Land and Water Conservation Centre for Natural Resources 1999–2000 report on pesticide monitoring under the Central and North West Regions' Water Quality Program concluded that 'the cotton industry is commended for this declining trend of endosulfan levels'. A high level of education regarding industry best practice was seen as a key factor of the result in 1999–2000. New restrictions were also placed on the use of this chemical for the 1999–2000 season. The report suggested the best management practices of the cotton industry should be made applicable to the entire agricultural sector to address sharp rises during the last decade of a number of chemicals. The herbicide atrazine was the second most commonly found chemical in the sampled rivers, and levels have been holding steady during the last 10 years. However, data from Cotton Consultants Australia shows atrazine has been used in cotton farming systems only 1 year during the last 8, and then at an extremely low level.

The Corporation generally does not see its role encompassing community education of cotton in Australia – within the industry this function is undertaken by the grower-representative organisation Cotton Australia. However, the Corporation does supply information and appropriate documentation to the general public, either through its website (www.crdc.com.au) or following written or verbal requests. During the year a major redesign of the Corporation's website was

completed, making the site more useful, user friendly and comprehensive. A wide range of Corporate publications, including Annual Reports, Annual Operating Plans, the Strategic (Five Year) Plan and various research reports are available online. In the future the CRDC is planning on including a searchable database of funded research in progress and summaries from completed projects, adding to the accessibility of results and accountability of expenditure.

In May 2001 the Corporation, in conjunction with the CSIRO science education magazine *The Helix*, produced a four-page special feature on cotton. The feature was included in the May/June copy of the popular magazine which is targeted at secondary school students and is delivered across Australia. Additional copies of the feature have been provided to Cotton Australia Grower Services Manager for use during school visits, as well as to Tourist Information Centres in cotton-growing regions.

The Corporation is also helping to improve knowledge within the general community by providing funding for interactive science-based displays for the Australian Cotton Exhibition Centre. The Exhibition Centre will be a national showcase and education centre for the industry located at Narrabri. The Centre is in the final planning stages and is due to open in March 2002.

The social, environmental and economic well being of many rural communities is influenced by cotton production. Through a considered and targeted research and development program, the Corporation is working to ensure the influence is a positive one.

Strategy 7: Involve industry personnel in regional adaptation of research, and effectively transfer new techniques, strategies and discoveries

Regional adaptation of research is an important step on the path from laboratory to industry adoption. To facilitate this process the Corporation funds a number of Industry Development Officers, based at Warren, Gunnedah, Goondiwindi, Griffith, Emerald and Dirranbandi/St George. The Corporation-funded Industry Development Officers are part of a larger team, the National Cotton Extension Team. The National Extension Team brings together cotton-related technology-transfer research and extension staff from state departments of agriculture and natural resource management, the Australian Cotton CRC and the CRDC. This allows activities to be conducted in a managed and consistent way. Leading the team is the National Cotton Extension Coordinator, a CRDC-funded position. The position was filled in February 2001 and is based at the Australian Cotton Research Institute, the headquarters of the Australian Cotton CRC. The coordinator position is a key to ensuring the general success of the industry's technology transfer and extension programs.

In addition to the National Coordinator and a number of in-field Industry Development Officers, the Corporation funds a trainee Industry Development Officer. The trainee position allows a potential Development Officer to gain a grounding in research extension and grower support before taking up a field position, potentially in an area which is isolated from other researchers and extension

officers. The program has already proven its success, and the industry's first trainee has made a smooth transition into a field-based position.

The coming year will see the launch of a new training program for growers. Since 1998 the CRDC has been funding a training coordinator to improve the levels of knowledge and adoption in the industry of Integrated Pest Management. Starting in the fourth quarter 2001 will be pilot courses to field test course design and content. Ultimately the courses will be nationally accredited, enabling widespread delivery and funding assistance for growers to undertake them. Integrated Pest Management is an exciting research development which has the potential to dramatically alter the way cotton production is managed. It represents a major change in attitude and growers will need confidence in the principles and outcomes before taking on such a challenge. This course will give growers that confidence, and facilitate further adoption and enhancement of Integrated Pest Management strategies in the field.

Strategy 8: Develop and engage creative, innovative and highly trained human resources

The Corporation recognises the intrinsic value in facilitating the proper training and professional development of researchers, not only for the cotton industry but for all of agriculture and the nation. Each year the CRDC funds a number of post graduate scholarships and post doctoral fellowships. The Corporation has found this to be an excellent way to assist young scientists to enter the industry. The

program has also meant the industry is providing training for its researchers and has helped to develop a strong loyalty to Australian cotton. During the reporting year funding was provided for 18 post graduate students and 5 post doctoral fellows.

As well as the post graduate program, the Corporation funds an undergraduate scholarship for an Agricultural Sciences student at the University of Sydney. This scholarship is currently awarded for the three-year term of the student's undergraduate degree. Investigations into expanding the undergraduate program to other educational institutions are continuing.

Scientific exchange travel, both domestically and internationally, give industry researchers new ideas, contacts and appreciation of different approaches to similar problems. The Corporation is continuing to apply a policy of assisting with appropriate travel opportunities for researchers as a tool for professional development. Corporation-funded researchers are encouraged to find and keep up with the best in the world, in order to improve upon it.

Performance Measures – People and Communities

Estimated Total Cost (PBS 2000–01): \$2.190m*;
Estimated Actual Total Cost: \$2.152m*

The Quality performance measure (as per the CRDC Portfolio Budget Statement 2000–01) for all Contributing Outputs stated that projects were assessed and performance reviewed by industry (Australian Cotton Growers' Research Association – ACGRA). Each year the ACGRA reviews all project applications and continuing reports, and subsequently makes recommendations, prior to the Corporation Board's project evaluation and budget meeting.

Workshops and Conferences

- Cotton Communities workshop, Sydney, October 2000
- Initial Wincott Meetings, December 2000 and March 2001
- Biotechnology Training Day, ACGRA Biotechnology Committee, CRDC Board and Staff, Narrabri, February 2001
- National Cotton Extension Team annual planning and review workshop, June 2001

Publications

- *Cotton Industry Benchmark Survey: An Analysis of the Australian Cotton Industry*, August 2000 (produced in conjunction with the Australian Cotton CRC)
- *Spotlight on Cotton Research*, August 2000
- *www.crdc.com.au*, CRDC Website, launched December 2000
- *The Performance of Ingard Cotton in Australia during the 1999–2000 Season*, December 2000
- *Cotton: Australia's Favourite Fibre*, May 2001 (a special feature produced for the CSIRO science education magazine, *The Helix*)

Table 4 Performance Information for Output Group 3 – People and Communities

CONTRIBUTING OUTPUT	RESEARCH PROGRAM	PERFORMANCE INFORMATION
3.1 Develop resources and researchers able to address sector issues	Processing and Marketing	Quantity: 7 new projects (↑3),*** 2 continuing (↑1)† Price: \$0.124 million**, 100% of PBS estimate
3.2 Ensure benefits of Best Management Practices program flow to the local environment and the regional community	Best Management Practices and the Environment	Quantity: 9 new projects (↑6), 8 continuing (↓1) Price: \$0.343 million
3.3 Assist the flow-on of benefits to local and regional communities	Community and Economics	Quantity: 2 new projects (↑2), 3 continuing (↑2) Price: \$0.109 million, 545% of PBS estimate
3.4 Improve return on investment by ensuring technology is transferred to farmers and adopted	Technology Transfer and Extension	Quantity: 5 new projects (↑1), 9 continuing (↑1) Price: \$1.239 million, 91% of PBS estimate
3.5 Ensure the supply of adequately trained personnel to assist in research, development, technology transfer and adoption	Human Resources	Quantity: 24 new projects (↑12), 3 continuing (↑1) Price: \$0.337 million, 108% of PBS estimate

* Includes an allocation for Management and Administration and Corporate Support.

† All projects from the research program, no pro rata adjustment.

** Total Contribution to Output.

*** Deviation from PBS projection.



Review of Operations

CottonResearch andDevelopmentCorporation

crdc

2000-2001
Annual Report

CORPORATE GOVERNANCE

Board of Directors

The Corporation has a nine-member Board, of which six are nominated by an independent Selection Committee established by legislation. Appointment to the Board is subject to Ministerial approval. The Minister nominates and appoints the Chair and the Government Director. The Board selects the Executive Director who becomes its ninth member. No activities have been required from a Selection Committee during the reporting year.

Appointment

Directors other than the Executive Director and the Government Director are appointed for a term not exceeding three years. The current term began in November 1999 and expires in September 2002. The Chair has been reappointed to September 2004. The Government Member holds office at the Minister's pleasure and the Executive Director during the Corporation's pleasure.

Expertise

Directors are selected from across the industry business and research communities and together they bring expertise in cotton production, processing, marketing, science, research and development, business management, technology transfer, conservation and management of natural

resources, economics and environmental and ecological matters.

Directors' Responsibilities

The Board keeps in close contact with the senior management of the Corporation and takes a hands-on approach to ensure research projects are properly focussed and meet contractual requirements. The Directors are responsible for ensuring that the affairs of the Corporation are properly managed and for setting the strategic directions for the Corporation to follow.

The Board's function include:

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

Responsibility for the day-to-day management of the Corporation lies with the Executive

Director and the senior management team. The close links between the Board and management have assisted the development of a sense of mutual confidence, trust, teamwork and of a common purpose. Senior management attend and participate in Board meetings, with other staff invited to contribute whenever appropriate.

At the first meeting following the Directors' appointments in 1999, the Board assigned

each Director with a research program of key responsibility based on the individual's expertise. Under this structure, Directors review the project applications and reports for the each program of responsibility and make subsequent recommendations to the full Board. Directors are also available to advise and work with research program coordinators and other staff to ensure effective management of Corporation-funded research, development and extension activities.

Table 5 Directors' Responsibilities

PROGRAM CODE	FUNDING PROGRAM	DIRECTOR	SUPPORTING PERSONNEL	SUPPORTING DIRECTOR
A	Insect Management	Neil Forrester	Vic Edge	Jeff Bidstrup
B	Diseases and Weeds	Jim Peacock	Sonia Tingay	Neil Forrester
C	Soils	Adam Kay	Helen Dugdale	Richard Browne
D	Water	Richard Browne	Helen Dugdale	Roberta Brazil
E	BMP and Environment	Roberta Brazil	Rachel Holloway	Bridget Jackson
F	Community and Economics	Graeme Hamilton	Angela Wiseman	Bridget Jackson
G	Processing and Market	Ralph Schulzé	Heather Ball	Jeff Bidstrup
H	Plant Breeding and Biotechnology	Jim Peacock	Sonia Tingay	Jeff Bidstrup
I	Farming Systems and Agronomy	Jeff Bidstrup	Helen Dugdale	Richard Browne
J	Technology Transfer and Extension	Adam Kay	Bruce Pyke	All
K	Human Resources	Bridget Jackson	Robin Logan	Ralph Schulzé

Directors as at June 30, 2001

Non-Executive Directors

Chair



Bridget Jackson, appointed November 1999

- BScAg, MBus
- Member of the Audit, Remuneration and Strategic Planning Committees
- Director, Cameron Agriculture Pty Ltd, Sydney, NSW.

Ms Jackson is an agricultural consultant with extensive experience in irrigated agriculture and the management of private farmer-group projects. Ms Jackson represents CRDC on the Board of the Australian Cotton CRC and as a director of the Australian Cotton Industry Council. Director responsible for Human Resources and Supporting Director for Best Management Practice and the Environment and Community and Economics.

Deputy Chair



Richard Browne, appointed November 1999

- WDA
- Member of the Audit and Remuneration Committees
- Regional General Manager, Auscott, Moree, NSW.

Mr Browne has been working in the cotton industry for 35 years, most of that at a senior management level in corporate agriculture involving production and processing of cotton. His main interest has been promoting research and development for the benefit of the industry. He was Chair of the CRC for Sustainable Cotton Production for the life of the organisation and was Chair of the Australian Cotton Growers' Research Association for three terms. Previously a member for the Cotton Research Council, the forerunner of the CRDC. Director responsible for Water and Supporting Director for Soils and Farming Systems and Agronomy.

**Jeff Bidstrup, appointed November 1999**

- Cotton and Grain Farmer, "Prospect", Warra, Qld.

Mr Bidstrup operates a cotton and grain property with a strong emphasis on sustainability and Integrated Pest Management issues. He also has some experience in downstream processing and marketing. Director Responsible for Farming Systems and Agronomy and Supporting Director for Insect Management, Processing and Market, and Plant Breeding and Biotechnology.

**Roberta Brazil, appointed November 1999**

- BA, LLB, LLM, Grad DipLeg.Prac.
- Resource Consultant,
- Director Best Rural Pty. Ltd., Brookstead, Qld.

Ms Brazil is co-proprietor of Brazil Enterprises producing cotton, grain and cattle on the Darling Downs and at Goondiwindi in Queensland and at Larrimah in the Northern Territory. Mrs Brazil is currently Chair of Land and Water Australia. Other appointments include Queensland representative on the Australian Landcare Council and Chair of the Condamine Catchment Management Association. She is the Director with primary responsibility for Best Management Practice and Environment and Supporting Director for Water.

**Neil Forrester, appointed November 1999**

- BScAg. (Hons), PhD
- Member of the Audit Committee
- Vice President Entomology, Deltapine International, Narrabri, NSW.

Dr Forrester has extensive field and laboratory research and extension experience with Pest Management and Resistance Management issues in a broad range of field crops, specialising in cotton for the last 18 years. He is the Director with primary responsibility for Pest Management issues and is the Supporting Director for Diseases and Weeds.



Adam Kay, appointed November 1999

- BScAg, DipEd., Grad Cert Rural Science (Cotton Production)
- Member of the Strategic Planning Committee
- General Manager, Cotton Seed Distributors, Wee Waa, NSW.

Mr Kay is an experienced extension agronomist who prior to his current position spent 12 years based in the Macquarie Valley with NSW Agriculture. Mr Kay is a graduate of the Australian Rural Leadership Program (Course 2) and during the early 1990s he was awarded a Churchill Scholarship to study cotton soil management. He has responsibility for the Soils and Extension research programs.



Jim Peacock, appointed October 1990

- AC PhD
- Member of the Intellectual Property and Remuneration Committees
- Chief, CSIRO Plant Industry, Canberra, ACT.

Recognised internationally in the field of plant molecular biology and its application in agriculture, Dr Peacock has been a Director of the CRDC since its inception and was previously a Director of the Cotton Research Council. He is also a Director of Gene Shears Pty Ltd. In 2000 Dr Peacock was received the inaugural Prime Minister's Prize for Science. Dr Peacock has special responsibility for the areas of Plant Breeding and Biotechnology and Diseases and Weeds.

Government Director



Graeme Hamilton, appointed May 2001

- PhD, DIC
- Member of the Strategic Planning Committee
- Director, Australian Plague Locust Commission, Agriculture Fisheries and Forestry - Australia, Canberra, ACT.

Having begun professional life as a cotton entomologist, Dr Hamilton has also worked with horticulture and grains industries both here and overseas, and now directs the joint Commonwealth/State approach to locust control. Dr Hamilton has special responsibility for the areas of Community and Economics and advises the Corporation on Government policy processes, public administration issues and strategic management.

Executive Director



Ralph Schulzé, appointed October 1990

- HDA (Hons)
- Observer to the Audit Committee

Prior to his appointment at the Corporation Mr Schulzé was an agronomist based in Narrabri with a background in vertically integrated cotton production and a Director of the Cotton Research Council. Currently a Director of Cotton Seed Distributors Ltd and a member of the management committee of the Australian Cotton CRC. With Chair Ms Jackson, Mr Schulzé represents the Corporation on the Australian Cotton Industry Council.

Director responsible for Processing and Market, and Supporting Director for Human Resources.

Other Directors during the reporting year

Government Director



Bob Quiggin, November 1997–January 2001

- Member of the Strategic Planning Committee
- BA, BEc, GradDipSc, MSc
- (Position during Board membership) Manager, International Agricultural Cooperation, Agriculture, Fisheries and Forestry – Australia (AFFA), Canberra, ACT.

Mr Quiggin is responsible for the CRDC's Community and Economics program, and advises the Corporation on government policy processes, public administration issues and strategic management. In January Mr Quiggin left the Department of Agriculture, Fisheries and Forestry – Australia to take up a position with the Department of Finance and Administration.

Government Director



Christopher Branson, February 2001–May 2001

- BScAg (Hons), MSc, MPubPol, PhD
- Member of the Strategic Planning Committee
- (Position during Board membership) Manager, Biotechnology and Science and Technology Policy, Agriculture, Fisheries and Forestry – Australia (AFFA), Canberra ACT.

Dr Branson has wide experience in the development and analysis of public policy and in public management and administration. More than 10 years experience working in science, technology and industry policy in AFFA, the Departments of Industry, Science and Technology and Prime Minister and Cabinet and the Australian Science and Technology Council (ASTEC). Prior to joining the Australian Public Service, Dr Branson worked as a research scientist in Australia and the USA. He holds graduate degrees in genetics and plant breeding from Iowa State University and North Dakota State University and in public policy from the Australian National University. In May Dr Branson left the Department of Agriculture, Fisheries and Forestry – Australia to take up a position with the Australia New Zealand Food Authority.

Conflicts of Interest

In accordance with Section 131 of the *Primary Industries and Energy Research and Development Act 1989*, Directors are appointed on the basis of their expertise and do not represent any particular organisation or interest group. The Board recognises that a Director's connection with any particular organisation or interest group does not necessarily imply a conflict of interest, and that it may wish to avail itself of Directors' individual skills and make use of their expertise.

The Board resolved in November 1999 to follow section 54 of the *Primary Industries and Energy Research and Development Act* and section 21 of the *Commonwealth Authorities and Companies Act 1997* regarding disclosure of interests. A Director who considers that he/she may have a direct or indirect pecuniary or non-pecuniary interest in a matter to be discussed by the Board must disclose the existence and nature of the interest before the discussion. The Board has a standing notice of Director's interests which was renewed at the meeting in December 2000, and is updated as necessary.

Possible material conflicts of interest are borne in mind during discussion and voting procedures.

Indemnities

The Board has taken the necessary steps to ensure adequate insurance cover is in place for Directors and Officers of the Corporation. The Corporation's insurance cover is provided through Comcover. The insurance contract

prohibits the CRDC from disclosing the nature or limit of the liabilities covered, or the amounts of premiums paid.

Committees

During 1999-2000 the Board operated four committees – the Audit, Intellectual Property Remuneration, and Strategic Planning Committees. The number of sub-committee meetings is not a reflection of the committee workload. Much of the work of the sub-committees is conducted via e-mail and telephone, rather than through formal meetings. The Corporation finds this arrangement to be both 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 our financial transactions. The committee also provides " a forum for communication between the directors, the senior managers of the authority and the internal and external auditors of the authority."

Membership of the committee includes the Chair Ms Bridget Jackson, the Deputy Chair Mr Dick Browne, and a non-executive Director Dr Neil Forrester. The Executive Director Mr Ralph Schulzé and the Business Manager Mrs Robin Logan are observers

during committee meetings. The Audit Committee met three times during the year.

Intellectual Property Committee

The role of this committee is to review the Corporation's Intellectual Property policy and make recommendations to the Board for any updates. The committee is also responsible for making recommendations and reporting to the Board on any Intellectual Property actions including commercialisation issues surrounding any of CRDC-funded research and development activities. The membership of the committee includes the Executive Director Mr Ralph Schulzé and three non-executive directors, Dr Neil Forrester, Mr Adam Kay and Dr Jim Peacock. The committee did not meet during the year.

Remuneration Committee

This committee consists of the Chair Ms Bridget Jackson, the Deputy Chair Mr Dick Browne, and a non-executive Director Dr Jim Peacock. The Remuneration Committee advises the Board on the Executive Director's remuneration and staff remuneration adjustments. The Committee met once during the reporting year.

Strategic Planning Committee

The major activity for this committee during the reporting year was to finish the process of revising the Corporation's Strategic Plan into a compliant and workable Outcome/Outputs framework. The committee is also responsible for conducting an annual review of the

Strategic Plan and making any recommendations to the Board for alterations. The committee include the Chair Ms Bridget Jackson, the Government Director, a non-executive director Mr Adam Kay and the Communications Manager Mr Tim Lester. The Government Director member was Mr Bob Quiggin to February 2001, Dr Chris Branson thereafter until May 2001 and finally Dr Graeme Hamilton. One meeting was held during the year.

Meetings

Board policy is to hold meetings away from the Corporation's office in Narrabri whenever it is appropriate and practical. The Board uses the opportunities presented by meetings to tour cotton-production areas, meet local growers and researchers and be updated on the varying research requirements throughout the industry. Meetings also present opportunities for Director training and education regarding specific issues of relevance and to meet with representatives of the Corporation's stakeholders.

Directors' attendance at Board and Committee Meetings

During 2000–01 the Board held six meetings, in Brisbane on August 18, 2000, Canberra, November 4 and 5, 2000, Dalby, December 4, 2000, Warren, February 8, 2001, Narrabri, March 14 and 15, 2001, and Moree, May 31, 2001. The year saw the Government Director change twice.

The number of sub-committee meetings and attendances listed is not a reflection of the committee workload. Much of the effort of the sub-committees is conducted via e-mail and telephone, rather than through formal meetings. The Corporation finds this arrangement to be both effective and productive.

Table 6 Attendance at Board and Committee Meetings

YEAR ENDED 30 JUNE	BOARD		AUDIT		INTELLECTUAL PROPERTY		REMUNERATION		STRATEGIC PLANNING	
	No. of Meeting Attended	No. of Meeting Eligible to Attend	No. of Meeting Attended	No. of Meeting Eligible to Attend	No. of Meeting Attended	No. of Meeting Eligible to Attend	No. of Meeting Attended	No. of Meeting Eligible to Attend	No. of Meeting Attended	No. of Meeting Eligible to Attend
Ms Bridget Jackson (Chair)	6	6	3	3			1	1	1	1
Mr Richard Browne (Deputy Chair)	6	6	3	3			1	1		
Mr Jeff Bidstrup	6	6								
Mrs Roberta Brazil	5	6								
Dr Chris Branson*†	2	2								
Dr Neil Forrester	6	6	2	3						
Dr Graeme Hamilton*	1	1								
Mr Adam Kay	6	6							1	1
Dr Jim Peacock	4	6					1	1		
Mr Bob Quiggin	3	3							1	1
Mr Ralph Schulzé	6	6	3	3					1	1

* Appointed to the Board during the year,

† resigned during the year

Key Issues in Corporate Performance

Revised Research Agreements

Due to the increasingly complex nature of the research agreements between the Corporation and funded research providers, a comprehensive review of the Corporation's standard research grant contracts was undertaken during the year.

A New Tax System

The New Tax System introduced significant changes in administrative operations at the beginning of the financial year. The Corporation reported to Minister Truss on May 29, 2000, that it had finished preparations for the changeover, including applying for and obtaining an Australian Business Number (71 054 238 316) and registering for the Goods and Services Tax, upgrading and testing the computerised financial management system (MYOB) and training key staff.

Corporation policy is to submit its monthly Business Activity Statement within 10 days of the end of the month, a target which has been consistently met.

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. In April 1998 the Corporation presented the then Minister for Primary Industries and

Energy, the Hon. John Anderson MP, with the *Strategic Plan* for the period from July 1998 to June 2003. In August 1998 the CRDC became subject to the CAC Act. On the advice of the Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry Senator the Hon. Judith Troeth the CRDC Board revised the *Strategic Plan* to ensure it was compliant with the legislation and would meet the requirements of the Report of Operations. The intent of the Plan itself did not change.

Five new Directors and a new Chair were appointed to the nine-member Corporation Board in November 1999. On December 14, 1999 the Minister for Agriculture, Fisheries and Forestry the Hon. Warren Truss MP wrote to the Corporation to outline the revised Federal Government priorities for rural research and development. Due to the combination of these events and the number of issues that had been exposed during the first planning and reporting cycle under the Outcome/Outputs framework, the Board deemed it appropriate and necessary to review the *Strategic Plan*. As a result the planning structure was simplified to a single Outcome and three main Output groups. This simplified *Plan* allows the Corporation to clearly demonstrate links between the statutory and industry objectives, Outcome and Outputs, key strategies and the research program. The revised framework was used to create and present the *Portfolio Budget Statements* and *Annual Operating Plans* for the 2000–01 and 2001–02 financial years. These documents were approved on the basis that the Corporation was continuing to review and revise its major planning documents, the *Strategic Plan 1998–2003* and

that the intent of the Plan was continuing and valid.

On May 27, 2000 the Corporation submitted the *Annual Operating Plan 2000–01* to Senator Troeth for approval. Written advice of that approval was received on June 8, 2000. On April 27, 2001 the Corporation submitted the *Annual Operating Plan 2001–02*. Approval was granted on May 17, 2001. The *Strategic Plan 1998–2003: Outcome/Outputs Revision 2001* was submitted to Senator Troeth on June 15, 2001 and approval was granted on July 5.

Alterations to the Strategic Plan

The difficulties faced by the Corporation during its first planning and reports cycle under the Outcome/outputs framework identified a number of areas of improvement for the Strategic Plan. The Corporation has since completed a review of the Strategic Plan and recently published a revised version. Copies are available from the CRDC office in Narrabri or on the website, www.crdc.com.au.

Government Online Initiative

As an authority of the Federal Government, the Corporation is subject to the requirements of the Government Online Initiative. As a small agency the CRDC has experienced difficulty meeting all of the requirements due to a lack of available resources and expertise. The Audit Committee has requested management investigate opportunities for the Corporation to obtain assistance in meeting its online obligations and to ensure full compliance is achieved and maintained.

The Organisation

Location of Offices

The Corporation has one office and it is located at 2 Lloyd Street, Narrabri, NSW, 2390. During the reporting year the Corporation submitted a tender to the Narrabri Shire Council to purchase the building that houses the Corporation's office. The tender was successful and contracts exchanged. Settlement is anticipated to be completed by mid-October 2001.

Service Charter

The Corporation does not provide services direct to the public and does not have a service charter. However, in the process of revising the Strategic Plan the CRDC has developed a Statement of Principles for the Board, Management and Staff which embody the set of values underlying 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 if industry and public funds invested through our Corporation;

5. strive to make a difference in improving the knowledge base regarding 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.

Research and Extension Manager

Bruce Pyke, appointed 1993

Business Manager

Robin Logan, appointed September 1999

Communications Manager

Tim Lester, appointed June 1999

Research Program Manager

Angela Wiseman, appointed June 2000

Administrative Assistant

Dianne Purcell, appointed July 1998

Administrative Assistant (part-time)

Karen Larsen, appointed early 1998

Research Program Coordinator – Soils, Water, Farming Systems and Agronomy (part-time)

Helen Dugdale, appointed July 2001

Research Program Coordinator – BMP and Environment (part-time)

Rachel Holloway, appointed January 2001

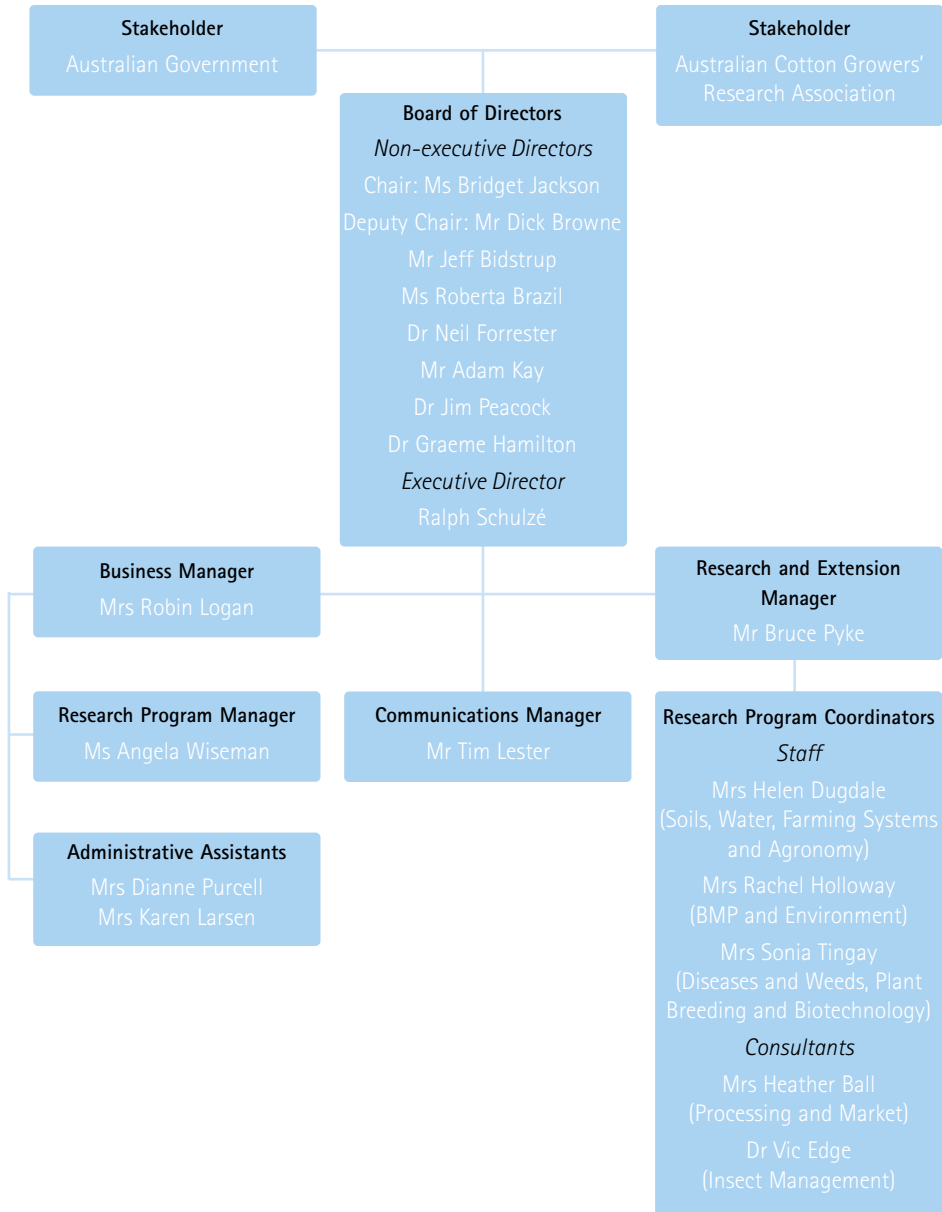
Staff

Staff 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 six full-time employees and three part-time employee as at June 30, 2000.

Executive Director

Ralph Schulzé, appointed 1991

Figure 14 Organisational Structure



Other Staff during the reporting year

Research Program Coordinator

Peta Slack-Smith, appointed January 1997, resigned January 2001

Appointments after the reporting year

Research Program Coordinator – Diseases and Weeds, Plant Breeding and Biotechnology (part-time)

Sonia Tingay, appointed July 2001

Training

During the reporting year the Corporation spent \$9,375 on Staff and Director training.

Contractors and Consultants

The Corporation employs consultants and contractors on a case-by-case needs basis, and after background checks to ensure proposed appointees have necessary skills and experience. During the reporting year the Corporation spent \$52,090 to remunerate consultants and contractors. It is Corporation policy not to disclose amounts paid to individual consultants due to privacy and confidentiality arrangements

CONTRACTOR/CONSULTANT	SERVICE
J&J Baker Ag Services	Administration of the Cotton Industry Best Management Practices Audit Office
Vic Edge	Program Coordination
Heather Ball	Program Coordination
Anita Maunder	Communications Service
P. Slack-Smith Consulting	Best Management Practices Audit Scrutineering
North West Farm Consulting	Program services
Guy Roth	Best Management Practices Auditing and scrutineering
RAC Agribusiness	Best Management Practices Auditing
Carmi-Jones Pty Ltd	Best Management Practices Auditing

Equal Employment Opportunity

The Corporation is committed to a merit-based, non-discriminatory recruitment and promotion policy.

Occupational Health and Safety

The *Occupational Health and Safety (Commonwealth Employment) Act 1991* provides that an employer must take all reasonable, practical steps to protect the health and safety at work of the employer's employees.

No accidents were reported and no investigations were conducted during the year.

Freedom of Information

General enquiries regarding access to documents or other matters relating to Freedom of Information should be made to the Business Manager. No requests made under the *Freedom of Information Act 1982* were received by the Corporation during the reporting year. Facilities for access to the documents are available to the Corporation.

Procedures and Information Sources

Funding information on individual projects funded by the Corporation is available on request. Information about CRDC projects is also available through the Australian Rural Research in Progress (ARRIP) database which can be accessed through the Internet and through most Australian research and public libraries.

Table 7 Categories of Documents Held

Category	Nature	Access	
Administration	Files	D	C: Documents customarily made available
Annual Operational Plans	Files, Publications	D, C	D: Documents not customarily made available for reasons of privacy or commercial-in-confidence
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	

Ecologically Sustainable Development and Environmental Performance

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

The Corporation has integrated these principles into its planning framework. The three Output groups, Sustainability, Profitability and Competitiveness, and People and Communities is a reflection of the triple-bottom-line concept – the need to factor environmental, economic and social considerations into all decisions. Almost half of the Corporation's budget is directed towards issues improving the industry's Sustainability, encompassing natural resource management and biodiversity. Additionally the CRDC funds a specific research program (Best Management Practices and the Environment) designed to minimise environmental impacts.

The development and adoption of the Best Management Practices program is providing environmental benefits for the industry. The past two seasons have seen far fewer incidences of off-target impacts, such as contamination of beef cattle or fish kills, from chemical sprays on cotton fields. The Corporation anticipates measures of some of these impacts will be available following the second industry Environmental Audit which is to be undertaken in 2002.

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'. Such events include proposals to:

- i) form or participate in the formation of a company;
- j) participate in significant partnerships, trusts, unincorporated ventures or similar arrangements;
- k) acquire or dispose of significant shareholding in a company;
- l) acquire or dispose of a significant business;
- m) commence or cease a significant business activity; and
- n) make a significant change in the nature or extent of interests in a significant partnership, trust, unincorporated venture or similar arrangement.

The Corporation had no significant events during the reporting year.

Significant Changes in the State of Affairs

There have been no significant changes to the Corporation's state of affairs or principal activities during the reporting year or to the date of this report.

Political Disclosures

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

Payment to Representative Bodies

The Corporation's industry representative body is the Australian Cotton Growers' Research Association. The CRDC makes no payments to the Growers' Research Association except for the purposes of producing the proceedings of the biennial Australian Cotton Conference. The most recent Conference was held in Brisbane in August 2000.



Financial statements

CottonResearch andDevelopmentCorporation

crdc

2000-2001
Annual Report



INDEPENDENT AUDIT REPORT

To the Minister for Agriculture, Fisheries and Forestry

Scope

I have audited the financial statements of the Cotton Research and Development Corporation for the year ended 30 June 2001. The financial statements comprise:

- Statement by Directors;
- Statement of Financial Performance;
- Statement of Financial Position;
- Statement of Cash Flows;
- Schedule of Commitments;
- Schedule of Contingencies, and
- Notes to and forming part of the Financial Statements.

The members of the Board are responsible for the preparation and presentation of the financial statements and the information they contain. I have conducted an independent audit of the financial statements in order to express an opinion on them to you.

The audit has been conducted in accordance with Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards, to provide reasonable assurance as to whether the financial statements are free of material misstatement. Audit procedures included examination, on a test basis, of evidence supporting the amounts and other disclosures in the financial statements, and the evaluation of accounting policies and significant accounting estimates. These procedures have been undertaken to form an opinion as to whether, in all material respects, the financial statements are presented fairly in accordance with Australian Accounting Standards, other mandatory professional reporting requirements and statutory requirements in Australia so as to present a view of the entity which is consistent with my understanding of its financial position, the results of its operations and its cash flows.

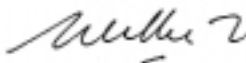
The audit opinion expressed in this report has been formed on the above basis.

Audit Opinion

In my opinion,

- the financial statements have been prepared in accordance with Schedule 1 of the Commonwealth Authorities and Companies (Financial Statements 2000-2001) Orders; and
- the financial statements give a true and fair view, in accordance with applicable Accounting Standards, other mandatory professional reporting requirements and Schedule 1 of the Commonwealth Authorities and Companies (Financial Statements 2000-2001) Orders, of the financial position of the Cotton Research and Development Corporation as at 30 June 2001 and the results of its operations and its cash flows for the year then ended.

Australian National Audit Office



Willie Tan
Senior Director

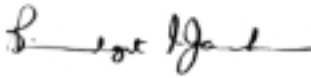
Delegate of the Auditor-General

Canberra
24 August 2001

STATEMENT BY DIRECTORS

In our opinion, the attached financial statements give a true and fair view of the matters required by Schedule 1 of the Commonwealth Authorities and Companies (Financial Statements 2000–2001) Orders made under the Commonwealth Authorities and Companies Act 1997 for the year ended 30 June 2001.

Signed:



Bridget Jackson

Chair

24 August 2001



Ralph Schulzé

Executive Director

24 August 2001

Statement of financial performance

For the year ended 30 June 2001

	Notes	2001	2000
REVENUES FROM ORDINARY ACTIVITIES			
Revenues from government	5A	13,703,603	11,166,275
Sales of goods and services	5B	775	
Interest	5C	782,004	655,777
Other	5D	1,064,762	854,091
Total revenues from ordinary activities		15,551,144	12,676,144
EXPENSES FROM ORDINARY ACTIVITIES			
Employees	6A	683,523	522,820
Suppliers	6B	297,109	289,980
Depreciation and amortisation	6C	30,107	26,362
Grants	7	12,863,211	11,301,534
Total expenses from ordinary activities		13,873,950	12,140,696
Net operating surplus from ordinary activities		1,677,194	535,448
Extraordinary items		-	-
Net surplus attributable to the Commonwealth		1,677,194	535,448

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

Statement of financial position

as at 30 June 2001

	Notes	2001	2000
ASSETS			
<i>Financial assets</i>			
Cash	8A	2,515,010	1,198,513
Deposits at Call	8A	11,604,357	11,293,757
Receivables	8B	1,733,565	1,328,928
Total financial assets		15,852,932	13,821,198
<i>Non-financial assets</i>			
Infrastructure, plant and equipment	9	69,753	87,898
Total non-financial assets		69,753	87,898
Total Assets		15,922,685	13,909,096
LIABILITIES			
<i>Provisions</i>			
Employees	10A	130,316	100,552
Total provisions		130,316	100,552
<i>Payables</i>			
Suppliers	11A	112,916	22,040
Grants	11B	218,755	3,000
Total payables		331,671	25,040
Total liabilities		461,987	125,592
EQUITY			
Accumulated surplus	12	15,460,698	13,783,504
Total Equity	12	15,460,698	13,783,504
Current liabilities		418,992	92,723
Non-Current liabilities		42,995	32,869
Current Assets		14,852,932	11,045,784
Non-current Assets		1,069,753	2,863,312

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

Statement of cash flows

for the year ended 30 June 2001

	Notes	2001	2000
OPERATING ACTIVITIES			
<i>Cash received</i>			
Appropriations		13,477,358	11,768,364
Sales of goods and services		684	-
Interest		783,610	611,068
GST recovered		1,184,168	-
Other		1,113,817	1,418,566
Total cash received		16,559,637	13,797,998
<i>Cash used</i>			
Grants		(13,562,853)	(10,883,430)
Employees		(588,147)	(566,994)
Suppliers		(779,939)	(1,833,840)
Total cash used		(14,930,940)	(13,284,264)
Net cash from operating activities	13	1,628,697	513,734
INVESTING ACTIVITIES			
<i>Cash used</i>			
Purchase of property, plant and equipment		(1,600)	(55,913)
Total cash used		(1,600)	(55,913)
Net cash from investing activities		(1,600)	(55,913)
FINANCING ACTIVITIES			
Cash received		-	-
Cash used		-	-
Net cash from financing activities		-	-
Net increase in cash held		1,627,097	457,821
Cash at the beginning of the reporting period		12,492,270	12,034,449
Cash at the end of the reporting period		14,119,367	12,492,270

Schedule of commitments

as at 30 June 2001

BY TYPE	Notes	2001	2000
CAPITAL COMMITMENTS			
Buildings		251,000	-
Total capital commitments		251,000	-
OTHER COMMITMENTS			
Operating leases		39,680	83,578
Other commitments	14	27,949,382	11,760,411
Total other commitments		27,989,062	11,843,989
COMMITMENTS RECEIVABLE		2,543,873	1,074,111
Net Commitments		25,696,189	10,769,878
BY MATURITY			
<i>All net commitments</i>			
One year or less		12,968,482	10,739,180
From one to five years		12,727,707	30,698
Net commitments		25,696,189	10,769,878
<i>Operating lease commitments</i>			
One year or less		33,579	47,897
From one year to five years		6,101	30,698
Net operating lease commitments		39,680	78,595

Schedule of contingencies

as at 30 June 2001

	Notes	2001	2000
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THE COTTON R&D CORPORATION HAS NO CONTINGENT LIABILITIES OF WHICH IT IS AWARE.

Notes to and Forming Part of the Financial Statements

For the year ended 30 June 2001

Note Description

1. Summary of Significant Accounting Policies
2. Reporting by segments and outcomes
3. Economic Dependency
4. Subsequent Events
5. Operating Revenues
6. Operating Expenses – Goods and services
7. Operating Expenses – Grants
8. Financial Assets
9. Non-Financial Assets
10. Provisions
11. Payables
12. Equity
13. Cash Flow Reconciliation
14. Commitments
15. Remote Contingencies
16. External Financing Arrangements
17. Remuneration of Directors
18. Related Party Disclosures
19. Remuneration of Officers
20. Remuneration of Auditors
21. Financial Instruments

Note 1. Summary of Significant Accounting Policies

1.1 Basis of Accounting

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

The statements have been prepared in accordance with:

- Schedule 1 of the Commonwealth Authorities and Companies (Financial Statements 2000–2001) Orders in relation to financial years ending on or after 30 June 2001;
- Australian Accounting Standards and Accounting Interpretations issued by Australian Accounting Standards Boards;
- other authoritative pronouncements of the Boards; and
- Consensus Views of the Urgent Issues Group

The statements have been prepared having regard to:

- Statements of Accounting Concepts;
- the Explanatory Notes to Schedule 1 issued by the Department of Finance and Administration; and
- Guidance Notes issued by that Department.

The Corporation Statements of Financial Performance and Financial Position have been prepared on an accrual basis and are in accordance with historical cost convention, except for certain assets which, as noted, are at valuation. Except where stated, no allowance is made for the effect of changing prices on the results or the financial position.

Assets and liabilities are recognised in the Corporation Statements of Financial Position when and only when it is probable that future economic benefits will flow and the amounts of the assets or liabilities can be reliably measured. Assets and liabilities arising under agreements equally proportionately unperformed are however not recognised unless required by an Accounting Standard. Liabilities and assets which are unrecognised are reported in the Schedule of Commitments and the Schedule of Contingencies.

Revenues and expenses are recognised in the Corporation Statements of Financial Performance when and only when the flow or consumption or loss of economic benefits has occurred and can be reliably measured.

1.2 Changes in Accounting Policy

The accounting policies used in the preparation of these financial statements are consistent with those used in 1999–2000.

1.3 Reporting by Outcomes

As comparison of Budget and Actual figures by outcome specified in the Appropriation Acts relevant to the Authority is presented in Note 2. Any intra government costs included in the figure 'net cost to Budget outcomes' are

eliminated in calculating the actual budget outcome for the Government overall.

1.4 Revenue

The revenues described in this Note are revenues relating to the core operating activities of the Corporation.

Revenue from the sale of goods is recognised upon the delivery of goods to customers.

Interest revenue is recognised on a proportional basis taking into account the interest rates applicable to the financial assets.

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

Revenue from the rendering of a service is recognised by reference to the state of completion of contracts or other agreements to provide services to Commonwealth bodies. The state of completion is determined according to the proportion that costs incurred to date bear to the estimated total costs of the transaction.

Revenues from Government – Output Appropriations

Appropriations for outputs are recognised as revenue to the extent they have been received into the Corporation's Bank account or are entitled to be received by the Corporation at year end.¹

Resources Received Free of Charge

Services received free of charge are recognised as revenue when and only when a fair value can be reliably determined and the services would have been purchased if they had not

been donated. Use of those resources is recognised as an expense.

Contributions of assets at no cost of acquisition or for nominal consideration are recognised at their fair value when the asset qualifies for recognition.

1.5 Employee Entitlements

(a) Leave

The liability for employee entitlements 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 liability for annual leave reflects the value of total annual leave entitlements of all employees at 30 June 2001 and is recognised at its nominal amount.

The non-current portion of the liability for long service leave is recognised and measured at the present value of the estimated future cash flows to be made in respect of all employees at 30 June 2001. In determining the present value of the liability, the Corporation has taken into account attrition rates and pay increases through promotion and inflation.

(b) Superannuation

Employees contribute to the Public Sector Superannuation Scheme. Employer contributions amounting to \$69,833 (1999-00: \$49,935) for the Authority in relation to these

schemes have been expensed in these financial statements.

No liability for superannuation benefits is recognised as at 30 June as the employer contributions fully extinguish the accruing liability which is assumed by the Commonwealth.

Employer Superannuation Productivity Benefit contributions totalled \$11,803 (1999-00: \$11,345) for the Corporation.

1.6 Leases

A distinction is made between finance leases, which effectively transfer from the lessor to the lessee substantially all the risks and benefits incidental to ownership of leased non-current assets, and operating leases, under which the lessor effectively retains substantially all such risks and benefits.

Operating lease payments are expensed on a basis which is representative of the pattern of benefits derived from the leased assets. The net present value of future net outlays in respect of surplus space under non-cancellable lease agreements is expensed in the period in which the space becomes surplus.

1.7 Borrowing Costs

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

1.8 Grants

The Corporation recognises grant liabilities as follows.

Most grant agreements require the grantee to perform services or provide facilities, or to meet eligibility criteria. In these cases, liabilities

are recognised only to the extent that the services required have been performed or the eligibility criteria have been satisfied by the grantee. (Where grants money are paid in advance of performance or eligibility, a prepayment is recognised).

In cases where grant agreements are made without conditions to be monitored, liabilities are recognised on signing of the agreement.

1.9 Cash

Cash means notes and coins held and any deposits held at call with a bank or financial institution.

1.10 Financial Instruments

Accounting policies for financial instruments are stated at Note 21.

1.11 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.

Assets acquired at no cost, or for nominal consideration, are initially recognised as assets and revenues at their fair value at the date of acquisition.

1.12 Property (Land, Buildings and Infrastructure), Plant and Equipment

Asset Recognition Threshold

Purchases of property, plant and equipment are recognised initially at cost in the Statement of Financial Position, except for purchases costing less than \$1,000, which are

expensed in the year of acquisition (other than where they form part of a group of similar items which are significant in total).

Revaluations

Land, buildings, infrastructure, plant and equipment are revalued progressively in accordance with the 'deprival' method of valuation in successive 3-year cycles, so that no asset has a value greater than three years old.

Freehold land, buildings on freehold land a leasehold improvements are each revalued progressively on a geographical basis. The current cycles, for all assets and leasehold improvements, commenced in 1989–1999.

Assets in each class acquired after the commencement of a progressive revaluation cycle are not captured by the progressive revaluation then in progress.

In accordance with the deprival methodology, land is measured at its current market buying price. Property other than land, plant and equipment are measured at their depreciated replacement cost. Where assets are held which would not be replaced or are surplus to requirements, measurement is at net realisable value. At 30 June 2001, the Corporation had no assets in this situation.

All valuations are independent.

Recoverable Amount Test

Schedule 1 requires the application of the recoverable amount test to the Authority's non-current assets in accordance with AAS 10 Recoverable Amount of Non-Current Assets. The carrying amounts of these non-current

assets have been reviewed to determine whether they are in excess of their recoverable amounts. In assessing recoverable amounts, the relevant cash flows have been discounted to their present value.

In 1989–99, the non-current assets of the Corporation were subjected to the test. The application of the recoverable amount test to the not-for-profit departmental non-current assets of the Corporation is a change of accounting policy required by the Finance Minister's Orders in 1999–2000. No write down to recoverable amount has been made in 2000–2001 as a result of this change in policy.

Depreciation and Amortisation

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. Leasehold improvements are amortised on a straight-line basis over the lesser of the estimated useful life of the improvements or the unexpired period of the lease.

Depreciation/amortisation rates (useful lives) and methods are reviewed at each balance date and necessary adjustments are recognised in the current, or current and future reporting periods, as appropriate. Residual values are re-estimated for a change in prices only when assets are revalued.

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

	2000–01	1999–2000
Leasehold improvements	Lease term	Lease term
Plant and equipment	4 to 10 years	4 to 10 years

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

1.13 Taxation

The Corporation is exempt from all forms of taxation except fringe benefits tax and the goods and services tax.

1.14 Insurance

The Corporation has insured for risks through the Government's insurable risk managed fund, called 'Comcover'. Workers compensation is insured through Comcare Australia.

1.15 Comparative Figures

Comparative figures have been adjusted to conform to changes in presentation in these financial statements where required.

1.16 Rounding

Amounts have been rounded to the nearest dollar.

Note 2 – Reporting by segments and outcomes

Reporting by segments

The Corporation operates primarily in a single industry and geographic segment providing funding for research for the Australian cotton industry.

The Corporation is structured to meet the following outcome:

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

Reporting by Outcomes for 2000–2001

	Outcome	
	Budget	Actual
	\$000	\$000
Total net administered expenses		
Add: Net cost of entity outputs		
Cost of outcome before extraordinary item	14,169	13,874
Extraordinary item		
Net Cost to Budget Outcome		
Outcome Specific assets	13,011	15,923
Assets that are not outcome specific		

Note 3 – Economic Dependency

The Authority is dependent on appropriations from the Parliament of the Commonwealth for its continued existence and ability to carry out its normal activities.

Note 4 – Subsequent Events

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 operation or the state of affairs of the Corporation in subsequent years.

2001	2000
\$	\$

Note 5 – Operating Revenues

Note 5A – Revenues from Government

Commonwealth Contributions	6,773,753	5,809,540
Industry Levies	6,929,850	5,356,735
Total Appropriations	13,703,603	11,166,275

Note 5B – Sales of goods and services

Goods	775	3,325
Total	775	3,325

Note 5C – Interest

Deposits	782,004	655,777
Total	782,004	655,777

Note 5D – Other revenues

Royalties	704,418	485,139
Project Refunds	360,344	365,627
Other		
Total	1,064,762	850,406

2001	2000
\$	\$

Note 6. Operating Expenses – goods and services

Note 6A – Employee expenses

Remuneration	612,991	472,885
Other employee expenses	70,532	49,935
Total	683,523	522,820

The Authority and its subsidiary contribute the Public Sector (PSS) Superannuation scheme which provides retirement, death and disability benefits to employees. Contributions to the schemes are at rates calculated to cover existing and emerging obligations. Current contribution rates 11.1% of salary (PSS). An additional 3% is contributed for employer productivity benefits.

Note 6B – Suppliers expenses

Supply of goods and services	230,810	227,211
Operating lease rentals	66,299	62,769
Total	297,109	289,980

Note 6C – Depreciation and amortisation

Depreciation of property, plant and equipment	22,042	18,297
Amortisation of leased assets	8,065	8,065
Total	30,107	26,362

The aggregate amounts of depreciation or amortisation expensed during the reporting period for each class of depreciable asset are as follows:

Office Equipment	4,756	2,698
Computer Equipment	12,232	10,545
Furniture and Fittings	5,054	5,054
Leasehold Improvements	8,065	8,065
Total allocated	30,107	26,362

	2001	2000
	\$	\$

Note 7. Operating Expense – Grants

The Corporation makes grants to support the research and development of issues relating to the cotton industry.

NON-PROFIT INSTITUTIONS		
Commonwealth organisations	4,573,807	3,926,907
State departments	3,720,728	3,006,729
Universities and colleges	1,566,021	1,323,506
Other research institutions	2,189,646	1,897,319
Corporate Activities	528,893	669,327
	12,579,094	10,823,788
Grants to commercial entities	284,116	477,746
Total	12,863,211	11,301,534

Note 8. Financial Assets

Note 8A. Cash

Cash at bank and on hand	2,515,010	1,198,513
Deposits at call	11,604,357	11,293,757
Balance of cash as at 30 June shown in the Statement of Cash Flows	14,119,367	12,492,270

Note 8B. Receivables

Goods and services	414,415	27,505
<i>Less: Provision for doubtful debts</i>	-	-
Other debtors	1,235,939	1,283,607
GST Receivable	83,211	17,816
Total receivables	1,733,565	1,328,928

RECEIVABLES (GROSS) WHICH ARE OVERDUE ARE AGED AS FOLLOWS:

Non Overdue	1,235,939	1,283,607
<i>Overdue by:</i>		
- less than 30 days	497,626	45,321
- 30 to 60 days	-	-
- 60 to 90 days	-	-
- more than 90 days	-	-
	1,733,565	1,328,928
Total receivables (gross)	1,733,565	1,328,928

2001
\$

2000
\$

Note 9. Non-Financial Assets

Note 9A - Infrastructure, Plant & Equipment

Office Equipment – at cost	43,246	43,246
Less Accumulated Depreciation	(13,406)	(8,649)
	29,840	34,597
Computer Equipment – at cost	59,431	48,662
Less Accumulated Depreciation	(28,670)	16,438
	30,761	32,224
Fixture & Fittings	22,443	21,250
Less Accumulated Depreciation	(13,962)	(8,908)
	8,481	12,342
Improvements – at cost	34,355	34,355
Less Accumulated Depreciation	(33,684)	(25,619)
	671	8,736
Total Infrastructure, Plant and Equipment	69,753	87,899

Note 9B Analysis of Property, Plant, Equipment and Intangibles

Movement summary 2000–01 for all assets irrespective of valuation basis

Item	Office Equipment	Computer Equipment	Fixtures & Fittings	Improve- ments	Total
Gross Value as at 1st July 2000	43,246	48,662	21,250	34,355	147,513
Additions – Purchase of Assets		10,769	1,193		11,962
Gross Value as at 30th June 2001	43,246	59,431	22,443	34,355	159,475
Accumulated Depreciation/Amortisation as at 1 July 2000	8,649	16,438	8,908	25,619	59,614
Depreciation/amortisation charge for year	4,756	12,232	5,054	8,065	30,107
Accumulated Depn/Amort. at 30 June 2001	13,405	28,670	13,962	33,684	89,721
Net Book Value as at 30 June 2001	29,841	30,761	8,481	671	69,754
Net Book Value as at 30 June 2000	34,597	32,224	12,342	8,736	87,899

	2001	2000
	\$	\$

Note 10. Provisions

Note 10A. Employees

Salaries & Wages	24,372	9,925
Leave	103,406	89,376
Superannuation	2,538	1,251
Aggregate employee entitlement liability	130,316	100,552

Note 11 – Payables

Note 11A – Suppliers

Trade Creditors	112,916	22,040
	112,916	22,040

Note 11B – Grant liabilities

State departments	58,862	–
Universities and Colleges	159,893	–
Other research institutions	–	3,000
Total	218,755	3,000

Note 12 – Equity

Item	Capital		Accumulated results		Statutory Funds		Asset revaluation reserve		Total reserves		TOTAL EQUITY	
	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000
Balance 1 July 2000			13,783,504	13,248,056							13,783,504	13,248,056
Operating result			1,677,194	534,448							1,677,194	534,448
Balance 30 June 2001			15,460,698	13,783,504							15,460,698	13,783,504

	2001 \$	2000 \$
Note 13 – Cash Flow Reconciliation		
RECONCILIATION OF OPERATING SURPLUS TO NET CASH PROVIDED BY OPERATING ACTIVITIES:		
Operating surplus (deficit) before extraordinary items	1,677,194	535,448
Extraordinary items	–	–
Operating Surplus/(Deficit)	1,677,194	535,448
Depreciation and amortisation of property, plant & equipment	30,107	26,362
Infrastructure, plant & equipment written off		
Profit on disposal of property, plant & equipment		
Interest from Loans		
Associated company – share of operating profit		
Changes in assets and liabilities		
(Increase)/decrease in receivables	(404,637)	124,895
(Increase)/decrease in other assets	(10,362)	(800)
Increase/(decrease) in liability to suppliers	90,876	(167,192)
Increase/(decrease) in employee provisions	29,764	(4,979)
Increase/(decrease) in grants payable	215,755	
Net cash provided by operating activities	1,628,697	513,734

Note 14 – Commitments

The increase in 'other commitments' reflects the Corporation's move from one year research grant agreements to three year research grant agreements commencing 1st July, 2001.

Note 15 – Remote Contingencies

The Corporation has no contingent liabilities of which it is aware.

Note 16 – External Financing Arrangements

The Corporation has no existing loan facility arrangements.

Note 17 – Director Remuneration

	2001	2000
	\$	\$
Aggregate amount of superannuation payments in connection with the retirement of directors	0	1,540
Other remuneration received or due and receivable by directors of the Authority	264,547	193,725
Total remuneration received or due and receivable by directors of the Authority:	264,547	195,265

The number of directors of the Authority included in these figures are shown below in the relevant remuneration bands

	Number
1. \$Nil-\$10,000	2
2. \$10,001-\$20,000	5
3. \$20,001-\$50,000	1
4. \$100,001-\$200,000	1

Note 18 – Related Party Disclosures

Directors of the Corporation

The Directors of Cotton Research & Development Corporation during the year were:

- Bridget Jackson (Chair)
- Dick Browne (Vice-Chair)
- Ralph Schulzé (Executive Director)
- Jeff Bidstrup
- Bobbie Brazil
- Neil Forrester
- Adam Kay
- Jim Peacock
- Graeme Hamilton

The aggregate remuneration of Directors is disclosed in Note 17.

Other transactions with Directors or Director related entities

The following grants were made to Director related entities. They were approved under the normal terms and conditions of the Corporation. Following full disclosure of their relevant interests, the Directors took part in the decisions of the Board.

	2001	2000
Grants made to director related entities (CSIRO Entomology, Plant Industries, Land & Water, Textile & Fibre Divisions)	4,573,807	3,799,018

Note 19 – Remuneration of Officers

The aggregate amount of total remuneration of Officers shown is

The number of Officers who received or were due to receive total remuneration of \$100,000 or more:

	Number	Number
\$100,000–\$110,000	1	0

The officer remuneration includes all officers concerned with or taking part in the management of the economic entity during 2000–01 except the Executive Director. Details in relation to the Executive Director have been incorporated into Note 17 – *Remuneration of Directors*.

	2001	2000
	\$	\$

Note 20 – Remuneration of Auditors

Remuneration to the Auditor-General for auditing the financial statements for the reporting period.

7,150	6,396
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No other services were provided by the Auditor-General during the reporting period.

Note 21 – Financial Instruments

(a) Terms, conditions and accounting policies

Financial Instrument	Notes	Accounting Policies and methods (including recognition criteria and measurement basis)	Nature of underlying instrument (including significant terms and conditions affecting the amount, timing and certainty of cash flows).
<i>Financial assets</i>			
		Financial assets are recognised when control over future economic benefits is established and the amount of the benefit can be reliably measured.	
Deposits at call	8A	Deposits are recognised at their normal amounts. Interest is credited to revenue as it accrues.	Temporarily surplus funds, mainly from monthly draw downs of appropriation, are placed on deposit at call with the Corporation's banker. Interest is earned on the daily balance at the prevailing daily rate for money on call and is paid at month end.
Term Deposit	8A	Term deposits is recognised at cost. Interest is accrued as it is earned.	Term deposits are with the Corporation's bank, as per the Corporation's Investment Policy.
Receivables for goods & services	8B	These receivables are recognised at the nominal amounts due less any provision for bad and doubtful debts. Provisions are made when collection of the debt is judged to be less rather than more likely.	Credit terms are net 14 days (1999-00: 14 days)
<i>Financial Liabilities</i>			
		Financial liabilities are recognised when a present obligation to another party is entered into and the amount of the liability can be reliably measured	
Trade creditors	11A	Creditors and accruals are recognised at their nominal amounts, being the amounts at which the liabilities will be settled. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced). Settlement is usually made net 30 days.	

(b) Interest Rate Risk

Financial Instrument	Floating Interest Rate		Fixed Interest Rate		Non-Interest Bearing		Total		Weighted Average Effective Interest Rate		
	Notes	00-01	99-00	1 year or less 00-01	99-00	00-01	99-00	00-01	99-00	00-01	99-00
FINANCIAL ASSETS (RECOGD)											
Cash at Bank	8A	-6892	-56,931					-6892	-56,931	N/A	N/A
Cash on Hand	8A					500	500	500	500	N/A	N/A
Deposits at call	8A	2,521,403	1,254,944					2,521,403	1,254,944	4.0	N/A
Receivables for goods & services	8B					1,733,565	1,328,928	1,733,565	1,328,928	N/A	N/A
Term Deposits	8A			10,604,356	8,430,445	1,000,000	2,863,312	11,604,356	11,293,757	5.91	6.03
Total Financial Assets (Recognised)		2,514,511	1,198,013	10,604,356	8,430,445	1,000,000	2,863,312	1,734,065	1,329,428	15,852,932	13,821,198
Total Assets								15,922,685	13,909,096		
FINANCIAL LIABILITIES (RECOGD)											
Trade Creditors	11A					112,916	22,040	112,916	22,040	N/A	N/A
Grant Liabilities	11B					218,755	3,000	218,755	3,000	N/A	N/A
Total Financial Liabilities (Recognised)						331,671	25,040	331,671	25,040	N/A	N/A
Total Liabilities								461,987	125,592		

(c) Net Fair Values of Financial Assets and Liabilities

	Note	2001	2000
FINANCIAL ASSETS			
Cash at Bank	8A	(6,892)	(56,931)
Cash on Hand	8A	500	500
Deposits on call	8A	2,521,402	1,254,944
Receivables for Goods and Services	8B	1,733,565	1,328,928
Term Deposit	8A	11,604,357	11,293,757
Total Financial Assets		15,852,932	13,821,198
FINANCIAL LIABILITIES (RECOGNISED)			
Trade creditors	11A	112,916	22,040
Grant liabilities	11B	218,755	3,000
Total Financial Liabilities (Recognised)		331,671	25,040

Financial assets

The net fair values of cash, deposits on call and non-interest-bearing monetary financial assets approximate their carrying amounts.

Financial liabilities

The net fair values of all loans, unsecured notes, finance lease and lease incentive liabilities, deposits and guarantees are based on discounted cash flows using current interest rates for liabilities with similar risk profiles. (Where the liability is on a floating rate of interest, the method returns the principal amount).

The net fair values for trade creditors of which are short-term in nature, are approximated by their carrying amounts.

(d) Credit Risk Exposures

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

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

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



Appendices

CottonResearch andDevelopmentCorporation

crdc

2000-2001
Annual Report

APPENDIX A THE RESEARCH PROGRAM

Project lists

During the reporting year the Corporation funded more than 185 research, development, travel, technology transfer, seminar and workshop projects. Agreements for the carrying out of research and development activities are made under Sections 13 and 14 of the Primary Industries and Energy Research and Development Act 1989. Corporation grant agreements are contracts entered into with research providers and are established on a whole-of-project-life basis.

The CRDC No. assigned to each project indicates the organisation undertaking the research. Research providers funded during the 2000–01 year are listed below.

Researcher Providers

Code	Organisation
AAW	A & A Williams Pty Ltd
ACEC	Australian Cotton Exhibition Centre
ANU	Australian National University
AWA	Agriculture Western Australia
CRC	Australian Cotton Cooperative Research Centre
CRDC	Cotton Research and Development Corporation
CSE	CSIRO Entomology
CSP	CSIRO Plant Industries
CWT	CSIRO Textile and Fibre Technology
DAN	NSW Agriculture
DAQ	Queensland Department of Primary Industries
DPIF	Department of Primary Industries and Fisheries, Northern Territory
FT	4T Consultants Pty Ltd
MCK	McKenzie Soil Management Pty Ltd
NEC	National Centre for Engineering in Agriculture
QUT	Queensland University of Technology
RIR	Rural Industries Research and Development Corporation
SLM	CSIRO Land and Water
UA	University of Adelaide
ULA	LaTrobe University
UNE	University of New England
UQ	University of Queensland
US	University of Sydney
UTS	University of Technology, Sydney
UWS	University of Western Sydney

Cotton R&D Corporation Research Projects Funded 2000/2001

CRDC No	Project Title	Date Start	Date Cease	Researcher	Researcher E-mail
PROGRAM A: INSECTS					
AWA2C	Defining an integrated pest management (IPM) system for INGARD cotton in north-western Australia.	07/99	06/02	Dr Amanda Annells	aannells@agric.wa.gov.au
CRC10C	Physiological and agronomic factors affecting the efficacy of Bt in transgenic cotton (Project continued under CRC26C)	07/99	09/00	Dr Philip Wright	
CRC17C	Post-doc - Sarah Mansfield: Enhancing the impact of early season predation on <i>Helicoverpa</i> spp.	07/00	06/03	Ms Sarah Mansfield	sarahm@mv.pi.csiro.au
CRC26C	Physiological and agronomic factors affecting the efficacy of Bt in transgenic cotton (Dept Ag CRC10C)	10/00	06/01	Dr Ian Rochester	rocky@mv.pi.csiro.au
CRC27C	Old Insectary: Temporary Accommodation	07/00	06/01	Mr Bruce Reddan	brucer@mv.pi.csiro.au
CRDC112C	Integrated Pest Management (IPM), Roundup Ready.	07/00	09/01		
CRDC122C	Pest status and management of shield bug pests in cotton.	07/00	06/01	Mr Moazzem Khan	khanm@dpi.qld.gov.au
CRDC142C	Wind tunnel tests for the RAD aerial rotary atomiser (UQ).	07/00	06/01	Mr Nicholas Woods	nicholas.woods@ mailbox.uq.edu.au
CRDC143C	Assessment of Endosulfan EC based on new NRA risk assessment criteria for Endosulfan ULV (UQ).	07/00	06/01	Mr Nicholas Woods	nicholas.woods @mailbox.uq.edu.au
CRDC144C	<i>Heliothis</i> egg collections for resistance testing. (Use Et Coordination of \$ provided by AIRAC committee of Avcare).	12/00	06/01	Dr Robin Gunning	rgunning@enternet.com.au
CRDC149C	Survey: INGARD #4.	07/00	09/01		
CRDC168C	Survey of aphid management practices 2000/2001.	07/00	09/01		
CSE72C	Resistance to Bt toxins in heliothine pests of cotton.	07/98	06/01	Dr Ray Akhurst	raya@ento.csiro.au
CSE74C	Efficacy of Bt cotton plants and causes of variation in performance.	07/98	06/01	Dr Joanne Daly	Joanne.Daly@ento.csiro.au
CSE76C	Augmentation and conservation of <i>Helicoverpa</i> parasitoid populations in cotton	07/98	06/02	Dr Nancy Schellhorne	schellhorn.nancy@ saugov.sa.gov.au
CSE82C	Postgraduate - Erica Crone: Characterisation of a potential new insecticidal transgene.	03/99	03/02	Ms Erica Crone	erica.crone@ento.csiro.au

CSE83C	Why is Bemisia tabaci biotype B not a problem in NSW cotton?	07/99	06/02	Dr Paul De Barro	paul.debarro@ento.csiro.au
CSE84C	Insect pest resistance and the role of induced responses to damage in Australian cottons.	07/98	06/02	Dr Geoffrey Baker	geoff.baker@ento.csiro.au
CSE86C	Quantifying behavioural responses of Helicoverpa moths to trap crops for area wide management	07/99	06/02	Mr Martin Dillon	
CSE88C	Postgraduate - Michael Zuckerman: Protease resistant insecticidal proteins for controlling Helicoverpa species.	07/00	12/03	Mr Michael Zuckerman	mizuckerman@hotmail.com
CSE89C	Genetics of Bt resistance in Helicoverpa Armigera: Understanding Bt resistance	07/00	06/03	Dr Rod Mahon	rod.mahon@ento.csiro.au
CSE90C	Ecological studies of Helicoverpa populations related to the successful implementation of IPM systems based on Bt transgenic cottons.	07/00	06/03	Mr Colin Tann	colint@mv.pi.csiro.au
CSP103C	Management of early season damage and secondary pests in cotton	07/99	06/02	Dr Lewis Wilson	lewisw@mv.pi.csiro.au
DAN118C	Resistance Management in Australian cotton: conventional insecticides & transgenic cottons.	07/98	06/01	Dr Johnathon Holloway	
DAN119C	Conservation and utilization of beneficial insects in the cotton agroecosystem for Integrated pest Management in conventional and transgenic cotton II.	07/98	06/01	Dr Robert Mensah	robert.mensah@agric.nsw.gov.au
DAN138C	Insecticide Resistance Management in Bemisia tabaci	07/99	06/02	Dr Robin Gunning	rgunning@enternet.com.au
DAN139C	Pesticide Resistance in Cotton Aphid and Twospotted Mite	07/99	06/02	Dr Grant Herron	grant.herron@agric.nsw.gov.au
DAN140C	Management of Resistance to Conventional Chemicals in Helicoverpa spp.	07/99	06/04	Dr Robin Gunning	rgunning@enternet.com.au
DAN141C	Role of Conventional and Novel Insecticides in Integrated Pest Management in Cotton	07/99	06/02	Mr Viliami Heimoana	viliamih@mv.pi.csiro.au
DAQ83C	Monitoring silverleaf whitefly and its natural enemies in cotton areas of Queensland	07/98	06/01	Mr Bernard Franzmann	franzmb@dpi.qld.gov.au
DAQ84C	Thresholds for green mirids in cotton	07/98	06/01	Mr Gordon Simpson	simpsog@dpi.qld.gov.au
DAQ85C	GRDC1C - Regional Management of Heliothis on the Darling Downs	07/98	06/01	Dr Melina Miles	milesm@dpi.qld.gov.au
DAQ92C	Postgraduate - David Lea: "Risk factors for silverleaf whitefly outbreaks in cotton"	02/99	06/02	Mr David Lea	lead@dpi.qld.gov.au
DAQ95C	In-field development of novel options for Helicoverpa control in central Queensland	09/99	06/02	Mr Paul Grundy	grundyp@prose.dpi.qld.gov.au
DAQ96C	IPM in dryland cotton on the Darling Downs	07/99	06/02	Dr Brad Scholz	scholzb@dpi.qld.gov.au

DAQ97C	Development of trap cropping protocols for heliothis management on cotton in central Queensland	07/99	06/02	Dr Richard Sequeira	sequeir@dpi.qld.gov.au
DAQ102C	Risk factors for silverleaf white fly outbreaks in cotton	07/99	06/02	Mr David Lea	lead@dpi.qld.gov.au
DAQ105C	Improved application and formulation of viral biopesticides against Helicoverpa.	07/00	06/04	Dr Caroline Hauxwell	hauxwec@dpi.qld.gov.au
DAQ106C	Design and construction of a high clearance multi-treatment spray rig	07/00	6/01	Dr David Murray	murrayda@dpi.qld.gov.au
UNE31C	Postgraduate - Emma Louise Cottage: Management of resistance in Bemisia tabaci to insect growth regulators and juvenile hormone mimics.	02/98	09/01	Ms Emma Cottage	emmacottage@hotmail.com
UNE33C	Postgraduate - David Britton: Studies of slow-release formulations for semiochemicals in cotton pest management	08/99	07/02	Mr David Britton	dbritton@metz.une.edu.au
UQ26C	Ecology of Trichogramma egg parasites in the Ord River Irrigation Area and their role in cotton IMP (Project only started Jan 2000)	07/99	06/02	Prof Myron Zalucki	m.zalucki@mailbox.uq.edu.au
UQ28C	Postgraduate - Andrew Davies: Ecology of the Trichogramma egg parasites in the Ord River Irrigation Area and their role in cotton IPM	02/00	02/03	Mr Andrew Davies	apdavies@agric.wa.gov.au
UQ29C	Postgraduate - Mark Wade: Biology, ecology and utilisation of the Damsel Bug as a predator in cotton - towards real IPM	02/00	02/03	Mr Mark Wade	mwade@zen.uq.edu.au
UQ30C	Understanding the behaviour of egg laying Helicoverpa moths: New designs for integrated control in cotton.	08/00	06/03	Dr Paul Cunningham	p.cunningham@mailbox.uq.edu.au
UQ31C	The Impact of LDP Spray Application upon the Biological Efficacy of Cotton Insecticides	07/00	06/02	Mr Gary Dorr	b.coate@research.uq.edu.au
UQ32C	Population Genetics of Heliothis Migration, Recruitment and Origins.	07/00	06/03	Mr Glenn Graham	G.Graham@cpitt.uq.edu.au
UWS2C	Oil and biological pesticide-based integrated pest management in cotton	07/00	06/01	Assoc Prof Andrew Beattie	a.beattie@uws.edu.au
A: TOTAL FUNDS 00/01					\$3,668,768

PROGRAM B: DISEASES AND WEEDS

ANU6C	Testing the tomato I-2 resistance gene for its ability to confer Fusarium resistance in cotton	01/00	06/02	Dr David Jones	jones@rsbs.anu.edu
CRC18C	Postgraduate - Florian Yan: Cotton soil health: Influences on cotton root diseases	07/00	06/03	Florian Yan	floriyan@yahoo.com
CRC29C	Postgraduate - John Harvey: Diversity and pathogenicity of Thielaviopsis Basicola (Black Root Rot).	02/01	01/04	Mr John Harvey	j.harvey@botany.uq.edu.au

CRDC61C	Emerald CHCG&I disease & weed prevention strategy, road signs.	07/00	06/01	Mr Greg Jensen	
CRDC121C	Identification and management of Bunchy Top syndrome in cotton (Continued as CSP143C).	07/00	06/01	Mrs Amelia Reddall	ameliab@mv.pi.csiro.au
CRDC125C	Fusarium workshop for researchers, growers and consultants.	07/00	06/01		
CRDC127C	Large scale trials for biological control of Fusarium Wilt.	07/00	06/01	Dr Subbu Putcha	subbup@mv.pi.csiro.au
CSP113C	Australian native cottons as sources of resistance and new pathotypes of fusarium wilt	07/00	06/03	Dr Bo Wang	b.wang@pi.csiro.au
CSP114C	Post Doc - Dr. Helen McFadden: Discovery of genes involved in the expression of cotton resistance responses of Fusarium wilt by the application of microarray technology	07/00	09/03	Dr Helen McFadden	h.mcfadden@pi.csiro.au
CSP115C	Targeted expression of genes for manipulation of the systemic acquired resistance responses of cotton for improved tolerance to fungal pathogens	07/00	06/03	Dr Helen McFadden	h.mcfadden@pi.csiro.au
DAN121C	Diseases of Cotton - VI	07/98	06/01	Dr David Nehl	davidn@mv.pi.csiro.au
DAN122C	Black Root Rot and Slow early Season Growth of Cotton	07/98	06/01	Dr David Nehl	davidn@mv.pi.csiro.au
DAN123C	Controlling Cotton Seedling Diseases and Vascular Wilts with Micro-organisms.	07/98	06/01	Dr Subbu Putcha	subbup@mv.pi.csiro.au
DAN124C	Sustainable Weed Management Systems for Cotton	07/98	06/01	Mr Graham Charles	graham.charles@agric.nsw.gov.au
DAN148C	Cotton Disease Control Washdown Facility	7/00	6/01		
DAQ107C	Ecology and development of management strategies for fusarium wilt in cotton.	07/00	06/04	Dr Natalie Moore	Faire@pi.csiro.au
QUT1C	Review of molecular diagnostic R & D for detecting fusarium wilt in cotton.	07/00	12/00	Prof James Dale	j.dale@qut.edu.au
UNE32C	Ecology and management of Bladder Ketmia (Hibiscus trionum) and other merging problem Malvaceae weeds	07/99	09/02	Dr Stephen Johnson	Stephenj@mv.pi.csiro.au
US48C	Postgraduate - Fiona Frances Ballard: "Identification and characterisation of genes for resistance to bacterial blight in the cotton plant".	03/99	01/03	Ms Fiona Ballard	fballard@bio.usyd.edu.au
B: TOTAL FUNDS 00/01					\$1,930,137

PROGRAM C: SOILS

CRC7C	Cotton residue decomposition	07/98	06/01	Dr Subbu Putcha	subbup@mv.pi.csiro.au
CRC11C	Understanding the salinity threat in cotton growing areas of Australia Phase III – Implementation and Management	07/99	06/02	Dr John Triantafilis	johnt@acss.usyd.edu.au
CRC12C	Long-term effects of cotton rotations on the sustainability of cotton soils II	07/99	06/02	Mr Nilantha Hulugalle	nilantha@mv.pi.csiro.au
CRC19C	Identification and remediation of nutritional stresses in cotton crops	07/00	06/03	Dr Ian Rochester	rocky@mv.pi.csiro.au
CRC32C	Capital Item: Purchase of Minihizotron for the study of Root dynamics in cotton-based farming systems.	07/00	06/02	Mr Nilantha Hulugalle	nilantha@mv.pi.csiro.au
CRDC126C	Soil Workshop	07/00	06/01		
CSP144C	Cool room for ACRI based projects (CSP140C).	07/00	06/02	Dr Michael Bange	mikeb@pi.csiro.au
MCK2C	Soil Management Training Courses - Walgett and Bourke	07/99	07/00	Dr David McKenzie	
SLM2C	Management of herbicide effects on soil biological processes essential for plant health and nutrition	07/00	06/03	Dr Vadakattu V.S.R. Gupta	vadakattu.gupta@adl.clow.csiro.au
US56C	Postgraduate – Sevag Bedrossian: Potassium status and mineralogy of soil in relation to premature senescence in cotton in Northern NSW	01/00	01/03	Mr Sevag Bedrossian	s.bedrossian@acss.usyd.edu.au
US59C	Graphite furnace atomic absorption spectrometer (AAS).	07/00	06/01	Dr Balwant Singh	b.singh@acss.usyd.edu.au
US60C	Capital Item: Soil hydraulic measurement apparatus.	07/00	06/02	Prof Alex McBratney	alex.mcbratney@acss.usyd.edu.au
C: TOTAL FUNDS 00/01					\$779,115

PROGRAM D: WATER

CRDC128C	Engineering Water Use Efficiency	07/00	06/01		
CRDC132C	Water Research Review Workshop	07/00	06/01		
CRDC146C	A scoping study on the use of large mobile irrigation systems in the Australian cotton industry.	05/01	07/01	Dr Steven Raine	raine@usq.edu.au
CSP116C	Developing integrated farm water management for cotton production	07/00	06/03	Dr Sunil Tennakoon	sunil.tennakoon@pi.csiro.au
DAN159C	Improving irrigation management of cotton grown on red soil using subsurface drip irrigation (Continuation of US54C).	01/01	12/01	Mr Ben O'Brien	bennyob@ozemail.com.au

NEC2C	Best Management Practice for Maximising Whole Farm Irrigation Efficiency in the Australian Cotton Industry.	09/97	03/01	Mr Paul Dalton	daltonp@ozemail.com.au
US54C	Improving irrigation management of cotton grown on red soil using subsurface drip irrigation (US project continued as DAN159C).	01/00	12/00	Mr Ben O'Brien	bennyob@ozemail.com.au
D: TOTAL FUNDS 00/01					\$237,082

PROGRAM E: BEST MANAGEMENT PRACTICE AND ENVIRONMENT

AAW1C	1. Enhancement of BMP Manual into an Environmental management System 2. Development of further BMP Manual modules	7/00	6/02	Mr John Williams	allanw@mpx.com.au
AAW2C	Best Management Practise - Workshops	07/00	06/01	Mr Allan Williams	allanw@mpx.com.au
CRC20C	Bioremediation enzyme for endosulfan sulphate	07/00	06/03	Dr John Oakeshott	john.oakeshott@ento.csiro.au
CRDC24C	Best Management Practice	07/97	06/02	Mrs Rachel Holloway	rachel@crdc.com.au
CRDC66C	Cotton chemicals and residues - risk management (MRL scoping study)	01/01	06/01	Dr Ivan Kennedy	i.kennedy@acss.usyd.edu.au
CRDC69C	Cotton Industry Codex Representation	02/01	02/02	Mr Kevin Bodnaruk	akc_con@zip.com.au
CRDC110C	Cotton Industry Best Management Practice Audit Office.	07/99	03/02	Mrs Jon-Maree Baker	bmp_auditoffice@northnet.com.au
CRDC120C	Potential For Long Distance Endosulfan Drift	07/00	06/01		
CRDC129C	Cotton Industry Environmental Audit - Scoping Study.	07/00	06/02		
CRDC133C	The development of guidelines for ground based spray equipment and the testing of suggested improvements for the Australian cotton industry.	07/00	06/01	Mr Murray Schoenfish	murrayks@iprimus.com.au
CSE77C	Bioremediation Enzymes for Endosulfan.	07/98	06/01	Dr John Oakeshott	john.oakeshott@ento.csiro.au
DAQ98C	Improved pesticide application performance	07/99	06/02	Mr Peter Hughes	hughesp@dpi.qld.gov.au
UQ27C	Optimisation of large droplet placement (LDP) technology for the aerial application of insecticides in cotton.	07/98	06/02	Mr Gary Dorr	b.coate@research.uq.edu.au
US39C	Post Grad - Angus Crossan - remediation of Pesticides on Cotton Farms.	07/97	03/01	Mr Angus Crossan	A.Crossan@agec.usyd.edu.au
US58C	Best Management Practice in Occupational health and Safety in the cotton industry	7/00	6/01	Assoc Prof Lynette Fragar	lfragar@doh.health.nsw.gov.au
UTS2C	Relationship between pesticides in Passive Samplers to Riverwater Concentrations and Macroinvertebrate Populations	07/99	06/02	Mr Alex Leonard	A.Leonard@uts.edu.au

UTS3C	Post Grad - Joanne Hawkins - Toxicity Pesticide Mixtures and Sediment Binding of Pesticides in Storm Runoff Water from Cotton Fields (Project discontinued see UTS2C)	07/99	06/01	Ms Joanne Hawkins	Joanne.Hawkins@uts.edu.au
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E: TOTAL FUNDS 00/01 \$1,157,084

PROGRAM F: COMMUNITY

ACEC1C	The Australian Cotton Exhibition Centre	07/00	06/02	Mrs Marion McLeod	marion@turboweb.net.au
CRDC18C	Joint Funded Farm Occupational Health and Safety R&D Programs (RIRDC).	04/97	06/01	Assoc Prof Lynette Fragar	lfragar@doh.health.nsw.gov.au
CRDC93C	Economics of Production: Benchmarking IPM -Wicks Consulting (99/00 budget, 00/01 project)	07/99	06/01	Mr Chris Wicks	info@fisherwicks.com.au
CRDC94C	Income and expenses of cotton production - BOYCE Chartered Accountants	07/99	12/00	Mr Philip Thompson	pthompson@boyceca.com
CRDC131C	Scholarships (undergraduate)	07/00	06/01		

F: TOTAL FUNDS 00/01 \$98,000

PROGRAM G: PROCESSING AND MARKET

CRC28C	Development, manufacture and commissioning of an instrument for computer image analysis of dyed cotton fabric visual quality.	10/00	06/01	Dr Geoffrey Naylor	geoff.naylor@tft.csiro.au
CRC38C	Production factors impacting NEPS prior to ginning. (Funds for extra casual assistance ACCRC).	03/01	06/01	Dr Greg Constable	greg.constable@pi.csiro.au
CRDC92C	CIE Cotton trade barriers study: (99/00 Budget)	07/99	06/01		
CRDC163C	Examination of available commercial data on NEPS, and traceback to field management.	06/01	06/02	Mr David Venz	dvenz@bigpond.com
CWT4C	Measuring Cotton Fibre Fineness and Maturity using the Sirolan-Laserscan	07/99	09/01	Dr Geoffrey Naylor	geoff.naylor@tft.csiro.au
CWT5C	Lubricants for improved ginning and spinning of cotton. A fresh approach to fibre length preservation in cotton processing.	07/00	06/01	Mr G.A Robinson	gary.robinson@tft.csiro.au
CWT6C	Measuring cotton fibre maturity using polarised light microscopy	07/00	06/03	Dr Stuart Gordon	stuart.gordon@tft.csiro.au
CWT7C	The effect of short fibre and nep levels on marata vortex spinning (MVS) efficiency and quality	07/00	06/01	Dr Stuart Gordon	stuart.gordon@tft.csiro.au
NEC7C	Field to Fabric research program	07/00	06/03	Dr Grant Roberts	grantrob@usq.edu.au

G: TOTAL FUNDS 00/01 \$431,914

PROGRAM H: PLANT BREEDING AND BIOTECHNOLOGY

ANU4C	Cloning genes to manipulate cotton fibre cellulose production for improved fibre traits.	07/98	02/02	Dr Joanne Burn	burn@rsbs.anu.edu.au
CRDC123C	Evaluation of ELISA test kit for quantification of Bacillus Thuringiensis (Bt) protein in Australian transgenic cotton varieties.	07/00	06/01	Dr Ho Dang	hod@mv.pi.csiro.au
CRDC124C	Ingard Cotton Study. (Carmi-Jones Ag Services).	07/00	06/01	Mr Trevor Jones	carmij@thehub.com.au
CSE70C	Postgraduate - Constanza Angelucci: endotoxin of Bacillus Thuringiensis in Helicoverpa Armigera.	07/97	10/01	Ms Constanza Angelucci	conniea@ento.csiro.au
CSP87C	Post Doc - Dr Y-L Ruan Molecular control of photoassimilate import into developing cotton fibre.	09/97	11/00	Dr Yong-Ling Ruan	Ruan@pi.csiro.au
CSP96C	Breeding Improved Cotton Varieties	07/98	06/03	Dr Greg Constable	greg.constable@pi.csiro.au
CSP97C	Cotton Biotechnology: Core Program	07/98	06/01	Dr Danny Llewellyn	D.Llewellyn@pi.csiro.au
CSP102C	Isolation of Novel Cotton Promoters to drive the Robust Expression of useful Genes in Transgenic Cotton.	07/98	08/02	Dr Emmanuelle Faivre-Nitschke	Faivre@pi.csiro.au
CSP104C	Evaluation of disease tolerance of transgenic cotton lines containing genes for putative antifungal proteins	07/99	06/01	Dr Helen McFadden	h.mcfadden@pi.csiro.au
CSP105C	Post Doc-Belinda Townsend: Potential for the genetic manipulation of gossypol - A defence chemical with negative impacts on cottonseed products.	07/99	07/02	Belinda Townsend	B.Townsend@pi.csiro.au
CSP111C	New methods to enhance regeneration of cotton plants from tissue cultures to aid crop improvement (OLD UMON1C)	07/98	06/01	Mr Ding Gang He	d.he@pi.csiro.au
CSP117C	Development and evaluation of cottonseed oils with improved nutritional and functional properties.	11/00	10/03	Dr Qing Liu	qing.liu@pi.csiro.au
CSP118C	Manipulating genes to enhance cotton fibre elongation and cellulose synthesis	09/00	12/03	Dr Yong-Ling Ruan	Ruan@pi.csiro.au
CSP119C	Use of microarrays to study gene expression and to identify genes involved in cotton fibre initiation and development	07/00	06/01	Dr Yingru Wu	yingru.wu@pi.csiro.au
CSP120C	Genetic characterisation of homoeologous recombination and chromosome inheritance in G. hirsutum x K genome alien chromosome addition lines	07/00	06/03	Dr Augusto Becerra	a.becerra@pi.csiro.au
CSP121C	CSIRO Plant Breeding Fibre Quality Laboratory	07/00	06/05	Dr Greg Constable	greg.constable@pi.csiro.au

CSP122C	CSIRO Field Experiments at ACRI	07/00	06/05	Dr Greg Constable	greg.constable@pi.csiro.au
DAQ89C	Cotton Strain and Cultivar testing in Queensland	07/98	06/03	Mr Gavin Mann	manng@dpi.qld.gov.au
UA7C	Post-Doc - Sharon Orford: Genetic manipulation of fibre quality in Australian cotton	07/00	06/03	Dr Sharon Orford	sharon.orford@adelaide.edu.au
UA8C	Postgraduate - Sven Delaney: Development of gene promoters for cotton fibre development.	02/01	12/03	Mr Sven Delaney	sven.delaney@adelaide.edu.au
ULA6C	Postgraduate - Kerryn Dunse: Engineering proteinase inhibitors for enhanced activity against Lepidopteran proteases.	03/98	03/01	Ms Kerryn Dunse	kdunse@bioserve.latrobe.edu.au
US43C	Identification and Utilisation of Disease Resistance Genes in Australian Cotton Cultivars.	07/98	12/00	Dr Karin Jacobsen Lyon	klyon@bio.usyd.edu.au
H: TOTAL FUNDS 00/01					\$1,758,843

PROGRAM I: FARMING SYSTEMS AND AGRONOMY

CRC21C	Cotton production systems for Southern NSW	07/00	06/03	Dr Scott Hardwick	scott.hardwick@ento.csiro.au
CSP95C	Development of agronomic management options for dry season cotton production in NW Australia.	07/98	06/01	Mr Steve Yeates	stephen.yeates@terc.csiro.au
CSP98C	Delivering to industry the benefits of cropping systems models.	07/98	06/01	Mr Dirk Richards	dirkr@mv.pi.csiro.au
CSP106C	Enhancing Development, Support and Evaluation of Computerised Decision Support	07/98	12/02	Dr Michael Bange	mikeb@pi.csiro.au
CSP123C	Applying cotton crop physiology to production issues	07/00	06/03	Dr Steven Milroy	stephenm@mv.pi.csiro.au
CSP124C	Predicting and enhancing cotton compensation following pest damage	07/00	06/03	Dr Tom Lei	toml@mv.pi.csiro.au
DAN131C	Evaluation of Ultra Narrow Row Cotton production in cool season irrigated areas.	10/98	06/01	Mr Jack Cooper	jack.cooper@agric.nsw.gov.au
DAN145C	Operational costs for cotton experiments - III	07/99	06/02	Mr Bruce Reddan	brucer@mv.pi.csiro.au
DAQ104C	GRDC2C - Using seasonal climate forecasts for more effective grain-cotton production systems (joint project)	07/99	06/02	Ms Kirrily Pollock	pollock@dpi.qld.gov.au
US42C	Development of "Nutrilogic" for Precision Agriculture - a Decision Support System for Agrotechnology transfer in the Cotton Industry	07/98	06/01	Mr Craig Stewart	c.stewart@agec.usyd.edu.au

US44C	Postgraduate - Craig Stewart: Development of "Nutrilogic" for precision agriculture. A decision support system for agrotechnology transfer in the cotton industry.	07/98	12/01	Mr Craig Stewart	c.stewart@agec.usyd.edu.au
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I: TOTAL FUNDS 00/01**\$929,267****PROGRAM J: TECHNOLOGY TRANSFER AND EXTENSION**

CRC13C	Trainee Industry Development Officer	07/99	06/02	To be appointed	
CRC22C	National Cotton Extension Coordinator	07/00	06/05	Ms Ingrid Christiansen	ingride@mv.pi.csiro.au
CRC08C	IPM Training Coordinator.	04/98	12/01	Mr William Dalton	bill.dalton@dpi.qld.gov.au
CRDC135C	Commissioned research: UNR Workshop	07/00	06/01		
CSP125C	Continued development and field evaluation of micro-computer cotton management packages	07/00	06/03	Ms Sandra Deutscher	sandra.deutscher@mv.pi.csiro.au
DAN134C	Industry Development Officer - Bourke	07/99	06/01		
DAN135C	Promotion of SoilPAC - Production of Video.	03/99	08/00	Mr Gus Shaw	gus.shaw@agric.nsw.gov.au
DAN143C	Industry Development Officer - Warren	07/99	06/02	Ms Kirrily Rourke	kirrily.rouke@agric.nsw.gov.au
DAN144C	Industry Development Officer - Gunnedah	07/99	06/02	Mr Mark Hickman	mark.hickman@agric.nsw.gov.au
DAQ90C	Cotton Industry Development Extension Officer - Border Rivers	07/98	06/01	Ms Mascha Korteweg	kortewm@dpi.qld.gov.au
DAQ93C	Cotton Industry Development Extension Officer - Dirranbandi & St George.	02/99	06/01	Miss Sarah Kerlin	kerlins@@prose.dpi.qld.gov.au
DAQ100C	Extension Agronomy for Cotton Production in CQ.	07/99	06/04	Mr David Kelly	kellydg@prose.dpi.qld.gov.au
FT1C	Groundrig Operators Guidelines v2	07/00	06/01	Mr Ian Rankine	four@tpgi.com.au
FT2C	SPRAYpak booklet revision	07/00	06/01	Mr Ian Rankine	four@tpgi.com.au

J: TOTAL FUNDS 00/01**\$1,030,094****PROGRAM K: HUMAN RESOURCES**

CRC25C	Jack Holland: Travel to 10th ACGRA Cotton Conference	08/00	08/00	Mr Jack Holland	jack.holland@nt.gov.au
CRDC141C	Insect Ute Guide (Joint funded with GRDC)	07/00	06/01	Mr Peter Wood	woodp@dpi.qld.gov.au
CSE91C	Travel to Vth International Conference on Bacillus Thuringiensis - Guanajuato, Mexico (travel for project CSE72C)	07/00	08/00	Dr Ray Akhurst	raya@ento.csiro.au
CSE92C	XXI International Congress of Entomology - Iguassu Falls, Brazil (travel for project CSE73C)	07/00	08/00	Dr Joanne Daly	Joanne.Daly@ento.csiro.au

CSE93C	Post Graduate – Erica Crone: Travel to 10 Australian ACGRA Cotton Conference	08/00	08/00	Ms Erica Crone	erica.crone@ento.csiro.au
CSE94C	Travel-Erica Crone: Gene and genome duplications and the evolution of novel gene functions conference. Aussios, France.	04/01	04/01	Ms Erica Crone	erica.crone@ento.csiro.au
CSP108C	ACRI Computer Network Support	07/98	06/02	Mr Tony Pfeiffer	tony.pfeiffer@pi.csiro.au
CSP126C	14th International Symposium on plant lipids – Cardiff Wales (travel for CSP78C)	07/00	07/00	Dr Qing Liu	qing.liu@pi.csiro.au
CSP127C	Replacement of ACRI Computer file server (SICALA)	07/00	06/01	Dr Michael Bange	mikeb@pi.csiro.au
CSP128C	Enhancing Access to climate and weather data	07/00	06/03	Dr Michael Bange	mikeb@pi.csiro.au
CSP129C	Travel for USA Scientist (Dan Munk) to visit Australia on a scientific exchange	01/01	01/01	Dr Michael Bange	mikeb@pi.csiro.au
CSP130C	Travel to XXI International Congress of Entomology – Iguassu Falls, Brazil	08/00	08/00	Dr Lewis Wilson	lewisw@mv.pi.csiro.au
CSP131C	Travel – Dr Curt Brubaker: The IXth plant & animal genome conference in San Diego California USA.	01/01	01/01	Dr Curt Brubaker	curtb@pi.csiro.au
CSP132C	Travel – Dr Tom Lei: National Institute of Environmental Studies, Tsukuba, Japan	06/01	06/01	Dr Tom Lei	toml@mv.pi.csiro.au
CSP133C	Travel-Belinda Townsend: Keystone symposia on plant foods for human health: Manipulating plant metabolism to enhance nutritional quality. Colorado, USA.	04/01	04/01	Belinda Townsend	B.Townsend@pi.csiro.au
CSP134C	Travel – Curt Brubaker & Liz Dennis: International Cotton Genome Initiative, 2001 Workshop.	01/01	06/01	Dr Elizabeth Dennis	e.dennis@pi.csiro.au
DAN125C	Purchase of high clearance applicator: Extension of cease Date to June 01	07/97	06/01	Dr Grant A Roberts	grantr@mv.pi.csiro.au
DAN150C	Safety at Harvest (Video Production)	03/01	06/01	Mr Gus Shaw	gus.shaw@agric.nsw.gov.au
DAQ108C	Travel – Study tour of Area-wide and Integrated Pest Management	05/01	05/01	Ms Julie Ferguson	fergusjm@dpi.qld.gov.au
DAQ109C	Travel – 2001 Beltwide Cotton Conference	01/01	1/01	Dr Brad Scholz	scholzb@dpi.qld.gov.au
DPIF1C	Travel – Training of two Northern Territory Australian Cotton CRC Technicians (Darwin / Narrabri).	01/01	01/01	Mr Nick Hartley	nick.hartley@dpif.nt.gov.au
RIR7C	Australian Rural Leadership Program – Course 8	07/00	06/01	Mr John Quantrill	arlp@interact.net.au
SLM3C	Travel to Australian Cotton Conference – Brisbane	08/00	08/00	Dr Vadakattu V.S.R. Gupta	vadakattu.gupta@adl.clow.csiro.au

UA9C	Honours-John Humphries: A functional analysis of TTG1 regulatory homologues in cotton.	02/01	10/01	Mr John Humphries	ua983001@ student.adelaide.edu.au
UA10C	Honours-Damien Lightfoot: The control of temporal gene expression during cotton fibre development.	02/01	10/01	Mr Damien Lightfoot	ua973698@ student.adelaide.edu.au
US55C	Undergraduate scholarship program - Sydney Uni	7/99	06/04	Dr Ivan Kennedy	i.kennedy@acss.usyd.edu.au
US57C	Travel to 5th International Conference on Precision Agriculture in Minneapolis, Minnesota Et Madison, USA	07/00	07/00	Prof Alex McBratney	alex.mcbratney@ acss.usyd.edu.au
K: TOTAL FUNDS 00/01					\$308,923
TOTAL PROJECT FUNDING					\$12,329,277

Cotton R&D Corporation Research Projects Funded 2001/2002

CRDC No	Project Title	Date Start	Date Cease	Researcher	Researcher E-mail
PROGRAM A: INSECTS					
AWA2C	Defining an integrated pest management (IPM) system for INGARD cotton in north-western Australia	07/99	06/02	Dr Amanda Annells	aannells@agric.wa.gov.au
CRC17C	Post-doc - Sarah Mansfield: Enhancing the impact of early season predation on <i>Helicoverpa</i> spp	07/00	06/03	Ms Sarah Mansfield	sarahm@mv.pi.csiro.au
CRC30C	Postgraduate - To be appointed: Role of native vegetation in harboring beneficial insects and reducing insect pest damage in cotton	07/01	06/04	To be appointed	
CRC36C	Managing <i>Helicoverpa</i> spp. on cotton with semio(signalling)- chemicals	07/01	06/04	Dr Chris Moore	moorec@dpi.qld.gov.au
CRC41C	Understanding and improving aphid management on cotton farms	07/01	06/02	To be appointed	
CRDC112C	Integrated Pest Management (IPM), Roundup Ready	07/00	09/01	To be appointed	
CRDC148C	Review of resistance program projects	07/01	06/02	To be appointed	
CRDC149C	Survey: INGARD #4	07/00	09/01	To be appointed	
CRDC150C	Upgrade of "Pest and Beneficials Guide"	07/01	06/02	To be appointed	
CRDC151C	INGARD survey (performance report) #5	07/01	06/02	To be appointed	
CRDC152C	Dog training for detection of heliothis pupae in cotton fields	07/01	06/02	Mr Craig Murray	craig@dog-training-specialist.com
CRDC153C	The impact of insecticides beneficials. A budget for research outcomes of the beneficials workshop.	07/01	06/02	To be appointed	
CRDC168C	Survey of aphid management practices 2000/2001.	07/00	09/01	To be appointed	
CSE76C	Augmentation and conservation of <i>Helicoverpa</i> parasitoid populations in cotton	07/98	06/02	Dr Mary Whitehouse	mary.whitehouse@ento.csiro.au
CSE82C	Postgraduate - Erica Crone: Characterisation of a potential new insecticidal transgene.	03/99	03/02	Ms Erica Crone	erica.crone@ento.csiro.au
CSE83C	Why is <i>Bemisia tabaci</i> biotype B not a problem in NSW cotton?	07/99	06/02	Dr Paul De Barro	paul.debarro@ento.csiro.au

CSE84C	Insect pest resistance and the role of induced responses to damage in Australian cottons	07/98	06/02	Dr Geoffrey Baker	geoff.baker@ento.csiro.au
CSE86C	Quantifying behavioural responses of Helicoverpa moths to trap crops for area wide management	07/99	06/02	Mr Martin Dillon	
CSE88C	Postgraduate - Michael Zuckerman: Protease resistant insecticidal proteins for controlling Helicoverpa species.	07/00	12/03	Mr Michael Zuckerman	mizuckerman@hotmail.com
CSE89C	Genetics of Bt resistance in Helicoverpa Armigera: Understanding Bt resistance	07/00	06/03	Dr Rod Mahon	rod.mahon@ento.csiro.au
CSE90C	Ecological studies of Helicoverpa populations related to the successful implementation of IPM systems based on Bt transgenic cottons.	07/00	06/03	Mr Colin Tann	colint@mv.pi.csiro.au
CSE95C	Honeybee dissemination of Heliothis NPV onto cotton flowers.	07/01	06/02	Mr Martin Dillon	
CSE96C	Resistance of helicoverpa armigera to cry2A	07/01	06/04	Dr Ray Akhurst	raya@ento.csiro.au
CSE97C	Selection and field efficacy of improved Helicoverpa NPV insecticides for Australian cotton	07/01	06/04	Dr Andrew Richards	andrew.richards@ento.csiro.au
CSE99C	Major National research Facilities (MRNF) bid for a containment facility in Brisbane.	07/01	06/02	To be appointed	
CSP103C	Management of early season damage and secondary pests in cotton	07/99	06/02	Dr Lewis Wilson	lewisw@mv.pi.csiro.au
DAN138C	Insecticide Resistance Management in Bemisia tabaci	07/99	06/02	Dr Robin Gunning	rgunning@enternet.com.au
DAN139C	Pesticide Resistance in Cotton Aphid and Twospotted Mite	07/99	06/02	Dr Grant Herron	grant.herron@agric.nsw.gov.au
DAN140C	Management of Resistance to Conventional Chemicals in Helicoverpa spp.	07/99	06/04	Dr Robin Gunning	rgunning@enternet.com.au
DAN141C	Role of Conventional and Novel Insecticides in Integrated Pest Management in Cotton	07/99	06/02	Mr Viliami Heimoana	viliamih@mv.pi.csiro.au
DAN151C	Conservation and utilisation of beneficial insects and other biological control agents for IPM in cotton II.	07/01	06/04	Dr Robert Mensah	robert.mensah@agric.nsw.gov.au
DAN152C	Resistance monitoring and management of transgenic Bt cotton	07/01	06/04	To be appointed	
DAN155C	Postgraduate - Brendon Griffiths: Simple field based test kit for pyrethroids.	07/01	06/02	Mr Brendon Griffiths	graham.denney@agric.nsw.gov.au
DAN157C	Insect collection & resistance coordinator (aphids, heliothis, whitefly).	07/01	06/02	To be appointed	
DAN158C	Post Doc - Emma Cottage: Mechanisms insecticide resistance in the cotton aphid, Aphis Gossypii.	10/01	06/02	Ms Emma Cottage	emmacottage@hotmail.com

DAQ92C	Postgraduate - David Lea: "Risk factors for silverleaf whitefly outbreaks in cotton"	02/99	06/02	Mr David Lea	lead@dpi.qld.gov.au
DAQ95C	In-field development of novel options for Helicoverpa control in central Queensland	09/99	06/02	Mr Paul Grundy	grundyp@prose.dpi.qld.gov.au
DAQ96C	IPM in dryland cotton on the Darling Downs	07/99	06/02	Dr Brad Scholz	scholzb@dpi.qld.gov.au
DAQ97C	Development of trap cropping protocols for heliothis management on cotton in central Queensland	07/99	06/02	Dr Richard Sequeira	sequeir@dpi.qld.gov.au
DAQ102C	Risk factors for silverleaf white fly outbreaks in cotton	07/99	06/02	Mr David Lea	lead@dpi.qld.gov.au
DAQ105C	Improved application and formulation of viral biopesticides against Helicoverpa.	07/00	06/04	Dr Caroline Hauxwell	hauxwec@dpi.qld.gov.au
DAQ110C	Pest status and management of shield bugs in cotton	07/01	06/04	To be appointed	
DAQ111C	New biopesticides against emerging sucking pests	07/01	06/04	Dr David Holdom	holdomd@dpi.qld.gov.au
DAQ112C	Heliothis management in south Queensland farming systems	07/01	06/04	Dr Melina Miles	milesm@dpi.qld.gov.au
DAQ113C	Postgraduate - Amanda Cleary: The effect of cereal stubble on Helicoverpa activity in early season cotton.	08/01	08/04	Miss Amanda Cleary	clearya@di.qld.gov.au
DAQ116C	Assessment of the potential for resistance to Gemstar.	07/01	06/04	Dr Caroline Hauxwell	hauxwec@dpi.qld.gov.au
UNE31C	Postgraduate - Emma Louise Cottage: Management of resistance in Bemisia tabaci to insect growth regulators and juvenile hormone mimics.	02/98	09/01	Ms Emma Cottage	emmacottage@hotmail.com
UNE33C	Postgraduate - David Britton: Studies of slow-release formulations for semiochemicals in cotton pest management	08/99	07/02	Mr David Britton	dbritton@metz.une.edu.au
UQ26C	Ecology of Trichogramma egg parasites in the Ord River Irrigation Area and their role in cotton IMP (Project only started Jan 2000)	07/99	06/02	Prof Myron Zalucki	m.zalucki@mailbox.uq.edu.au
UQ28C	Postgraduate - Andrew Davies: Ecology of the Trichogramma egg parasites in the Ord River Irrigation Area and their role in cotton IPM.	02/00	02/03	Mr Andrew Davies	apdavies@agric.wa.gov.au
UQ29C	Postgraduate - Mark Wade: Biology, ecology and utilisation of the Damsel Bug as a predator in cotton - towards real IPM.	02/00	02/03	Mr Mark Wade	mwade@zen.uq.edu.au
UQ30C	Understanding the behaviour of egg laying Helicoverpa moths: New designs for integrated control in cotton.	08/00	06/03	Dr Paul Cunningham	p.cunningham@mailbox.uq.edu.au

UQ31C	The Impact of LDP Spray Application upon the Biological Efficacy of Cotton Insecticides	07/00	06/02	Mr Gary Dorr	b.coate@research.uq.edu.au
UQ32C	Population Genetics of Heliothis Migration, Recruitment and Origins.	07/00	06/03	Mr Glenn Graham	G.Graham@cpitt.uq.edu.au
UWS3C	Evaluation of mineral oils for cotton IPM	07/01	06/03	Assoc Prof Andrew Beattie	a.beattie@uws.edu.au
A: TOTAL FUNDS 01/02					\$4,238,215

PROGRAM B: DISEASES AND WEEDS

ANU6C	Testing the tomato I-2 resistance gene for its ability to confer Fusarium resistance in cotton	01/00	06/02	Dr David Jones	jones@rsbs.anu.edu
CRC18C	Postgraduate - Florian Yan: Cotton soil health: Influences on cotton root diseases.	07/00	06/03	Florian Yan	florijan@yahoo.com
CRC29C	Postgraduate - John Harvey: Diversity and pathogenicity of Thielaviopsis Basicola (Black Root Rot).	02/01	01/04	Mr John Harvey	j.harvey@botany.uq.edu.au
CRC31C	Postgraduate - To be appointed: The role of weeds as alternative hosts of Fusarium wilt in cotton	07/01	06/04	To be appointed	
CRDC154C	Weeds. A budget for research outcomes of the Weeds workshop.	07/01	06/02	To be appointed	
CRDC155C	Field trials for the fusarium biocontrol agent.	07/01	06/02	To be appointed	
CRDC167C	Weeds extension material - WeedPAK.	07/01	06/02	Dr Stephen Johnson	Stephenj@mv.pi.csiro.au
CSP113C	Australian native cottons as sources of resistance and new pathotypes of fusarium wilt	07/00	06/03	Dr Bo Wang	b.wang@pi.csiro.au
CSP114C	Post Doc - Dr. Helen McFadden: Discovery of genes involved in the expression of cotton resistance responses of Fusarium wilt by the application of microarray technology	07/00	09/03	Dr Helen McFadden	h.mcfadden@pi.csiro.au
CSP115C	Targeted expression of genes for manipulation of the systemic acquired resistance responses of cotton for improved tolerance to fungal pathogens	07/00	06/03	Dr Helen McFadden	h.mcfadden@pi.csiro.au
CSP143C	Identification and management of Bunchy Top syndrome in cotton (Year 2&t3 of CRDC121C).	07/01	06/03	Mrs Amelia Reddall	ameliab@mv.pi.csiro.au
DAN153C	Managing Black Root Rot of Cotton	07/01	06/04	Dr David Nehl	davidn@mv.pi.csiro.au
DAN154C	Diseases of Cotton VII	07/01	06/04	Dr David Nehl	davidn@mv.pi.csiro.au

DAN156C	Weed management packages for cotton	07/01	06/02	Mr Graham Charles	graham.charles@agric.nsw.gov.au
DAQ107C	Ecology and development of management strategies for fusarium wilt in cotton	07/00	06/04	Dr Natalie Moore	Faivre@pi.csiro.au
DAQ117C	Best Weed Management strategies for dryland cropping systems with cotton. A scoping study (Joint project ACCRC, Weeds CRC).	07/01	06/02	Dr Ian Taylor	iant@mv.pi.csiro.au
UNE32C	Ecology and management of Bladder Ketmia (Hibiscus trionum) and other emerging problem Malvaceae weeds	07/99	09/02	Dr Stephen Johnson	Stephenj@mv.pi.csiro.au
US48C	Postgraduate - Fiona Frances Ballard: "Identification and characterisation of genes for resistance to bacterial blight in the cotton plant".	03/99	01/03	Ms Fiona Ballard	fballard@bio.usyd.edu.au
B: TOTAL FUNDS 01/02					\$1,809,325

PROGRAM C: SOILS

CLW1C	Environmental impacts of genetically modified cotton on soil biological processes -effects of farming systems	07/01	06/04	Dr Vadakattu V.S.R. Gupta	vadakattu.gupta@adl.clow.csiro.au
CRC11C	Understanding the salinity threat in cotton growing areas of Australia Phase III – Implementation and Management	07/99	06/02	Dr John Triantafyllis	john@acss.usyd.edu.au
CRC12C	Long-term effects of cotton rotations on the sustainability of cotton soils II	07/99	06/02	Mr Nilantha Hulugalle	nilantha@mv.pi.csiro.au
CRC19C	Identification and remediation of nutritional stresses in cotton crops	07/00	06/03	Dr Ian Rochester	rocky@mv.pi.csiro.au
CRC32C	Capital Item: Purchase of Minihizotron for the study of Root dynamics in cotton-based farming systems.	07/00	06/02	Mr Nilantha Hulugalle	nilantha@mv.pi.csiro.au
CRDC156C	Cotton trash: Use and effects on soil health	07/01	06/02	To be appointed	
CSP144C	Cool room for ACRI based projects (CSP140C)	07/00	06/02	Dr Michael Bange	mikeb@pi.csiro.au
SLM2C	Management of herbicide effects on soil biological processes essential for plant health and nutrition	07/00	06/03	Dr Vadakattu V.S.R. Gupta	vadakattu.gupta@adl.clow.csiro.au
US56C	Postgraduate - Sevag Bedrossian: Potassium status and mineralogy of soil in relation to premature senescence in cotton in Northern NSW	01/00	01/03	Mr Sevag Bedrossian	s.bedrossian@acss.usyd.edu.au
US60C	Capital Item: Soil hydraulic measurement apparatus.	07/00	06/02	Prof Alex McBratney	alex.mcbratney@acss.usyd.edu.au
C: TOTAL FUNDS 01/02					\$658,719

PROGRAM D: WATER

CRC37C	Measuring the influence of water quality on drainage through irrigated cotton soils	07/01	06/04	Ms Rachael Zischke	zischker@dnr.qld.gov.au
CRDC146C	A scoping study on the use of large mobile irrigation systems in the Australian cotton industry.	05/01	07/01	Dr Steven Raine	raine@usq.edu.au
CRDC157C	Investigation into the feasibility of partial rootzone drying in cotton irrigation systems.	07/01	06/02	To be appointed	
CRDC158C	Water relations of the cotton plant (CSP)	07/01	06/04	To be appointed	
CSP116C	Developing integrated farm water management for cotton production	07/00	06/03	Dr Sunil Tennakoon	sunil.tennakoon@pi.csiro.au
DAN159C	Improving irrigation management of cotton grown on red soil using subsurface drip irrigation (Continuation of US54C)	01/01	12/01	Mr Ben O'Brien	bennyob@ozemail.com.au
D: TOTAL FUNDS 01/02					\$381,323

PROGRAM E: BEST MANAGEMENT PRACTICE AND ENVIRONMENT

AAW1C	1. Enhancement of BMP Manual into an Environmental management System 2. Development of further BMP Manual modules	7/00	6/02	Mr John Williams	allanw@mpx.com.au
CRC20C	Bioremediation enzyme for endosulfan sulphate	07/00	06/03	Dr John Oakeshott	john.oakeshott@ento.csiro.au
CRDC24C	Best Management Practice	07/97	06/02	Mrs Rachel Holloway	rachel@crdc.com.au
CRDC69C	Cotton Industry Codex Representation.	02/01	02/02	Mr Kevin Bodnaruk	akc_con@zip.com.au
CRDC110C	Cotton Industry Best Management Practice Audit Office.	07/99	03/02	Mrs Jon-Maree Baker	bmp_auditoffice@northnet.com.au
CRDC129C	Cotton Industry Environmental Audit – Scoping Study.	07/00	06/02	To be appointed	
CRDC159C	Biodiversity on the cotton farm	07/01	06/02	To be appointed	
CRDC160C	Environment Audit II	07/01	06/02	To be appointed	
CRDC161C	BMP Harvest, ginning & shipping: A scoping study	07/01	06/02	To be appointed	
DAQ98C	Improved pesticide application performance	07/99	06/02	Mr Peter Hughes	hughesp@dpi.qld.gov.au
UQ27C	Optimisation of large droplet placement (LDP) technology for the aerial application of insecticides in cotton.	07/98	06/02	Mr Gary Dorr	b.coate@research.uq.edu.au
UTS2C	Relationship between pesticides in Passive Samplers to Riverwater Concentrations and Macroinvertebrate Populations	07/99	06/02	Mr Alex Leonard	A.Leonard@uts.edu.au
E: TOTAL FUNDS 01/02					\$1,095,112

PROGRAM F: COMMUNITY

ACEC1C	The Australian Cotton Exhibition Centre	07/00	06/02	Mrs Marion McLeod	marion@turboweb.net.au
CRDC145C	Joint Funded Farm Occupational Health and Safety R&D Programs (RIRDC – continued from CRDC18C)	07/01	06/02	Assoc Prof Lynette Fragar	lfragar@doh.health.nsw.gov.au
CRDC162C	Income and expenses of cotton production – BOYCE Chartered Accountants	07/01	06/02	To be appointed	
CRDC169C	Biotechnology community education program	07/01	06/02	To be appointed	
F: TOTAL FUNDS 01/02					\$73,000

PROGRAM G: PROCESSING AND MARKET

CRDC163C	Examination of available commercial data on NEPS, and traceback to field management	06/01	06/02	Mr David Venz	dvenz@bigpond.com
CTFF1C	A Survey of Cotton Wax Contents in Australian Cotton	07/01	06/02	Dr Stuart Gordon	stuart.gordon@tft.csiro.au
CTFF2C	Cotton fineness and Maturity Measurement using the Sirolan-Laserscan	01/02	06/03	Dr Geoffrey Naylor	geoff.naylor@tft.csiro.au
CTFF3C	Participation in an international interlaboratory trial to develop standard reference cotton samples for fibre fineness and maturity	07/01	06/03	Dr Geoffrey Naylor	geoff.naylor@tft.csiro.au
CWT4C	Measuring Cotton Fibre Fineness and Maturity using the Sirolan-Laserscan	07/99	09/01	Dr Geoffrey Naylor	geoff.naylor@tft.csiro.au
CWT6C	Measuring cotton fibre maturity using polarised light microscopy	07/00	06/03	Dr Stuart Gordon	stuart.gordon@tft.csiro.au
NEC7C	Field to Fabric research program	07/00	06/03	Dr Grant Roberts	grantrob@usq.edu.au
G: TOTAL FUNDS 01/02					\$404,603

PROGRAM H: PLANT BREEDING AND BIOTECHNOLOGY

ANU4C	Cloning genes to manipulate cotton fibre cellulose production for improved fibre traits	07/98	02/02	Dr Joanne Burn	burn@rsbs.anu.edu.au
CSE70C	Postgraduate – Constanza Angelucci: Binding sites for the Cry 1 Ac delta-endotoxin of Bacillus Thuringiensis in Helicoverpa Armigera	07/97	10/01	Ms Constanza Angelucci	conniea@ento.csiro.au
CSP96C	Breeding Improved Cotton Varieties	07/98	06/03	Dr Greg Constable	greg.constable@pi.csiro.au
CSP102C	Isolation of Novel Cotton Promoters to drive the Robust Expression of useful Genes in Transgenic Cotton	07/98	08/02	Dr Emmanuelle Faivre-Nitschke	Faivre@pi.csiro.au

CSP105C	Post Doc-Belinda Townsend: Potential for the genetic manipulation of gossypol – A defence chemical with negative impacts on cottonseed products.	07/99	07/02	Belinda Townsend	B.Townsend@pi.csiro.au
CSP117C	Development and evaluation of cottonseed oils with improved nutritional and functional properties.	11/00	10/03	Dr Qing Liu	qing.liu@pi.csiro.au
CSP118C	Manipulating genes to enhance cotton fibre elongation and cellulose synthesis	09/00	12/03	Dr Yong-Ling Ruan	Ruan@pi.csiro.au
CSP120C	Genetic characterisation of homoeologous recombination and chromosome inheritance in <i>G. hirsutum</i> x K genome alien chromosome addition lines	07/00	06/03	Dr Augusto Becerra	a.becerra@pi.csiro.au
CSP121C	CSIRO Plant Breeding Fibre Quality Laboratory	07/00	06/05	Dr Greg Constable	greg.constable@pi.csiro.au
CSP122C	CSIRO Field Experiments at ACRI	07/00	06/05	Dr Greg Constable	greg.constable@pi.csiro.au
CSP135C	Postgraduate - To be appointed: Molecular analysis and manipulation of terpene biosynthesis in cotton	01/02	01/05	To be appointed	
CSP136C	Cotton Biotechnology: Core Program	07/01	07/04	Dr Danny Llewellyn	D.Llewellyn@pi.csiro.au
CSP137C	Development of a unigene set of cotton clones for general microarray analysis of gene expression in cotton plants	07/01	06/04	Dr Yingru Wu	yingru.wu@pi.csiro.au
DAQ89C	Cotton Strain and Cultivar testing in Queensland	07/98	06/03	Mr Gavin Mann	manng@dpi.qld.gov.au
MU1C	Transgenic cotton for the control of Fusarium Wilt	07/01	06/04	Dr Robyn Heath	r.heath@botany.unimelb.edu.au
UA7C	Post-Doc - Sharon Orford: Genetic manipulation of fibre quality in Australian cotton	07/00	06/03	Dr Sharon Orford	sharon.orford@adelaide.edu.au
UA8C	Postgraduate – Sven Delaney: Development of gene promoters for cotton fibre development.	02/01	12/03	Mr Sven Delaney	sven.delaney@adelaide.edu.au
H: TOTAL FUNDS 01/02					\$1,634,131

PROGRAM I: FARMING SYSTEMS AND AGRONOMY

CRC21C	Cotton production systems for Southern NSW	07/00	06/03	Dr Scott Hardwick	scott.hardwick@ento.csiro.au
CRC34C	Agronomic aspects of Bt efficacy in transgenic cotton	07/01	06/04	Dr Ian Rochester	rocky@mv.pi.csiro.au
CRDC164C	UNR Harvest alternatives workshop, and field research.	07/01	06/02	To be appointed	
CSP106C	Enhancing Development, Support and Evaluation of Computerised Decision Support	07/98	12/02	Dr Michael Bange	mikeb@pi.csiro.au

CSP123C	Applying cotton crop physiology to production issues	07/00	06/03	Dr Steven Milroy	stephenm@mv.pi.csiro.au
CSP124C	Predicting and enhancing cotton compensation following pest damage	07/00	06/03	Dr Tom Lei	toml@mv.pi.csiro.au
CSP138C	Refining crop agronomy for dry season cotton production in NW Australia	07/01	06/04	To be appointed	
CSP139C	Application of crop simulation within the Australian cotton industry	07/01	06/04	Mr Dirk Richards	dirkr@mv.pi.csiro.au
CSP140C	The impact of temperature extremes on cotton performance	07/01	06/04	Dr Michael Bange	mikeb@pi.csiro.au
CSP141C	Postgraduate – To be appointed: Training in crop physiology - Functional responses of cotton to environment mediated via internal nitrogen dynamics	07/01	06/04	To be appointed	
CSP142C	Phosphorus and potassium nutrition of cotton	07/01	06/04	To be appointed	
DAN145C	Operational costs for cotton experiments – III	07/99	06/02	Mr Bruce Reddan	brucer@mv.pi.csiro.au
DAQ104C	GRDC2C – Using seasonal climate forecasts for more effective grain-cotton production systems (joint project)	07/99	06/02	Ms Kirrily Pollock	pollock@dpi.qld.gov.au
DPIF2C	Investigation of cotton growing at different sites under different farming systems in the Northern Territory	07/01	06/04	To be appointed	
US44C	Postgraduate – Craig Stewart: Development of "Nutrilogic" for precision agriculture. A decision support system for agrotechnology transfer in the cotton industry	07/98	12/01	Mr Craig Stewart	c.stewart@agec.usyd.edu.au
I: TOTAL FUNDS 01/02					\$1,452,154

PROGRAM J: TECHNOLOGY TRANSFER AND EXTENSION

CRC13C	Trainee Industry Development Officer	07/99	06/02	To be appointed	
CRC22C	National Cotton Extension Coordinator	07/00	06/05	Ms Ingrid Christiansen	ingridc@mv.pi.csiro.au
CRC35C	IPM Training Coordinator.	01/02	06/05	Mr William Dalton	bill.dalton@dpi.qld.gov.au
CRC08C	IPM Training Coordinator.	04/98	12/01	Mr William Dalton	bill.dalton@dpi.qld.gov.au
CRDC165C	Review of other rural industry extension programs	07/01	06/02	To be appointed	
CRDC166C	Economics of production: Benchmarking IPM	07/01	06/02	To be appointed	
CSP125C	Continued development and field evaluation of micro-computer cotton management packages	07/00	06/03	Ms Sandra Deutscher	sandra.deutscher@mv.pi.csiro.au

DAN143C	Industry Development Officer – Warren	07/99	06/02	Ms Kirrily Rourke	kirrily.rouke@agric.nsw.gov.au
DAN144C	Industry Development Officer – Gunnedah	07/99	06/02	Mr Mark Hickman	mark.hickman@agric.nsw.gov.au
DAQ100C	Extension Agronomy for Cotton Production in CQ	07/99	06/04	Mr David Kelly	kellydg@prose.dpi.qld.gov.au
DAQ114C	Cotton Industry Development Extension Officer – Border Rivers.	07/01	06/04	Ms Mascha Korteweg	kortewm@dpi.qld.gov.au
DAQ115C	Cotton Industry Development Extension Officer - Dirranbandi & St. George.	07/01	06/04	Miss Sarah Kerlin	kerlins@@prose.dpi.qld.gov.au
J: TOTAL FUNDS 01/02					\$898,522

PROGRAM K: HUMAN RESOURCES

CRDC67C	R&D Contingency Budget 2001/2002	07/01	06/02	To be appointed	
CSE98C	Travel – Ray Akhurst: 4th Pacific Rim Conference on the Biotechnology of Bacillus Thuringiensis and its Environmental Impact.	07/01	06/02	Dr Ray Akhurst	raya@ento.csiro.au
CSP108C	ACRI Computer Network Support	07/98	06/02	Mr Tony Pfeiffer	tony.pfeiffer@pi.csiro.au
CSP128C	Enhancing Access to climate and weather data	07/00	06/03	Dr Michael Bange	mikeb@pi.csiro.au
CTFT4C	Travel – 2002 Beltwide Cotton Conference USA, & 2002 ITMF Fibre Maturity Working group Meeting, Europe (Part of CWT6C)	07/01	06/02	Dr Stuart Gordon	stuart.gordon@tft.csiro.au
RIR8C	Australian Rural Leadersip Program – Course 9	07/01	06/03	Mr John Quantrill	arlp@interact.net.au
UA9C	Honours-John Humphries: A functional analysis of TTG1 regulatory homologues in cotton	02/01	10/01	Mr John Humphries	ua983001@student.adelaide.edu.au
UA10C	Honours-Damien Lightfoot: The control of temporal gene expression during cotton fibre development.	02/01	10/01	Mr Damien Lightfoot	ua973698@student.adelaide.edu.au
UNE35C	Travel – David Britton: International Society for Chemical Ecology 2001 Conference – Lake Tahoe, California, USA	07/01	07/01	Mr David Britton	dbritton@metz.une.edu.au
US55C	Undergraduate scholarship program – Sydney Uni	7/99	06/04	Dr Ivan Kennedy	i.kennedy@acss.usyd.edu.au
US61C	Sponsor prize "Proficiency in fourth year agronomy in the B.Sc.Agr. degree program."	07/01	06/04	Mr Lindsay Campbell	Lindsay.Campbell@cropsci.usyd.edu.au
CRC39C	Travel – Dr Pat Collyer: Chairman of the USA Cotton Disease Council – Review of Australian Fusarium Research.	02/02	02/02	To be appointed	
K: TOTAL FUNDS 01/02					\$745,314
TOTAL PROJECT FUNDING					\$13,390,418

APPENDIX B – ACRONYMS

In the interests of readability and ease of use, the Corporation attempts to avoid acronyms, initialisms and those abbreviations that are not self-explanatory wherever possible. However, some times it is unavoidable. Following is a list of acronyms that are used in the cotton industry or by Government, and/or that may appear in this publication.

		ARLP	Australian Rural Leadership Program
		AOP	Annual Operating Plan
		ARRIP	Australian Agricultural Research in Progress database
		AWA	Agriculture Western Australia (Department of)
AAAA	Aerial Agricultural Association of Australia	AWM	Area Wide Management
ABARE	Australian Bureau of Agricultural and Resource Economics	BMP	Best Management Practice
ACEC	Australian Cotton Exhibition Centre	BRS	Bureau of Rural Sciences
ACGRA	Australian Cotton Growers' Research Association	Bt	<i>Bacillus thuringiensis</i> (crystal protein expressed in Ingard® Cotton)
ACIC	Australian Cotton Industry Council	CAC Act	<i>Commonwealth Authorities and Companies Act 1997</i>
ACCRC	Australian Cotton Cooperative Research Centre (also Cotton CRC)	CCA	Cotton Consultants Australia Inc.
ACRI	Australian Cotton Research Institute (located near Narrabri, NSW)	CRC	Cooperative Research Centre
AFFA	Agriculture Fisheries and Forestry - Australia	CRDC	Cotton Research and Development Corporation
ANAO	Australian National Audit Office	CSD	Cotton Seed Distributors
		CSIRO	Commonwealth Scientific and Industrial Research Organisation
		DLWC	Department of Land and Water Conservation (NSW)

DNR	Department of Natural Resources (Queensland)	MDBC	Murray-Darling Basin Commission
DOFA	Department of Finance and Administration (Federal)	MLA	Meat and Livestock Australia
ESD	Ecologically Sustainable Development	MP	Member of Parliament
EPA	Environmental Protection Agency (NSW)	NFF	National Farmers' Federation
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>	NRA	National Registration Authority for Veterinary and Agricultural Chemicals
GMAC	Genetic Manipulation Advisory Committee	NSW Ag	New South Wales Agriculture (Department of)
GOA	Groundrig Operators Association	PBS	Portfolio Budget Statement
GRDC	Grains Research and Development Corporation	PIERD Act	<i>Primary Industries and Energy Research and Development Act 1989</i>
HRDC	Horticulture Research and Development Corporation (now Horticulture Australia Ltd)	QDPI	Queensland Department of Primary Industries
ICAC	International Cotton Advisory Committee	RCMAC	Raw Cotton Marketing Advisory Committee
OGTR	Office of the Gene Technology Regulator	RIRDC	Rural Industries Research and Development Corporation
IP	Intellectual Property	RRDCC	Rural Research and Development Chairs' Committee
IPM	Integrated Pest Management	TIMS	Transgenic and Insect Management Strategy committee
LWRRDC	Land and Water Resources Research and Development Corporation (now Land and Water Australia)	TRC	Technology Resource Centre (at the Australian Cotton Research Institute)



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crdc

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THE COTTON RESEARCH AND DEVELOPMENT CORPORATION IS A PARTNERSHIP BETWEEN, AND JOINTLY FUNDED BY THE FEDERAL GOVERNMENT AND THE AUSTRALIAN COTTON INDUSTRY

