The University of Queensland
Cotton Research & Development Corporation

IDENTIFICATION OF SOCIO-ECONOMIC RESEARCH STUDY AREAS IN THE COTTON INDUSTRY - *A SCOPING STUDY*

Conducted on behalf of the Cotton Research & Development Corporation

By

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Box 1.1 – The study team

Study team

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Executive Summary

The Cotton Research and Development Corporation (CRDC) asked the University of Queensland to undertake a study to indicate socio-economic areas for research for the cotton industry. This report presents the issues that are concerning the cotton industry and recommendations for Cotton Research and Development Corporation (CRDC) from the study, which was conducted in the second semester in 1999.

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LIST OF ACRONYMS AND ABREVIATIONS

AAAA	Aerial Agricultural Association of Australia
ABARE	Australian Bureau of Agriculture and Resource Economics
AES	Aboriginal Employment Strategy
BMP	Best Management Practices
CCA	Cotton Consultants Australia
CRDC	Cotton Research and Development Corporation
CSIRO	Commonwealth Scientific and Industrial Organisation
DPI	Department of Primary Industries
GMO	Genetically Modified Organism
Ha	Hectare
ICUN	International Union for Conservation of Nature and Natural Resources
IPM	Integrated Pest management
IRM	Insect Resistance Management
LWRRDC	Land and Water Resource Research and Development Corporation
No.	Number
N/A	Not available
NRA	National Registration Authority
NSW	New South Wales
MRL	Maximum Residue Limit
PAM	Participative Action Management
PROALMAT	Programa de Incentivo ao Algodao do Mato Grosso
Qld	Queensland
R & D	Research and Development
R, D & E	Research, Development and Extension
WAMP	Water Allocation Management Program

CHAPTER 1

INTRODUCTION

1.2 General introduction to the study

This report addresses the objectives, methodologies and the outcomes of a Scoping Study conducted by The University of Queensland on behalf of the Cotton Research and Development Corporation (CRDC). The study was conducted in Australia's cotton production areas from September to November 1999. It identifies socio-economic, environmental and policy issues facing the cotton industry and the need and the opportunities for CRDC to fund further research in these areas. By undertaking these recommended studies, CRDC will assist in building the sustainability and image of the industry as a whole. By including the general community in research and development projects, through participative approaches, more meaningful and effective results could be achieved.

Cotton Research & Development Corporation (CRDC) has been strategically investing heavily in developing new technologies through partnership with various stakeholders in technical agronomic research. However investment in socio-economic and policy research has been limited. The concern about the need to consolidate a transdisciplinary research portfolio for the cotton industry in Australia, including the interrelated social, economical, environmental and institutional issues, is becoming clear in several reviews, according to LWRRDC (1999). Examples of such indications were provided by PMSC (1995), Berkes and Folke (1998), Gumderson *et al.* (1995) and Harris (1998) cited by (LWRRDC 1999).

According to Alexandra (1998), natural resources policies are part of the complex relationships between processes of the physical environment and of human culture and therefore, offers numerous opportunities to improve natural resources management by focusing research on the societal aspects. Including the human dimension in natural resources and business management is a key issue for success in contemporary Australia.

The University of Queensland in the past has been involved in some of the cotton industry's research projects, such as the Integrated Pest Management program. The Rural Extension Centre also has done work in evaluation of some projects, and as this report shows, there are many opportunities for other research projects that can assist the cotton industry towards its goal of making itself more sustainable.

There are several sociological issues that confront the cotton industry within the community. Rural areas facing the migration of youth. Rural women are facing a number of problems. Thew use of chemicals for the control of pests and diseases and weeds has been the issue in some communities. Community groups have a role in helping the rural communities in learn from these experiences and this can lead to the development of learning communities (Chamala 1999e).

The study of the role of various government agencies, agribusiness services and other key stakeholders in developing a sustainable cotton industry can provide ideas for developing a strategy for collaborative action. Understanding these sociological issues and other human factors in the diffusion of new technologies and identifying the factors that contribute to the slow or late adoption and adaptation of these technologies can further enhance the industry's ability to achieve community development. There are no systematic studies in the area using a social science perspective. There are many possibilities for developing inter-disciplinary action research projects.

Since 1980, when the World Conservation Strategy of the International Union for Conservation of Nature and Natural Resources (ICUN) was released, the concept of sustainability has been widely used (Alexandra and Price 1998); (Loucks et al. 1998). Sustainability is a key issue for agriculture, because in the1990's the pressure for misuse of natural resources is being severely criticised by the wider society. Sustainability demands that we pay attention to the entire lifecycles of our products, states a declaration of Business Charter for Sustainable Development in the United States of America (Loucks et al. 1998).

> According to Chamala (1999d, p.1) *"Historically farm management discipline evolve from agriculture economics, which in turn derived from classical and neo-classical economic theory. The content and focus of farm management has progressively moved from single input, productivity improving methods through single product management, to whole farm management and then beyond farm gate to value adding and agribusiness approach. This approach served its function in the evolution of the agricultural/rural development, however the challenges ahead of agriculture are increasingly becoming complex. Sustainable farm and catchment planning is now being linked with the* ***community management of natural resources*** *to solve economic, social and environmental issues of development. Many stakeholders, such as government, business and community influence what happens at the farm level. Cotton industry is experiencing this shift of linking farm management to community management. Similarly many other disciplines such as sociology, psychology, extension education, information technology and communication sciences are contributing to the development of farm and community management education".*

Chamala (1999d) argues for a participatory approach to the evolvement of various stakeholders in the sustainable use of natural resources in an action learning framework, as no one blue print of farm management approach will solve the complex issues of the next millennium.

1.2 Research Objectives

1.2.1 General objective

The objective of this research was to undertake a Scoping Study with the key stakeholders of the cotton industry to define areas of socio-economic and environmental research needs and opportunities within the cotton industry. The project also reviewed the literature including studies conducted previously in order to identify the knowledge gaps in this industry. On the bases of the literature review and stakeholders' views, recommendations will be made for further research. The intention is to give CRDC an opportunity to commission need-based studies over a period of time.

1.2.2 Specific objectives of the study

The main specific objectives of the research were:

- To determine what growers and other stakeholders see as the key issues facing them and their industry.
- To identify what areas of socio-economic and environmental research within the cotton industry have already been identified as key issues and determine knowledge gaps in above areas within the cotton industry;
- To identify suitable methods of conducting research with the involvement of the stakeholders of the cotton industry;
- To produce recommendations for further research projects for CRDC.

These objectives are in accordance with CRDC's mission statement *"To enhance the contribution by research and development to a viable and sustainable cotton industry for the benefit of the Australian community"* (Cotton Research & Development Corporation 1998a). It also complies with CRDC's Community Goal "*Viable regional communities in a healthy environment"* and with objectives number 4 and 5 *"To ensure that cotton production and processing systems deliver identifiable social and environmental benefits to the regional and broader community"* and *"To ensure the cotton industry delivers commercial benefits to the regional and broader community"* (Cotton Research & Development Corporation 1998a) p.5; (Cotton Research & Development Corporation 1998b)

CHAPTER 2

BACKGROUND TO THE AUSTRALIAN COTTON INDUSTRY

2.1 Evolution of the Australian Cotton Industry

The Australian cotton growing industry is located primarily on the riverine flood plains in New South Wales and Queensland (Arthington 1995). A brief look at the historic development of the Australian cotton industry since the first seeds were brought in from England (Cotton Research & Development Corporation 1995) is presented in Box 2 below. The intention is to relate this development to socio-economic and environmental issues related to its development.

Box 2.1 - Chronological outline of cotton industry development in Australia

1788	Cotton introduced to Australia.
1830	First export shipment of three bags sent to England.
1857	Small quantities of raingrown cotton grown in Queensland.
1861-65	American Civil War caused American cotton production to fall with Australia filling the gap.
1871	Cotton production peaked in Australia but fell away as World prices for cotton declined.
1926	Queensland Cotton Marketing Board established and Government subsidy introduced to promote cotton production in Central Qld.
1934	Cotton production reached 17,000 bales.
1954	Cotton industry all but non-existent.
1958	Keepit Dam completed on the Namoi River providing irrigation water to the Namoi Valley.
1960	Limited irrigated cotton production in south-west Queensland
1961	Two Americans, Frank Hadley and Paul Kahl, plant a commercial crop at Wee Waa using water from the Keepit Dam to irrigate the crop.
1963	A bounty on raw cotton was introduced to encourage expansion of the industry. Cotton production starts in the Ord River Irrigation Scheme in NSW Western Australia.
1996	Cotton established in the Macquarie Valley following completion of the Burrendong Dam. Cotton production also begins in Bourke.
1968	Emerald Irrigation Area established and first exportable surplus produced
1971	Raw Cotton Bounty removed. Cotton production at 87,000 bales.
1973	Cotton production in the Ord River Scheme ceases due mainly to insect resistance to pesticides.
1975	Cotton production at 110,000 bales.
1976	Cotton established in the Gwydir Valley at Moree using water from the newly constructed Copeton Dam.
1977	The construction of the Pindari and Glenlyon Dams allows cotton to be grown in the Macintyre Valley.
1980	Approximately 435,000 bales of cotton produced.
1985	Cotton production reaches 1.1 million bales.
1992	World record yields lead to a record harvest of 2.2 million bales.
1995	Crop fell to around 1.4 million bales because of drought.
1999	Production reaches 2.3 million bales.

Source: Adapted from CRDC (1995)

2.2 The importance of cotton in Australia

Cotton in Australia is a fast growing industry. The areas grown in New South Wales and Queensland have increased from 72,000 and 25,000 ha in the 1982-83 season to 382,000 and 170,000 ha in the 1998-99 season respectively (ABARE 1998). In Australia, cotton is produced mostly by farms owned and operated by families. Currently around 1500 Queensland and New South Wales farms and their families are involved in cotton production. These farmers grow other crops and are involved in animal production too, as part of their production systems and management strategies (Cotton Research & Development Corporation 1998b). Table 1 shows the Australian cotton area over the last 17 years.

Table 2.1 Australian cotton area by season for NSW and Qld and total ('000 ha)

Year	NSW	Qld	Australia
1982-83	72	25	97
1983-84	105	33	138
1984-85	131	52	183
1985-86	136	41	177
1986-87	125	31	156
1987-88	164	81	245
1988-89	141	53	194
1989-90	175	65	240
1990-91	202	77	279
1991-92	225	87	312
1992-93	204	82	286
1993-94	210	84	294
1994-95	157	89	246
1995-96	201	120	321
1996-97	277	119	396
1997-98	299	139	438
1998-99	382	170	552

Source: (The Australian Cottongrower 1999) Primary data: ABARE

Total production for the 1998-99 season reached 3.2 million bales,[1] which was a new record for the country. Average lint yield has improved from 1,045 kg per ha in 1982-83 to an estimated 1,519 kg in the 1998-99 season (ABARE 1998). Australia's average yield per ha is more than double the World's average, according to Cotton Yearbook 1999 (The Australian Cottongrower 1999). In the 1997-98 season Australia has had the world's second highest yield amongst those countries with production of more then 200,000 bales per year. Cotton makes a major contribution to Australia's health and export income. Gross value of cotton production reached more than A$ 1,5 billion in the 1998-99 season and the value of cotton exports exceeded A$ 1.7 billion in the same year.

There is no doubt about the importance of cotton production for the Australia's economy, as shown in the figures above. Cotton is the nation's fourth largest rural export earner (behind only wool, meat and wheat) (Cotton Research & Development Corporation 1997). However, for an estimated 25 rural towns in New South Wales and Queensland, cotton has also a vital importance for the local economy (The Australian Cottongrower 1998). Cotton was able to promote growth in these areas or at least maintain it, at a time when in many other "bush" towns the economy was declining.

[1] Bales of 227 kg

From a socio-economic perspective, cotton is responsible for employment and economic turnover in these "cotton towns". Average wages in the cotton industry are higher than in other sectors. It is estimated that for each unit of labour employed directly in cotton production, another two units have a job in directly or indirectly related activities (Cotton Research & Development Corporation 1995).

CHAPTER 3

RESEARCH METHODOLOGY

In this Scoping Study three major methodological approaches were used. They are as following:

(a) Review of literature
(b) Focus group meetings
(c) A telephone survey

A total of 78 people had their say in the survey. Seventeen took part in the focus group meeting discussions, 20 farmers responded to the telephone survey and 41 other stakeholders were listened to in the telephone survey. Among those other stakeholders, environmentalists, local and regional council members, traders, policy makers, research and extension specialists, aerial spray operators, media agents and other consultants were included.

3.1 Review of literature

The review of literature was done by using available hard copies of Australian and international references, as well as by using electronic databases. The literature search aimed to capture the current level of understanding and information available on the socio-economic, environmental and institutional issues facing the cotton industry.

3.2 Focus group meetings

The focus group meetings were held in two areas. The Dalby area in Queensland and the Moree area in New South Wales were chosen, because they are a good representation of cotton production areas. The intention with these focus group meetings was to add qualitative information to elicit stakeholders' ideas and views on issues facing the cotton industry. They also intended to gather information on stakeholders' views of what research methodologies or approaches should be employed by CRDC in research projects for the future.

Focus groups have a strongly proven value in market research and evaluation. Its value relies on the fact that they enable depth qualitative information to be obtained in a relatively short period of time. It also allows the researcher to explore the issues as they are raised by the participants (Cotton Extension Group & Rural Extension Centre 1997).

Chamala (1999b) paraphrasing Morgan, (1988 p.12) states that the Focus Group technique is *"the explicit use of the group interaction to produce data and insight that would be less accessible without interaction found in a group"*. It is therefore a means of collecting data and studying ideas within a group environment about a topic of interest and to generate premises based on informants' insights (Chamala 1999b; Morgan 1988). The use of focus groups is therefore considered complementary to both qualitative and quantitative research.

The focus group meeting with cotton growers from Dalby and Moree regions were held on 26th of October and 3rd of November 1999 respectively. To organise the meetings, the following strategy was used:

(a) CRDC was contacted to assist in defining the communities where the focus group meetings could be run successfully, and where relevant information on cotton industry issues was available. From these contacts, Moree and Dalby regions were chosen.

(b) The branches of Cotton Growers Association in these two communities were contacted. After getting their support an appropriate time for the meetings was organised.
(c) A list of growers from these two communities was obtained and a letter was sent to these growers to seek their collaboration.
(d) A follow-up telephone call was made to each of the invited grower, to encourage their participation.
(e) A few days before the meetings, a reminder fax was sent to each growers who confirmed interest in participating
(f) The structure of the focus meeting was defined by the research team based on the current literature of focus group meeting methodology.
(g) At the focus group meeting the following procedures and processes were used in conducting the qualitative data collecting operation:

Procedures used:

- The facilitator welcomed the growers and provided an outline of the session.
- The objective of the session was explained.
- The growers introduced themselves and provided the information set out in growers profile section.
- The key questions to be answered were explained, viz:
- What are the key issues[2] facing you as a cotton grower - specifically those that you believe are being imposed on you by external forces, including your local community/ town?
- CRDC is seeking to undertake research of the most important issues so that they can be effectively addressed. Which of the issues should receive priority?
- Which would be the most appropriate manner for this research to be undertaken?

The proceedings were recorded on audiotape. Written notes were also taken.

Process used:

Identification of key issues

The information was obtained through a two-phase process. In the first phase, the group split into two groups and developed lists of issues under the respective headings of:

Group 1	Social and Economic Issues
Group 2	Environmental and Policy Issues

The groups self selected.

The groups used brainstorming to identify and list the issues. At the completion of this stage, the groups re-joined. Each group presented its findings and the list was discussed and added to.

In Moree, in the light of the smallness of the group, the session was conducted as a discussion, with the facilitator asking questions and each individual being give an opportunity to respond. Where appropriate, additional probing questions were asked. A member of the group wrote down responses on butcher's paper that was then posted on the wall. Separate lists were recorded for each of the following issues:

[2] Social-economic, environmental and institutional only-not production related

Prioritising of issues to be researched by CRDC

All participants were provided with the opportunity to rank the issues that they believed should receive priority attention by CRDC. Ranking was done by each person allocating a total of $20 across the issues. The allocation per issue could range between $1 per issue (i.e. 20 issues) or as high as $20 for one issue. In fact, the highest allocation to a single issue was $10.

Growers were asked if, in making recommendations to CRDC, the need for a multi-disciplinary approach should be recommended. After discussion, it was agreed that the recommendations would be circulated to participants who would be given the opportunity to consider whether the recommendation conveyed the sense intended.

Recommended Research Methodology from growers point of view

Finally, the growers were asked to consider a range of research strategies, including field research that involved the growers themselves as well laboratory and field research and policy research undertaken independently of the growers without any grower input.

Social, Economic, Environmental and policy

The groups used brainstorming to identify and list the issues.

Finally, the growers were asked to consider a range of research strategies, including field research that involved the growers themselves as well as laboratory and field research.

A total of seventeen cotton growers (13 from Dalby and 4 from Moree) attended the meetings. Refer to Chapter 5 for details on profiles of the respondents. It should be noted that the growers who attended the focus group meetings were mostly the leaders of Cotton Growers' Associations. Therefore, even if the sample is small, a good representation of the growers' views from these two regions was obtained.

3.3 Telephone survey

In addition to the literature search and the focus group meetings, a telephone survey was carried out with key stakeholders from the whole production and marketing chain of the cotton industry. DPI Call Centre did the telephone survey from the 22nd to the 26th of November 1999. The survey included growers, R, D & E[3] professionals, suppliers, policy makers, environmentalists, community leaders, marketing specialists, AAAA members, and the community in general from all areas where cotton plays an important role in the local economy. The interviews were carried out by using two sets of questionnaires designed by the research team (See appendix 5 and Appendix 6). Data gathered from this survey was analysed using standard statistical procedures.

The telephone survey was designed by the research team in consultation with the CRDC and two questionnaires were provided to the Department of Primary Industries, (DPI Call Centre) which was responsible for the telephone survey. The list of interviewees was also defined by the research team, based on information from CRDC, The University of Queensland and other relevant sources of information from the cotton industry. Special attention was given to include all sort of stakeholders. Selection of the interviewees was done based on the following criteria:

[3] Research, Development and Extension.

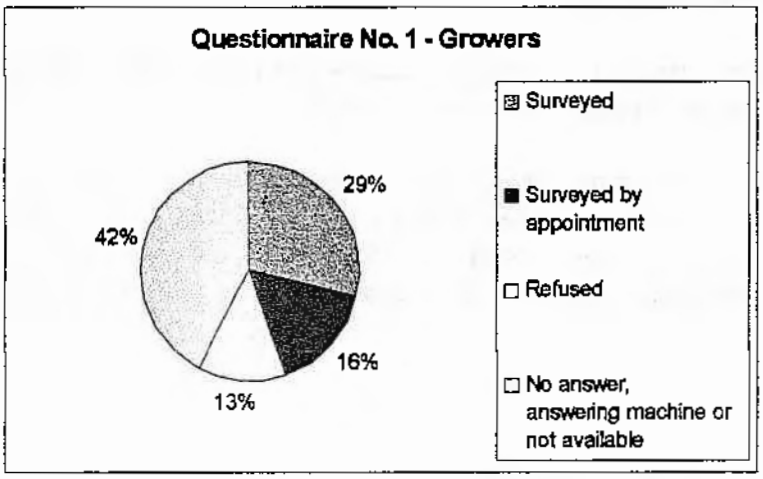
(a) Their involvement in the cotton industry's organisations or other organisations which operate and are somehow interested in cotton industry (e.g. Local and Regional Council members, Environmental Groups, Media, etc)
(b) Their role in these organisations (Committee members were preferred)
(c) If their telephone number were available
(d) Growers from Moree and Dalby were deliberately left out of the list, as the focus group meetings were held in these two communities.

A total of 45 cotton growers were listed to be interviewed using questionnaire No. 1 (see Appendix 5) and 97 other stakeholders were listed to be interviewed using questionnaire No. 2 (see Appendix 6). Complete response to the telephone survey are shown in Figure 3.1 and Figure 3.2 below.

After the completion of the telephone survey, the strike rate was approximately 45%, with each number being tried a least three times. The clients took the survey very seriously and displayed a considerable amount of thought and effort when answering the questions.

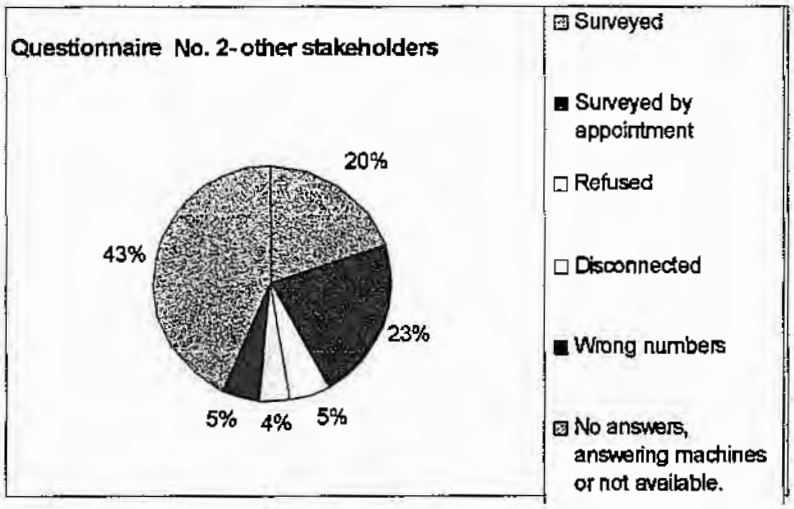
The following graphs show the survey response for both (group 1 – growers and group 2 – other stakeholders)

Figure 3.1 - Graph of survey using questionnaire No. 1 – Cotton Growers



45 people
20 surveyed
6 refused
0 disconnected or fax machines
0 wrong numbers
16 appointments set, resulted in 7 of the surveys.
19 no answers, answering machines or not available.

Figure 3.2 – Graph of survey using questionnaire No. 2 – other stakeholders



97 people
41 surveyed
5 refused
4 disconnected
0 fax machines
5 wrong numbers
39 appointments set, resulted in 22 of the surveys
42 no answers, answering machines or not available

3.3.1 Limitations of the survey

a) Sample size:
A total sample of 38 growers took part in the survey (21 in the telephone survey and 17 in focus group meetings). This sample size is not big enough, considering there are there are approximately 1500 cotton growers in Australia (less then 3%). However, considering the **qualitative approach** and their profile and geographical distribution as well as their leadership role in the cotton industry, the views expressed by these industry leaders could be considered as reflecting the opinions of many people in the industry, beyond their personal views.

Only 41 "other stakeholders" representing all areas of the cotton industry were interviewed. Again the sample size could be considered small, however those interviewed were leaders of their segments of the industry.

b) Method of conducting the survey:
Some respondents felt that the questions were broad and ambiguous. Some of them did not identify themselves with the structured issues outlined in the questionnaire.

Some respondents expressed difficulty in answering on the spot to some questions and some would have preferred a copy of the questions be sent out to read first.

CHAPTER 4

REVIEW OF LITERATURE

4.1 Social studies into Australian cotton industry

4.1.1 – Industry's image and community perceptions

Several studies have been conducted in Australia over the last 10 years, to understand community and consumers' attitudes towards the cotton industry. The Australian Cotton Foundation has funded specific studies in New South Wales and Queensland, such as those done by Stollznow Research Pty Ltd (Stollznow Research Pty Ltd 1995a; Stollznow Research Pty Ltd 1995b; Stollznow Research Pty Ltd 1997; Stollznow Research Pty Ltd 1998). Economic assessment for the industry was also carried out by the Centre for International Economics (Cotton Research & Development Corporation 1995).

In these studies, the socio-economic importance of the industry was emphasized. In March 1998 a group of 22 journalist were interviewed to find out about ways to develop improved communication strategies. It is believed that in the regional areas where cotton is produced, around 100.000 people live and they hold the key to the industry's public image. It was concluded *The industry is still seen as "dirty", corporate and environmentally unfriendly. Fortunately, the industry's ongoing efforts to reduce its environmental impact are also widely recognized* (Payne 1998) p.4.

The Australian cotton industry has long been heavily scrutinised by the community, as a result of the perceptions that it has potential environmental and human health impacts. The industry commissioned an independent study in 1990, with the objective of auditing its operations. The auditors produced 69 recommendations that should be implemented to drive the industry towards long term sustainability. A comprehensive research and development program was undertaken during the following six years, to identify and develop potential solutions and best practices to minimise the impact of cotton production on riverine environment (Cotton Research & Development Corporation 1997).

Stollznow Research Pty Ltd (1997) stated that the same major areas of concern for the cotton industry have existed for a long time and cause considerable anxiety within the community. The effect of cotton production on community health is ranked as the major concern, and this involves chemical drift and residues in water and soil. More specifically Stollznow Research Pty Ltd says *"so strong is the concern that there is often hostility or uneasiness within these communities where individuals are careful whom they speak to and what they say in order to maintain some semblance of harmony"* p.5.

The concern about public image of a particular industry does not apply only to the cotton industry. In Victoria, the Berrybank Farm Piggery has made a 2 million-dollar investment since 1989, to set up a cleaner pig production system. This had both financial and environmental benefits, but the major benefit came from changes to its image in the community. From an environmentally unfriendly operation is has become a welcome industry, that helps the local economy and the community and offers a good working environment for the people employed there (Berry Bank Farm Piggery 1999)

4.1.2 Aboriginal Employment Strategy

Specific strategies involving the cotton industry in the search for solutions to socioeconomic problems in the areas where cotton is grown are a reality in Australia. In Moree, the Gwydir Cotton Growers Association is developing the Aboriginal Employment Strategy (AES) with excellent results, preparing aboriginal people to be "job-ready" and by find job opportunities (Brian J. Mackney & Associates Pty Ltd and Gary Shiels & Associates Pty. Ltd 1999). Up till October 1999, this strategy has already employed over 85 people (Esterns 1999).

4.1.3 Good neighbours program

To implement the Best Management Practice (BMP) by 2001, the cotton industry has set up a plan known as the "Good Neighbours" program. The industry understands that the acceptance and adoption of BMP is paramount to achieve a sustainable cotton industry and this must involve growers, the agri-business chain and the community. Therefore, the industry's commitment to the community is a major component of the Good Neighbours program (Thomson 1999). The main goals of Good Neighbours program are:

- Recruit cotton growers to adopt BMP
- Gain community recognition of environmental action and sustainability
- Challenge the opinion of industry's critics
- Change community perceptions of cotton growing
- Create a more stable political environment for the cotton industry.

4.2 Studies of environmental issues in the cotton industry

The environmental issues have been studied intensively over the last decade. Some of these studies are listed in (Cotton Research & Development Corporation 1997). Stollznow Research Pty Ltd (1995b) identified two distinct groups when studying Sydney urban community perceptions of the cotton industry, relating to environment. The first group are those who have particularly negative attitude towards anything which might affect the environment; and the second group are those who think that the sustainability of the environment is paramount and must be proven before the natural resources are used or modified. Therefore, concluded the study, environment is a dominant issue on the metropolitan socio-political agenda (Stollznow Research Pty Ltd 1995b) p.4

4.2.1 Water use related problems

As water is a scarce resource, in some communities, water usage is also considered a major issue between water users. Land clearing was considered a major issue in St George in 1997 but it was also understood that it relates to grazing, and not to cotton (Stollznow Research Pty Ltd 1997). According to Chamala (1999c) two major types of extension programs were initiated in Australia, aiming to improve water use efficiency. They were the Water Wise Program (mass education approach) and the Waterwatch program and LWRRDC[4] five irrigation projects (participatory action learning approach) for irrigation industry. Technical issues on water use efficiency have been the focus of other reviews by the University of Southern Queensland, The University of Queensland and the National Centre for Engineering in Agriculture (Raine 1999).

Chamala suggests (1999a) a community extension activity approach to improve water use efficiency and the steps that could be used to design specific programs aiming to tackle the problem. These steps are:

[4] LWRRDC – Land and Water Resources Research & Development Corporation

- Develop a logo
- Establish irrigator groups for improving profits through irrigation management and other support groups.
- Develop links between four target groups (Irrigator group, R&D support group, Technical support group and Financial & service industry support group)
- Help the group design communication strategies

Studies in Europe have shown that cotton can tolerate salinity in irrigation water up to 6 dS/m, but increase of soil salinity when excessive irrigation is used is still an environmental concern for cotton production (Hamdy 1992)

4.2.2 Effects of cotton production on the community

Environmental impacts of cotton production have been a key issue for the industry for a long time. In 1999, the cotton industry paid a A$400,000 compensation package for beef cattle producers and beef processors affected by an endosulfan contamination of meat from Queensland and New South Wales sent to and rejected by the South Korean market.

The BMP manual introduced by the cotton industry is a manual that consists of a series of self-assessment worksheets, which assist farmers to assess their operation in relation to a series of benchmarks and guidelines. From these worksheets, cotton growers can develop their own plans of action designed to minimise risks to the community and the neighbouring areas. The importance of BMP in this sense is that it recognises that cotton production is an industry that takes place in a diverse range of social, economic and environmental conditions (Thomson 1999).

4.2.3 Pesticides and related problems

Up to now, the Australian Cotton industry (as well as the cotton industry worldwide) is highly dependent on use of pesticides, particularly those used to control the key pest *Heliothis* (Bowner and Skerritt 1992);(Meadley 1993.); (Qureshi 1994). The link between pesticides and human health problems has been explored intensively. In 1991, according to Film Australia and Channel 4 a television documentary was made focusing on leukemia.

It was described as follows:

> "An *Australian telemovie focusing on a cotton growing area torn between the immediate prosperity of its booming cotton crop and the possible environmental and health problems it represents. The story is told through the eyes of Louise, a young farmer's wife whose eight-year-old daughter has been diagnosed as having leukemia. When she discovers that there have been other similar cases in the area, she is led to believe there may be a connection between chemical sprays and her daughter's illness*" (Film Australia and Channel 4 1991.)

Great efforts have been made in research to develop solutions to environmental problems associated with cotton production in Australia. The industry has funded multi-layered research projects aiming to reduce the amount of pesticides used by growers (Cotton Australia 1999). The Australian Cotton Growers Research Association (ACGRA), Cotton Research and Development Corporation have been working continuously on improving the environmental and economical sustainability of the cotton industry. An Integrated Pest Management (IPM) strategy for reduction of chemical uses in cotton growing operations, by using chemical and non-chemical methods of pest control has been introduced (Cotton Extension Group & Rural Extension Centre 1997); (Cotton Research & Development Corporation 1997). CSIRO Plant Industry has developed a cotton variety with built-in

protection against the *Heliothis* caterpillar and the use of this technology has reduced chemical applications by 52% in cotton growing areas (Cotton Australia 1999).

In 1992 CRDC organised a workshop with key stakeholders to discuss the impact of pesticides on riverine environment. This workshop was preceded by another workshop held in Moree in July 1991 which concentrated on issues related to control of irrigation and stormwater run-off from cotton farms (Cotton Research & Development Corporation et al. 1992). After the first workshop, a report was produced by Barret, Peterson & Batley (1991) *"The impact of pesticides on the riverine environment with specific reference to cotton growing"* which set out the current knowledge on the issue and was the basis for the second workshop. After the second workshop, the major recommendations were (Cotton Research & Development Corporation et al. 1992):

(a) As immediate priority:
- *The preparation of a situation statement summarising current knowledge on riverine ecosystems;*
- *The determination of standard monitoring protocols for chemicals, biological and hydrological studies;*
- *The need for a specialist workshop on toxicity of pesticides to Australian biota.*

(b) As very high priority:
- *A program of monitoring and research on the transport and fate of pesticides in water.*

(c) As high priority:
- *The investigation of methods for decontaminating pesticide-laden waters;*
- *Studies on aquatic and riverine biota.*

(d) Medium priority
- Studies on regional aspects of stormwater drainage from irrigation farms

(e) Lower priority
- Studies on groundwater contamination

Endosulfan is the most commonly used insecticide. This insecticide is ranked as a high risk for the environment because of its high use and high toxicity (Batley and Peterson 1992).

Insect resistance to chemicals in cotton production is a major problem. In 1983 an insect resistance management strategy (IRM) was introduced to reduce the problem. The specification of time "windows" for different pesticides was adopted by almost all growers, even though the strategy relied on voluntary compliance (Cotton Research & Development Corporation 1995). Overspraying is rare nowadays; spray drift can still be a significant source of problems in cotton production, with some drifts reaching water supply systems supplying water to other users (Barret 1992). An analysis of the impact of chemicals used in cotton growing areas on Australian biota can be seen in Arthington (1992) and Cotton Research & Development Corporation (1992)

A complete list of studies into the cotton industry focusing on environmental issues in Australia can be found in Cotton Research & Development Corporation (1997). Studies conducted by Anon (1991), Arthington (1995) and Cotton Research & Development Corporation (1992) are examples of how the environmental issues have been on the top of the agenda for the cotton industry in Australia through out the 1990's.

In Thailand, a comprehensive study of the history of cotton production shows that cost of crop protection problems are regarded as major driving forces behind the recent changes in cotton production systems (Castella et al. 1999). It is understood that the shift from a subsistence production system to a large-scale operation system has increased the reliance on chemical

pesticides. Many obstacles arose to the use of IPM[5] principles among key stakeholders and the industry collapsed, indicating that there is a need for more sustainable IPM practices to be learnt in a collective way in the cotton industry. Cotton and heavy use of pesticides are mentioned in other studies around the world, particularly in Latin America (Murray 1994.).

4.3 Economic issues in the Cotton industry

Social research explores forms of knowledge and bases of understanding and perception of individuals and groups (LWRRDC 1999, p 2). It refers to relations of individuals to others or groups of individuals or tendencies and impulses towards others. In the cotton industry as well as in other intensive production industries such as dairy, pigs and poultry, this is particularly important given the impact it has on the communities in terms of economic turnover, environmental concerns, employment and political power (Spies 1996).

More specific economic research is concerned with the allocation of scarce resources, to get maximum sustainable benefits, and satisfy alternative and often competing human needs and wants (LWRRDC 1999).

Recent studies have shown the need to place greater emphasis on nonmarket economic aspects of the use of natural resources such as land and water if sustainable development is to be achieved (Lockwood 1999). Environmental economic research can make a contribution to achieve sustainable development. It deals with the economic aspects of the use of natural resources, pollution and waste control, optimal levels of utilization of natural resources, compensation for natural disasters. It suggests ways of including environmental cost in Cost-Benefit analysis (Lockwood 1999).

In Mexico, (Chauvet 1999) identified that the attempt to solve agronomic problems of agricultural enterprises was not fully successful because factors beyond the scientific sphere have been ignored. These include socio-economic conditions and suggest that sustainable development should consider issues such as biosafety, when transgenic products like cotton, maize and potatoes are to be grown.

Recent developments in the Brazilian cotton industry have been made in the Central West area of the country. The Mato Grosso State Government created a program named PROALMAT, with intensive research to develop new varieties suitable for the region's climate. Cotton production has increased by 120% over the 1997-98 to the 1998-99 seasons, reaching 557,634 tons. A private Foundation supported by growers is fostering the fast technical development (Estermann and Monteiro 1999).
According to Barnett (1995), economic sustainability relates to technical and managerial efficiency. An indicator of economic sustainability is the long-term net farm income, which can be measured by real net farm income, total factor productivity, farmers' terms of trade, average real net farm income and debt servicing ratio (CSIRO 1998). Attributes of managerial skills are: level of farmer education, extent of participation in training and landcare and implementation of sustainable practices (CSIRO 1998).

4.4 Cotton industry and policy studies

Policy or institutional research, according to LWRRDC (1999 p.2) is "research for analytical and/or prescriptive purposes, examining public policy processes, public administration and program delivery, and the institutions wherein these operate".

[5] IPM – Integrated Pest Management

Hogwood and Gunn, cited by Dovers (1999), identified two broad categories of analysis to understand policies. (a) Policy studies; and (b) Policy analysis. These categories overlap in the area of evaluation.

Table 4.1 – Categories of studies into policies

Policy studies	Policy analysis
• Study of policy contents • Study of policy process • Study of policy outputs • Evaluation	• Evaluation • Information for policy-making • Process advocacy • Policy advocacy, with either the analyst as political author or political actor as analyst

Source: Dovers (1999)

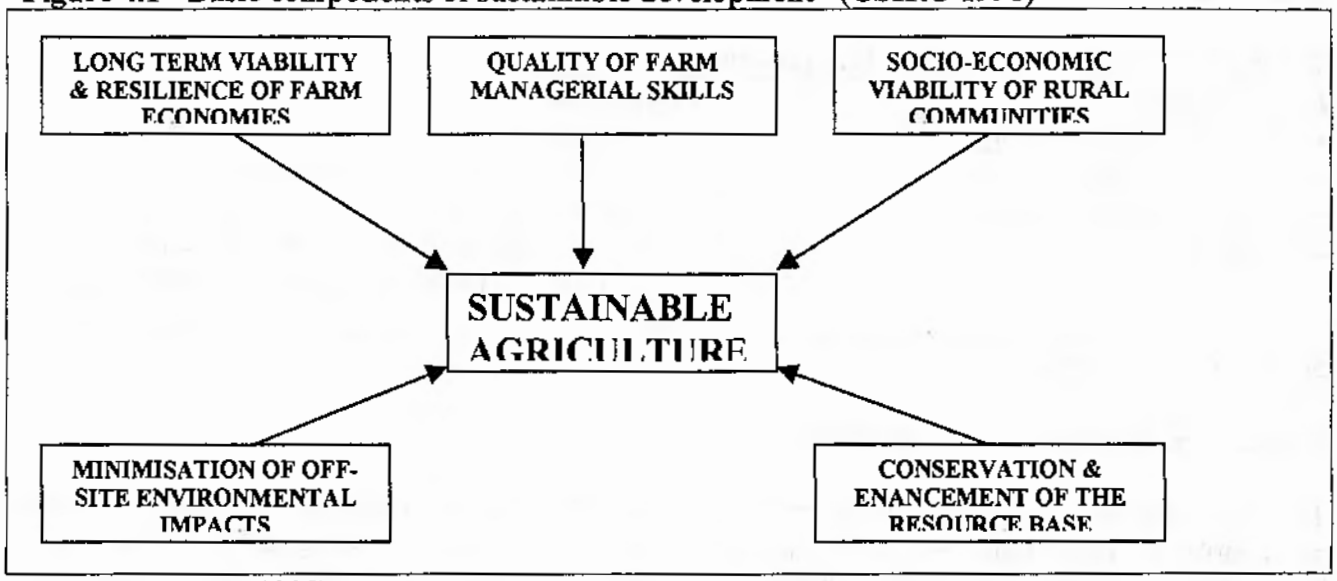
4.4.1 Regulation versus self-regulation

The cotton industry in Australia is aware of strong national and international pressures for a more sustainable and environmentally sound agriculture. There are many motivating factors for adopting best management practices deriving from the threats of an external regulation for the industry. Therefore the industry's perception is if it is unable to demonstrate good environmental management and performance, the industry may loose its autonomy. Losing autonomy means the need to obey strict government regulation, which would be less desirable.

A framework for policy analysis and prescription for ecologically sustainable development and natural resource management was present by Dovers (1999). Dover's perception is that there exists a crucial gap namely, *"the lack of a useable 'language' describing policy processes and institutional arrangements in the context of natural resources management"* p.79. The cotton industry uses natural resources intensively and therefore the same gap can be considered.

The basic components of sustainable agriculture, according to CSIRO are shown in Figure 4.1 below. It is noticeable that cotton is one of the most interesting examples where economic, social and environmental sustainability is discussed intensively.

Figure 4.1 - Basic components of sustainable development (CSIRO 1998)



Source: CSIRO (1998)

The Participative Action Management (PAM) model was suggested by Chamala and Mortis (1990 p.20), described as *"an organizational system by which various interests in the community and other outside agencies are organized in a group which offers true partnership to all stakeholders"*. The PAM model consists of six step planning cycle which are: (a) understanding the situation; (b) identifying problems and opportunities; (c) developing solutions; (d) developing a plan; (e) implementing the plan; and (f) reviewing and reflecting on the program. All steps work in a cycling process. It has some similarities with the traditional strategic planning, involving understanding the situation, identifying problems and opportunities, developing a plan, and implementing the plan. However, in contrast to strategic planing PAM places additional emphasis on the development of solutions and the continuous evaluation of outcomes, with the participation of all stakeholders in all stages of the planing process (Chamala, 1995; Chamala et all, 1999). Therefore, PAM involves "button-up" strategies and aims for the empowerment of all stakeholders and would be a suitable approach for the cotton industry's projects.

CHAPTER 5

RESULTS & DISCUSSION

The results from the review of literature, the focus group meetings with cotton growers and the telephone survey with growers and other stakeholders are presented in three sections.

Section 5.1 – Findings from the literature review;
Section 5.2 – Results from the cotton growers focus group meetings;
Section 5.3 – Results from the telephone survey with cotton growers and other stakeholders.

5.1 – SUMMARY OF THE FINDINGS FROM THE LITERATURE REVIEW

The literature review has indicated previous studies done focusing on the cotton industry in Australia. Four major areas of analysis were identified: (a) social studies; (b) environmental studies; (c) economic studies; and (d) policy studies.

5.1 .1 – Social studies

Some studies conducted mainly by Market research Companies commissioned by Cotton Australia, aimed to understand the urban community and consumers attitude towards the cotton industry.

In these studies, the socio-economic importance of the industry was emphasized. It is believed that in the regional areas where cotton is produced, around 100.000 people live and they hold the key to the industry's public image. In general, it was concluded that the industry is still seen as "dirty", corporate and environmentally unfriendly. *"Fortunately, the industry's ongoing efforts to reduce its environmental impact are also widely recognized"* says (Payne 1998) p.4.

As a result of these studies "Good Neighbours" program was initiated in 1998-99 and the main objectives of the program were:

- Recruit cotton growers to adopt BMP
- Gain community recognition of environmental action and sustainability
- Challenge the opinion of industry's critics
- Change community perceptions of cotton growing
- Create a more stable political environment for the cotton industry.

However, this program impact was not evaluated yet. It was interesting to find that the cotton industry is the major motor of the economy for at least 25 rural towns in Australia. Cotton growers are making major efforts to improve the industry's image in the community through their growers associations. They are undertaking programs such as the Aboriginal Employment Strategy in Moree. The importance of cotton to the Australian economy is vital, with exports earning more than A$ 1.7 billion in the 1998/1999 season. Cotton is a natural fiber with less environmental impact when compared to synthetic fibber, but despite this, it still has an image of a "dirty industry". Why positive contributions to rural communities' development and its other positive initiatives are not viewed by urban community in Australia? This could be an interesting study to undertake in action research. Cotton growers expressed the felling of being affected by the so-called "tall poppy syndrome" and they are feeling uncomfortable about it.

5.1.2 – Environmental studies

Most studies conducted identified the environmental issues such as pesticides use and its impact on the other industries, food chain, community and water use issues as the major problems. As a result of these issues, cotton industry commissioned an independent study in 1990 with a view to audit its operations. The auditors produced 69 recommendations that should be implemented to drive the industry towards long term sustainability. A comprehensive research and development program was undertaken during the following six years, to identify and develop potential solutions and best practices to minimise the impact of cotton production on riverine environment (Cotton Research & Development Corporation 1997).

CRDC, cotton industry, several government agencies have undertaken several new initiatives such as " water use efficiency", " Best Management Practices" and "Good neighbors" and "Integrated Pest Management" in the last few years to address some of the environmental issues. Adoption these environmental technologies don't follow Transfer of Technology (TOT) model as each of these practices need adaptation to suite each farming system. There is need for experimentation and innovation to overcome environmental problems. More over diffusion and adoption/adaptation of environmental have human dimension(socio-economic factors affecting their adoption) to understand. Hence there is a need to undertake socio-economic studies and social scientists and extension specialists need to work closely with technical scientists and industry in a collaborative way.

5.1.3 – Economic studies

Very few specific economic studies related to cotton industry were conducted. Beneficial economic and social impact of cotton industry on 25 rural communities and aboriginal employment and their development through cotton industry need to be undertaken economists and sociologists and extension either separately or in interdisciplinary manner. The results from these studies could be useful in changing the image of cotton industry in the community. Environmental economics can make a positive contribution to understand economic barriers to the adoption of environmental technologies and new policy formulations by the government.

5.1.4 – Policy studies

No specific policy studies focusing on cotton industry were found. There are several federal and state government policy initiatives and legislation. And some may have beneficial impact while others have negative impact. There is a need to understand how these policies promote or retard the cotton industry development in particular and rural communities in general. Under what conditions self regulation by the industry better than government regulation? To what extent involvement of stakeholders in policy formulation helps implementation of these policies. Policy studies and policy analysis as suggested by Mobbs and Dovers (1999) could be used as general guidelines in commissioning the policy studies for the cotton industry..

5.2 RESULTS FROM COTTON GROWERS FOCUS GROUP MEETINGS

Results from Focus Group Meetings: Darling Down Cotton Growers Inc (Dalby - Qld) and Gwydir Valley Cotton Growers' Association (Moree - NSW)

The results of the focus groups meetings are organised into the following sections:

- Profile of farms and growers attending the focus group meetings
- Identifications of the key issues of cotton industry (social, economic, environmental and policy issue)
- Issues that need further research
- Research approach to be used in future research
- Role of growers and other stakeholders in R & D and E.

5.2.1 Profile of farms and growers attending the focus group meetings

In Dalby, thirteen farmers took part in this meeting, representing twelve properties measuring a total of 12 500 hectares, ranging from 2500 ha down to 600 ha and averaging slightly more than 1040 ha. Cotton is cultivated on just over 40% of the farm, ranging from 1400 down to 150 ha. (Average 432.5 ha). Both dryland and irrigated cotton is farmed.

All the growers were the owners /part of the family that owned, their properties. Just under a third were less than 40 years of age, with 8 % over 50, and the balance being between 40 and 50 years of age. On average, the growers had managed their enterprise for just over 14 years. (Range: 35 years to 5 years). All growers present were members of the Management Committee of the Darling Downs Cotton Growers Inc. Four were also committee members of local community organisations.

In Moree, the four farmers who attended the meeting represented seven properties totaling 50050 hectares, ranging from 36 000 ha down to 950 ha. The average of the other five properties is over 2600 ha. On average, cotton is cultivated on just over 44% of the farm, ranging from 12000 down to 300 ha. (Excluding the largest property, the average is 1733 ha).

Three of the growers were the owners their properties. Auscott Limited owns one property, the largest. One person is less than 40 years of age and the other three over 50. On average, the growers had managed their enterprise for 22.75 years. (Range: 35 years to 18 years). All growers present were members of the Gwydir Valley Cotton Growers' Association. They included the president and two vice presidents.

5.2.2 Identification of key issues

Detailed final lists are attached as Appendix 1 and Appendix 3. Other insights provided by the groups during the plenary session's discussions are set out in Appendix 2 and Appendix 4.

In Dalby, a total of 69 issues were identified. The largest groupings were the social (25) and economic (17) issues, followed by environmental (16) and policy issues (11). In Moree, a total of 40 issues were identified. The largest groupings were the social (14) and policy (14) issues, followed by economic (6) and environmental issues (6).

It should be noted that the later emphasis on priorities reversed this. It would suggest that the growers are aware of the large number of socio-economic issues faced by their industry, but believe that the environmental-technical issues remain a priority for further research.

The issues covered:

- Economic impact
- Image of the industry
- Social
- Chemical spray
- Water use
- Natural environment and land use

5.2.3 Key insights from the discussion

Table 5.1 - Economic issues identified in the focus group meetings

Dalby	Moree
▪ "The need to educate the community about the flow on effects of the industry is pretty important" ▪ "The cotton industry is playing a very significant role in minimising or reversing those issues (the issues facing rural Australia) where cotton is produced, e.g. there is stable employment, ... wages in the industry are higher than in general agriculture, health services remained..."	▪ "MRL rules are a game to reduce prices". ▪ "Endo is a trade issue rather than a health issue". ▪ "The regulations are contracting the window of opportunity in cotton growing". ▪ "Good economic practices are best for the environment". ▪ "With this best practice and endosulfan problem, I have a hard time telling (my son) to stay on the farm. I feel like telling him to leave and get a job". ▪ "Community expectations put costs on all businesses, not just cotton. Especially health, safety and environmental management". ▪ "Chemical companies do nothing - it's the growers who jump through the hoops". ▪ "Most chemical companies would be happy to see endosulfan go so that they can sell us something more expensive".

Table 5.2 Cotton industry's public image issues identified in the focus group meetings

Dalby	Moree
▪ "We need to see the environment as the community sees it" ▪ "Perceptions haven't changed, the issues have become more intense as the industry has grown" ▪ "Many in the services industries know how much they have benefited from cotton, but are not prepared to support the industry because of the poor image throughout the community" ▪ "The industry is its own worst enemy. We continue to make stuff-ups and this makes it extremely difficult to address these other issues" ▪ "I don't see BMP as a problem, but the promotional campaign of "Good Neighbours" was a stuff up" ▪ There is far greater environmental awareness in the community which is well intentioned, but ill informed and that is what is crucifying us" ▪ "We need to get back to a middle ground that its OK not to hate the cotton growers, then we could get support from service industry providers" ▪ "We...are seen as an environmental disaster" ▪ "Lack of understanding...affects the social side" ▪ "Future research is required to identify the causes of negative attitudes" ▪ "There are positive images like the support of local football teams" ▪ "The Good Neighbours program was too soon" (to be effective) because "we had to prove that we were good neighbours before we could boast about it" ▪ "Cotton Week creates cohesiveness in the community" ▪ (Cotton) is "keeping the young people in the country (areas)" ▪ "The cotton industry has attracted more progressive farmers because it is seen as an exciting industry and the industry is benefiting because it is attracting a better calibre of farmer, perhaps more professional operators" ▪ "The sons are staying on the farm" ▪ "People are staying on the farm because there is a future" ▪ "A lot of people are jealous of the success in the cotton industry"	▪ "The public aren't stupid; if you give them (the correct information), they will understand". ▪ "The problem for the industry is that one farmer gets it wrong and the whole industry gets the blame." ▪ "Locally, endosulfan is perceived as a cotton chemical by the beef producers". ▪ "The Aboriginal Employment Strategy (AES) has been a powerful success for Moree. We didn't deliberately set it up as a cotton project, but it evolved that way (and it is now) a well recognised program that the cotton industry runs". ▪ "The plight of rural and country towns is of no interest to city people". ▪ "People have a poor image of chemical spraying from the Vietnam War and cotton is still copping it". ▪ "With public perceptions-you need to spoon feed it 150 times before it sinks in". ▪ The Good Neighbours Program. "It was not successful; it came at the wrong time. It should have come a year later when BMP had been working properly". ▪ "You can't say that what the consumer says should be done –it's plain stupid because they don't know (how all their requirements can be met *e.g. labeling of GMO products)".*

Table 5.3 Environment issues identified in the focus group meetings

Dalby	Moree
▪ "Cotton can be environmentally responsible because it has the profits to implement good practice" ▪ "Environmental problems cause social problems" ▪ "Policy and environmental issue are interrelated"	▪ "The problems are man made. These new rules have no foundation" "They are political" ▪ "We have very good country along the river which is going to be stuffed up because we can't grow cotton the way we are supposed to, now". ▪ "We need to find the way so that the good soils along the river can stay productive". ▪ "If you have the flu in the city.... You have a greater chance of killing an old person than any cotton grower will have from a drift on a stock route". ▪ "The bureaucracy that manages water is a bit hopeless". ▪ "There is an expectation that we will use water more efficiently and produce a higher value from it but they won't give us any rights (of long term supply) as a trade off. We are expected to do more with less without security of supply". ▪ "The environment is more important than the rural economy".

Table 5.4 Social and general impact issues identified in the focus group meetings

Dalby	Moree
▪ "In order to survive in the future, we need community support and need to understand how to change their attitudes" ▪ (In selecting areas for research).... "We have tended to focus on technical issues because that is where people are attacking us e.g. spray drift and water issues"... ▪ "Governments at all levels make decisions without consulting with growers. e.g. recent irrigation developments"	▪ "Young people leave the town and it is difficult to get them back. It would be good if we can show them that there are opportunities in cotton". "Doesn't matter what level you are at there are good opportunities there". ▪ "There are no meetings in town against the cotton industry. The town needs the cotton industry. You don't get many letters in the paper...." ▪ "It's more of a "have not" issue than an environmental issue". ▪ "There are poor communications between the various farm organisations". ▪ "We are all pretty sick of the issues". ▪ "We don't understand how the city is thinking". "What we don't do well is try and understand how the people who are making the decisions think and try and understand voters and the community". ▪ "CRDC should assess the impact of this type of activity (AES) in improving the image of the industry". ▪ "The key issue in getting trained people is the unions in the various (government) departments working together". ▪ "CRDC is making decisions about research without consulting enough at grass roots".

5.2.4 Issues that need further research and priorities established at Focus Group Meetings

The issues receiving priority –and the frequency of allocation is as follows:
(Technical issues identified were those that have social and or economic flow-on effects)

Table 5.5 – Issues identified as needing further research and priorities established, according to the focus group meetings discussions

Issue	Dalby		Moree	
	Priority	Frequency	Priority	Frequency
Environmental Issues				
▪ Spray application technology (to prevent off farm spray drift)	48	10		
▪ Area-wide management	35	8		
▪ Integrated Pest Management	32	8		
▪ Natural viruses	19	6		
▪ Public Health issues (Odour v drift)	10	2		
▪ GMO's	4	2		
Socio-Economic Issues				
▪ Community benefit from a viable industry	40	10		
▪ Lack of information and understanding about the impact of chemical use	8	3		
▪ Viability implications of water restrictions	7	2		
▪ Competition from synthetics			1.5	1
▪ Education of the public; Research into how to educate city people			20	2
▪ How to get more information to the media			20	1
▪ Chemical companies are increasing price substantially			0.5	1
Policy Issues				
▪ BMP	36	8		
▪ WAMP	12	4		
▪ Water storage efficiency	10	4		
▪ Water use efficiency	8	3		
▪ CRDC should concentrate on agronomic research			35	2
▪ MRL's – how can trade/political rules be modified			1	1
▪ How to promote the industry and make research findings understood			1	1

Note: Each participant spent a total of $20.00 on the issues considered a priority from his or her point of view. Technology to prevent spray drift received a total of $ 48.00 and was pointed as a priority 10 times, which represents approximately 60% of the participants.

5.2.5 The top five issues identified for research were:

1. Spray application technology (to prevent off farm spray drift)
2. BMP
3. The local community benefit that is gained from a viable industry
4. Area-wide management
5. Integrated Pest Management

In Moree, the issue receiving the highest rating was agronomic research; in fact, growers questioned the role of CRDC in research other than agronomic research. Growers did agree that it would be appropriate for this research to be broadened into a multidisciplinary approach. The other top issues identified for research are all concerned with the need to improve the wider community's understanding of the cotton industry so that it can gain a more positive image.

In general it was agreed that the research methodology to be used for the policy issue subject (BMP) as well as for the three environmental/technical issues should incorporate a multi disciplinary approach because solutions will not be one dimensional in character. Indeed, many of the issues raised by the group often overlap a number of the issue categories provided (to facilitate discussion). This could help identify why the resolution of some issues triggers new issues – particularly of an socio-economic or environmental nature.

5.2.6 Research approach to be used in further research

- "The use of telephone research methods is common in rural areas but it only provides a rough picture "
- " Focus groups provide better information"
- "The more grower involvement, the greater the benefit of the research'. The researchers get information from the growers and the growers get information about the research"
- "Future research (including technical research) should use a multi disciplinary approach so that the underlying causes and hence their social, economic, environmental and policy impact or potential impact can be measured or predicted"
- "In some areas, such as off farm spray research all that is needed (***to cover non technical aspects***) is a literature research of extension methods"
- "We are happy to have them (researchers) on the farm as soon as they are ready to put it out to trial.... For two reasons. It gives you an idea if the new variety will suit your farm and it really keeps you up to what they are doing".
- "Farmers and end users need to drive the research right from the start. Set the direction and then use the talents of the researchers, rather than the other way round."
- "Cooperation and collaboration between researchers is important".

Growers suggested that the research methodology to be used should be appropriate to the nature of the research, but emphasised the need to involve growers at all stages - in both formulation and implementation of projects.

5.2.7 Summary and discussion and of focus group meetings findings

Five key areas for research were identified. They are:

a) Spray application technology (to prevent off farm spray drift)
b) BMP
c) The local community benefit that is gained from a viable industry (so as to change attitudes about the industry and improve the image)
d) Area-wide management
e) Integrated Pest Management

The research, whether applied or pure should:

a) Involve growers to the maximum extent
b) Look at the underlying causes not only of technical problems but also of the current image of the industry
c) Use a multi disciplinary approach to ensure that the underlying causes and hence their social, economic, environmental and policy impact or potential impact can be measured or predicted.

- While the highest rating questioned the role of CRDC in research other than agronomic research, the need for research that would help improve the wider community's understanding of the cotton industry so that it can gain a more positive image, was strongly supported.

- The growers agreed that it would be appropriate for agronomic research to be broadened into a multi-disciplinary approach.

- In Moree, there was little disagreement about the nature of the issues, but significant variance in their prioritisation for research purposes and indeed, the question of CRDC' s role in non-agronomic research.

- The perceived failure of some CRDC initiatives outside their traditional domain of agronomic research has left a legacy of mistrust in the Gwydir Valley.

- A key distinguishing feature of Gwydir Valley Cotton Growers' Association's (Moree) image in the local community is the very high profile it has developed because of its lead role with the successful Aboriginal Employment Strategy and other socially relevant initiatives. Details about the Strategy are attached.

- The rating used by the growers indicated very strongly held views.

5.3 RESULTS FROM THE TELEPHONE SURVEY OF COTTON GROWERS AND OTHER STAKEHOLDERS

The telephone survey was conducted with the objective of getting quantitative and additional qualitative data from cotton growers and other stakeholders. The selected interviewees were a strong representation from the industry's organisations as shown below:

- *32 out of 41 "other stakeholders" were committee members.*
- *15 out of 20 cotton growers were committee members.*

The results of the telephone survey are organised in the following sections:

- ♦ Profile of farms, cotton growers and other stakeholders
- ♦ Identifications of the key issues of cotton industry (social, economic, environmental and policy issue)
- ♦ Issues that need further research
- ♦ Present attempts to solve the issues facing the cotton industry
- ♦ Research approach to be used in future research
- ♦ Roles of cotton growers and other stakeholders in future R & D and E.

5.3.1 Profile of the telephone survey respondents

The profile of the growers and other stakeholders involved in the telephone survey are presented in Tables 5.6 to 5.11.

Table 5.6 – Respondents by Gender and Age Groups

Gender and age groups	Growers		Other Stakeholders		Total	
	N.	%	N.	%	N.	%
Gender						
Female	3	15	6	15	9	15
Male	17	85	35	85	52	85
Age groups (years)						
< 25	0	0	1	2	1	1.7
25 – 34	3	15	9	22	12	19.6
35 – 44	14	70	15	37	29	47.5
45 – 55	2	10	14	34	16	26.2
> 55	-	0	2	5	2	3.3
N/A	1	5	-	-	1	1.7
Total	20	100	41	100	61	100

N/A – Not available

From a gender perspective, females were not well represented; the majority (85%) was males. From an age group perspective, 65% of the respondents were less than 45 years old, which is a characteristic of the cotton industry – younger farmers compared to other primary industries run it.

Table 5.7 – Respondents by farm ownership and participation of cotton in total farm income

Issue	Number of interviewees	%

Farm ownership		
• Family farm	15	75
• Tenant	1	5
• Other (company, trust)	4	20
Cotton as major enterprise		
• Yes	18	90
• No	2	10
% of total income from cotton		
• Less than 50%		
• From 50 to 75%	2	10
• More than 75%	4	20
	14	70

From Table 5.7 it is noted that the majority of cotton is grown on family owned and operated farms (75%). However, cotton growers contract a significant part of the required labour as can be noted from Table 5.11. Cotton is the major enterprise for 90% of the growers who responded the survey. The majority of growers responding to the telephone survey have their main income from cotton. Less than 10% of the respondents have cotton representing less than 50% of their overall farm income.

Table 5.8 – Size of the property and area under cotton in 1998-1999 season

Characteristic	Number of respondents	%
Property size in ha		
< 500	4	20
500 – 999	4	20
1,000 – 4,999	4	20
5,000 – 10,000	3	15
> 10,000	4	20
N/A	1	5
Area under cotton (ha)		
< 100	2	10
100 – 499	9	45
500 – 1,000	5	25
1,000 – 2,000	1	5
> 2000	2	10
N/A	1	1

More than half of the respondents own farms with more than 1000 ha. The most common area under cotton over the 1998/1999 season was between 100 and 500 ha (45% of the respondents).

Table 5.9 – Respondents by membership in cotton industry's associations (in %)

	Growers		Other Stakeholders		Total	
	N.	%	N.	%	N.	%
Members	15	75	32	78	47	77
Non-members	5	25	9	22	14	23

National level	3	15	9	22	12	20
State level	5	25	4	10	9	15
Local level	6	30	10	24	16	26
Other association	1	5	9	22	10	16

As can be seen from Table 5.9, most of the growers at the meetings and other stakeholders interviewed are industry leaders.

Table 5.10 - Respondents by highest level of education (in %)

Highest level of education	Growers (%)	Other stakeholders (%)
Primary school	0	0
Secondary High School	30	10
Agriculture College	20	20
University degree	40	65
Other	5	2
N/A (Not available)	5	2

It is interesting to note from Table 5.10 above, that the majority of the growers (60%) and 85% of the other stakeholders have an agriculture college or a university degree. This is another unique characteristic of the cotton industry, and has implications in their involvement in future R &D and E projects.

Table 5.11 – Average contracted labour employed (number of people)

Type of employment	Growers		Other Stakeholders	
	Peak time	Off peak time	Peak time	Off peak time
Permanent	6.7	6.7	16	16
Part time	5.5	-	1.5	1.5
Casual labour	15.3	6.2	6.3	2.7

Note: All respondents were considered for calculating the average, regardless of whether they employ contracted labour or not.

5.3.2 Identification of socio-economic, policy and environmental issues faced by the cotton industry and the community over the last 5 years

From the literature review and the current status of knowledge, a list of possible issues that are commonly discussed among cotton the industry's stakeholders was prepared in a form of a questionnaire for a telephone interview. The results for these pre-prepared lists of issues are shown in Table 5.12 below.

Several open-ended questions were also included and this provided an opportunity for the respondents to add new issues and comments to the questionnaire. Results of these answers are also listed later in this report.

Table 5.12 – Most important socio-economic, environmental and policy **issues discussed** in the cotton industry over the last five years – growers and other stakeholders (Number of times the issue was mentioned and percentage of interviewees that mentioned the issue)

Issues	Growers		Other stakeholders	
	Number	%	Number	%
1 – Social issues				
1.1 Number of jobs created by the cotton industry	3	15	5	12
1.2 Unemployment in rural areas	2	10	5	12
1.3 Rural exodus	0	0	14	34
1.4 Relationship with neighbors	1	5	2	5
1.5 Community development	2	10	11	27
1.6 Stress and health problems	0	0	3	7.5
1.7 Roles of women and youth	1	5	1	2.5
1.8 Availability of skilled staff	6	30	4	10
1.9 Career opportunities in the industry for young people?	3	15	3	7.5
1.10 Social conflicts	2	10	15	36
1.11 Other	3	15	4	10
2 – Environmental issues				
2.1 Pollution with agrochemical	8	40	22	54
2.1 Soil and water contamination	7	35	18	44
2.3 Wild life depredation	2	10	1	2.5
2.4 Water availability and use	2	10	27	66
2.5 Off farm impacts of cotton	2	10	2	5
2.6 Soil fertility	0	0	5	12
2.7 Other	12	60	-	-
3 – Economic issues				
3.1 Negotiation and marketing	0	0	6	15
3.2 Financial management	2	10	4	10
3.3 Financial and personal stress	1	5	2	5
3.4 Employer/employee relationship	2	10	2	5
3.5 Migration of casual labour	2	10	1	2.5
3.6 Inputs supply and costs	2	10	7	17
3.7 Training for staff and farmers	2	10	3	7.5
3.8 The use of the Internet, computers, etc.	0	0	2	5
3.9 Impacts of new technologies	1	5	5	12.5
3.10 Multiplier or ripple effect of cotton on the rural community	2	10	3	7.5
3.11 Value adding, processing industries	0	0	7	17
3.12 Cotton price, costs and profits	3	15	12	30
3.13 Other	2	10	-	-
4 - Policy and institutional issues				
4.1 Government policies	9	45	7	17
4.2 Cotton industry's rules and policies	3	15	6	15
4.3 General infrastructure (phone, roads, other facilities)	1	5	5	12.5
4.4 Banking	1	5	1	2.5
4.5 Other	6	30	-	-

When asked about what the interviewees and his or her group (association) are doing to solve specific problems related to the issues mentioned in Table 5.9, the following statements were obtained:

Growers opinions:

1. We have a whole lot of strategies in place, e.g.. Best Practice Management, pest management (encouraging others to take up), drift management. How we deal with water management issues and deal with the government with redistribution of water. Also other groups telling us how to use our water try to get strategies on how to overcome.
2. Identify the issues, focused on one issue to solve it, good information stream. We are well educated
3. Relationship between cotton and cattle, we have set up strategies to keep the livestock away from cotton fields, using Ingard cotton in the sensitive areas. We use helicopters in sensitive areas for spraying as they have a much small turning circle and do not spray excess chemicals
4. We try to educate the public on the way we feel.
5. Meetings, surveys.
6. Undergoing audit meetings put our views forward.
7. Tackling government on water issues, producing scientific evidence proving the Government is wrong about pollution. Educating the community to cotton - employment revenue.
8. Band together, communication and public image
9. Water - harassing the government in regards to legislation, keeping an eye on what legislation is going through in relation to water
10. Spray drift management plan.
11. Raise the level of acceptance of the industry, minimise our impact
12. Regular meetings attend forums and bring those issues back to the local growers, policies and setting up chemical safety on the farm as well as spray drift management.
13. Voluntary auditing of management practices
14. Building ring tanks
15. Kindly involved with the whole thing - speak to politicians
16. Raise the industry's profile together

Other stakeholders' opinions (What are they doing to tackle the cotton industry issues)

1. Ensuring we comply with the spray drift management plans and NRA sulfa compliance program
2. We put a lot of time into putting information into the community, educating them on the whole. We are trying to implement all the best management practices that the researchers have developed for our progress
3. We try to inform people and market ideas to help with research
4. Develop and adopt a IPM based industry helps lower pesticide problems
5. We try and address issues to people who grow it or want to know about it
6. Assist in how to sell better variety

7. We meet on a regular basis and discuss the issues faced by the industry
8. Just focusing on process and channel as much information as we can and sharing it
9. Correct corporate figures, make sure products we sell are used correctly
10. Undertaking research; probably about 20 extension research projects
11. Running education, visit schools and educate them on the whole process
12. Demonstrating the work of extension and research
13. Delivering messages of research and knowledge to other people, mailouts, websites etc
14. Being in the committee, being involved
15. Advising on management practices, collecting information and informing others on it
16. Promoting the cotton industry to the public
17. Work hard at following cotton rules and regulation
18. Accreditation membership cert. National requirement that our members need a chemical safe accreditation. Standards set for professional consultants. IPM program development
19. Actively promoting IPM (integrated pest management), trying to find other ways of controlling pests other then spraying
20. We aim to further the professional development of consultants to help their clients to produce cotton economically using sound practices
21. We are in the scientific or extension side of things; we sit on the agriculture council, we consult to growers and get our message across to the growers via the growers groups.
22. Active role in best management practice, spray management plans, pest management, crop and farming development
23. We research into water management
24. Holding meetings, talking to farmers and encouraging them to do it right, take further training.
25. We promote information on the use of chemicals, promote profession
26. Trying to use a soft approach to insecticide use, scheduling of irrigation to be more water efficient, helping in re-circulating irrigation waters to minimise runoff into streams.
27. Alternatives to pesticides include Ingard, wheat stubble and IPM.
28. We are not directly but we are indirectly helping by being on a lot of committees with Cotton Australia, CCA, we have an involvement in growers associations as well
29. All the projects we have for the next year are based on community benefit. Encourage kids to look at cotton industry as a future
30. Approach minister of primary industries to discuss issues relating to cotton growing. Media publicity. Try and raise issues with cotton growers

Table 5.13 – Issues mentioned in Table 5.12 that **need further research**, according to cotton growers and other stakeholders (in numbers and percentage of interviewees)

Issues	Growers		Other stakeholders	
	Number	%	Number	%
1 – Social issues				

1.1 Number of jobs created by the cotton industry	3	15	1	2.5
1.2 Unemployment in rural areas	3	15	2	5.0
1.3 Rural exodus	0	0	4	10.0
1.4 Relationship with neighbors	0	0	0	0
1.5 Community development	3	15	4	20.0
1.6 Stress and health problems	2	10	2	5.0
1.7 Roles of women and youth	1	5	1	2.5
1.8 Availability of skilled staff	5	25	2	5.0
1.9 Career opportunities in the industry for young people?	3	15	1	2.5
1.10 Social conflicts	1	5	6	15.0
1.11 Other	3	15	5	12.5
2 – Environmental issues				
2.1 Pollution with agrochemical	9	45	10	25.0
2.1 Soil and water contamination	7	35	7	17.5
2.3 Wild life depredation	0	0	2	5.0
2.4 Water availability and use	7	35	13	32.5
2.5 Off farm impacts of cotton	4	20	2	5.0
2.6 Other	13	65	25	62.5
3 – Economic issues				
3.1 Negotiation and marketing	1	5	1	2.5
3.2 Financial management	1	5	1	2.5
3.3 Financial and personal stress	0	0	0	0.0
3.4 Employer/employee relationship	2	10	1	2.5
3.5 Migration of casual labour	0	0	1	2.5
3.6 Inputs supply and costs	2	10	0	0.0
3.7 Training for staff and farmers	2	10	0	0.0
3.8 The use of the Internet, computers, etc.	0	0	0	0.0
3.9 Impacts of new technologies	2	10	2	5.0
3.10 Multiplier or ripple effect of cotton on the rural community	2	10	0	0.0
3.11 Value adding, processing industries	1	5	3	7.5
3.12 Cotton price, costs and profits	2	10	8	20.0
3.13 Other	2	10	3	7.5
4 - Policy and institutional issues				
4.1 Government policies	7	35	1	2.5
4.2 Cotton industry's rules and policies	4	20	1	2.5
4.3 General infrastructure (phone, roads, other facilities)	1	5	2	5.0
4.4 Banking	0	0	1	2.5
4.5 Other	7	35	7	17.5

When the interviewees were asked the open ended question about which of the issues concerning the cotton industry should be further analysed by CRDC to provide answers and solutions for these problems, the following response was achieved: (See Box 5.1)

Box 5.1 – Additional issues that need further research indicated by the telephone survey

- More publicity
- Environment especially with pesticides spray drifts. New products need new spray technology and the community is encouraging us to follow those lines
- More work on what causes pesticides use problems, how growers access can information on re-entering cotton fields to get accurate periods for spraying.
- Education and social issues
- Need an extension department
- More information of the government policies
- Monitoring the environment is what the cotton industry counts on the most
- The sustainability of the industry
- We have all got to work together
- Economic issues of cotton industry
- IPM is the key thing they should be concentrating on
- CRDC should stay out of the political arena
- Chemical development, alternative crops to cotton
- The impact of air assist spraying technology to reduce drift
- Consult environmental groups a bit more than they do
- Community perception
- Providing research on water use and management
- What will happen with chemicals, insecticides? Our other concern is price and water

Ninety five percent of the cotton growers said that other stakeholders should be involved in research too while 83% of other stakeholders think they should be involved in cotton research projects too. Table 5.14 below shows the ways in which growers think they could be involved in research projects

Interviewees were asked how further research should be undertaken, in terms of approach. Table 5.14 below shows the results for this question, for both growers and other stakeholders.

Table 5.14. Research approach to be used in further research, according to cotton growers and other stakeholders (in absolute numbers and %).

Research method (approach)	Growers		Other stakeholders		Total	
	Number	%	Number	%	Number	%
Literature research	12	60	21	51	33	54
Field tests	11	55	12	29	23	38
Laboratory research	10	50	30	73	40	65
On farm field tests	17	85	21	51	38	62

Table 5.15 what should be the growers' role in research, according to growers' and other stakeholders' opinion

Growers' opinions	Other stakeholders opinions
• The role of consultant and advisory, growers should give some direction in terms of what should be researched, where the research should be directed. They are also the ones being impacted with the lack of information • Active role or trial field days • Plenty of examples where growers make part of their farm available for researchers to come on and do their work • Growers should have access to all research results; they should be an extension arm of the chemical firms and trial chemicals through us. The problem is they charge full price for the genetic engineering and it has not been tested, when really we are researching it for them and ironing out the bugs for them, we deal with the public image, publicity and the final result • What research needs to be done • Collaborator, consultation • As much as practical. • Part of a survey, cross section. • They are the ones doing the growing and they could be the ones doing a study on the individual farms • Involve their property to do the tests. They need to do a fair bit. You need to get quite a few farmers to participate • Facilitate experiments. • Provide info and land • Very large one, they should have a lot of input. • Made aware and participate in research • Co operation, direction, indication of what needs to be researched • Field tests at farm plots, need real conditions that the substance is grown under, not just controlled laboratory conditions • Provide their farms to researchers • Input into how it should be done	• Present topics • More just open ended communication between growers. • In supplying data, show how much they spend in the local industry and what income they bring in themselves • Supply the means to get the research done, such as capital, farm and resources • On farm irrigation efficiency data • Representation on boards and committees, at the moment it is very workable • Directing and informing • Fund it, provide facilities to undertake testing, helping to gather data • Tell the researchers what they want, be guiding what is happening out in the field • What is needed to be done and to direct • Consultation, growers have to make sure the research is practical to the growers. • Providing suitable sites, providing infrastructure for those on farm experiments. • Involved in the on-farm research • I think very little, they could use the farms as test cases, but leave the growers out of it because I don't think it would get done if it was left to farmers themselves • They should be involved so that the results are credible • Able to input ideas into project • Growers should direct CRDC, they are the one on the ground so they should be driving research, also make themselves and their properties available for trials • Just keep informing • What they can do to be a party to development • Which direction to point at, more say in what area should be researched • Be exposed to research on any angle on whatever they could do • Make access available to the researchers • Pay for part of it, they need to have representatives to do decision making • Just to work hard, and attend conferences • Address the researchers well along with the whole process • Educators and tools for the researchers to work with • Promoting • Consulted, involved in field work, receive results, in everything

The survey also asked the interviewees which problems are growers', governments and the community's responsibility to solve the problems faced by the cotton industry. The answers obtained were as followed:

Table 5.16 Issues that are GROWERS' responsibility, according to Growers themselves and other stakeholders

Growers' opinions	Other stakeholders' opinions
☛ The growers and the Government should work together, in a joint effort, rather then have it given as one or the other. They should go into consultation and work together. Half of the trouble is the Government going off and trying to fix the problem without consultation with growers and other industry groups ☛ Chemical usage ☛ Variety issues ☛ For irrigation and water management, make sure he's containing his water, make sure he is spraying correctly etc ☛ Chemical issues ☛ All hand in hand, everyone's responsibility ☛ Insecticide, the industry should be able to sort that out. We don't need the Government telling us what to do. ☛ Responsible for what we do ourselves (mainly on our properties) ☛ All of the problems, and employ the right people to solve them if necessary e.g.. Consultants. You can't solve problem on your own ☛ All should be shared between growers and the Government. ☛ Take care of own impact on e.g. neighbours ☛ On farm chemical use, each individual needs to make sure they are doing the right thing on their farm	☺ Ensuring that the inputs we use, stay on our farm ☺ The industry should be self-regulating. That is the path to follow ☺ Try different spraying techniques and just doing things probably ☺ Extend information ☺ Fund the appropriate body ☺ Engage in the use of consulting and ask for help ☺ Get information and access it and pass onto other growers ☺ Insure better education ☺ Issue is only going to be involved by working in collaboration ☺ Push for self regulation ☺ Look at research trials ☺ Look at the problem, get information and educate themselves on it to solve the problem ☺ Don't be so greedy ☺ Try different ways to find whatever works to solve problems ☺ Keep promoting and get people here to see the whole process of cotton ☺ Follow regulations ☺ The reduction of spraying and the implementation of IPM, also the industry should promote the work they do in IPM ☺ Get involved in best practice management ☺ Target influential growers; that are the best way to get the message across. We are also proactive in using IPM ☺ Do trials into different avenues on how to prevent such problems ☺ Being informative, consulting issues ☺ Spray drift and pesticide ☺ Inputs into research, adapting research findings to practical applications ☺ Combine experience Through involvement with CRDC and Cotton Australia, to recognise the key issues and make sure they are addressed

Table 5.17 Issues that are GOVERNMENT'S responsibility, according to Growers themselves and other stakeholders

Growers' opinions	Other stakeholders' opinions
☛ The issue of residue in meat, the Government hasn't really addressed the issue in as far as helping cotton growers stop that problem, they should invest in research ☛ Salinity ☛ Money ☛ Make sure the chemicals we use are as safe as possible to the environment and don't do too much harm to others, and give us the info so that we don't do damage to our employees and that there is not a risk with OCC health and safety. Make sure they get all this information from chemical companies before the chemical is released. ☛ Water use issues ☛ The right to farm, water allocation, access to resources ☛ Overseeing, like they are doing with audits with endosulfan, they need to make sure they don't go overboard and get carried away with it though. ☛ Very few, as they don't have a grass roots hand on the situation. ☛ All should be shared between growers and the Government. ☛ Stay out of it as much as they can ☛ The actual labeling of the correct methods of using certain products. What you can spray when and how you can spray it. ☛ Duty of care to ensure that chemicals used are safe	☺ They do not give us access to technology, the United States are our competitors and they have subsidies and access to bio technology, we are meant to be competitive with one arm tied behind our back ☺ All aspects of primary production ☺ Don't want the government involved ☺ The only involvement we want is in more research ☺ Just carry on with the research ☺ By listening a little more and knowing more of the problem ☺ Provide environment where the industry finds profitable use and marketing ☺ Listen to all parties and provide funding ☺ Support CRDC, cotton quality ☺ Never have been in a situation where we have to see the government ☺ Have to comply with their regulations first and to be sure that they answer ☺ Educate consumers ☺ Funding ☺ Support the industry ☺ Set regulations after consultation with farmers ☺ Consistency for rules and more communication worldwide ☺ Government reviewing registration of different products, they should keep in mind the practicalities of the changes to different labels ☺ Maintain the funding in R and D and with the industry ☺ Government should not be involved in any of it. The Government always balls it up. We just want to advise the Government what works and what doesn't work ☺ Intervention, regulation ☺ Land and water uses ☺ Drift and pesticide related problems ☺ Adopting economically and environmentally sustainable water policies ☺ Funding the CRDC so that they can do the research ☺ Mandatory buffer zone for cotton farmers and their actions

Table 5.18 Issues that are COMMUNITY'S responsibility, according to Growers themselves and other stakeholders

Growers' responsibility	Other stakeholders' opinions
☛ Moral support and understanding ☛ Set up community guidelines of what they think is acceptable in their area. Those ways the farmers and Government know what expectations are out there. This allows people to know what they can and can't do. These guidelines should be realistic, and agreed to be both parties and both parties should live by these. Town planning and housing blocks should not be developed in very strong agriculture areas. ☛ Very strong agriculture areas and then have these people try to impose control on farmers; land use and zoning issues need to be addressed. ☛ Water is up to God, prices is determined by North America ☛ Recognise the cotton industry is trying to put in and do the right things. It is up to other grain and cattle groups to do the same thing and try to do there best to improve their industry ☛ They should be involved in sorting out and fixing problems that effect them. ☛ Making sure they know the facts and do not just get hyped up on media propaganda. Know the facts rather then getting caught up in the emotional side of it all Any local activities	☺ Not make judgement without being informed ☺ Closer communication, public image ☺ Just support to work well together ☺ They don't need to play an active role in the cotton industry. The community does keep an eye on what the cotton industry does, that is helpful to ensure that everything runs smoothly ☺ Just working in the industry and research ☺ Educate themselves, be educated, understand the cotton problem ☺ Contribute with funds if possible ☺ None, they should take their guidance from what we're doing ☺ More access to information to educate themselves and be proactive and helpful ☺ Just make sure everything is under control ☺ Work to keep environment and the cotton industry sustainable ☺ Help promote cotton industry ☺ Monitor the progress, provide moral support ☺ Understand BMP ☺ Help keep themselves informed (green groups), know what the industry is doing as a whole rather then just a few small groups ☺ Other groups have fear of the unknown so they could become more educated as to what is going on in the industry ☺ The ladies should get together and preach to the schools rather then the converted. Women in cotton do a great job. A fair bit of "bs" but it goes a long way in the industry ☺ Community perceptions are incorrect. Need to know a little more about industry ☺ Knowing about situation and the facts, how the industry is trying to solve the issues ☺ Input on what they know, we should consult with the community Education on our part to the community to make them aware of what goes on in the industry. The benefits, clear up misconceptions to chemical usage

Table 5.19 How should other stakeholders be involved in research in the cotton industry, according to growers and other stakeholders themselves.

According to growers	According to other stakeholders themselves
▪ Give their other expertise, they should be involved to much the same extent. The researchers or scientists are needed also, also the community. Some require consultation with the community, others are only growers issues. ▪ In an active and objective way ▪ Water quality, a lot of rivers and creeks have soil erosion and blue green algae, also weed seed being carried in the water, and some rivers have high level of chemicals in the water itself (washed off dry land farm). Other stakeholders should look into best practice and try to abide by them. It takes a lot of cooperation from stakeholders and landholders. ▪ Councils are becoming very interested in the results of tests, they should be more involved. Also the chemical companies themselves and state politicians should participate ▪ Liaise with them in different ways, however is necessary ▪ Ginners and Queensland Cotton, it is their livelihood as much as ours, they can be accountable by segregating the cotton seed from the Ingard or genetically modified cotton seed. We don't want cattle eating Ingard and then later finding there is a problem with their meat. ▪ Cotton Australia and CRDC should be involved to overseas the research. ▪ Co-operation with trials and experiments ▪ They should be privy to information before it goes to legislation and have their say, especially on the water issue. ▪ Put forward proposals ▪ They should be from the financial point of view, it is all the one industry and it is not going to be there if we don't all pitch in to help solve the problems ▪ Consultation, what sort of trial work should be done	▪ In a review type situation ▪ Collaborate, share information, no use reinventing the wheel, if farmers have done the investigation, then they should share with CRDC rather then have them re-do the research. International chemical companies that have done research, they should share the results rather then have the CRDC start the same project again from the beginning ▪ The more the better, basically in the same way as farmers ▪ Exposure to literature available ▪ Assisting with research ▪ As a technical resource ▪ Offer ideas and provide information, express their opinions ▪ Promoting and keep growing cotton ▪ Present opinions, as much as possible ▪ Financially, sponsorship (as they will benefit) and the collection of that data. ▪ Take part in the socio-economic survey, as well as people not directly involved in cotton. ▪ Spray drift management, the aerial operators should invest in it as well ▪ Consultants usually know what is going on before the growers do ▪ All stakeholders should be involved through consultation discussion and working through the issues, particularly the community ▪ Should be input from community groups to get their concerns and ideas on which problems they feel need to be tested as well ▪ The industry wont survive if we cant keep doing things, so the whole industry should be contributing to making it better ▪ Cotton Australia and local growers associations should get involved in a supportive role, not actually hands on stuff

5.4 Summary and discussion of the telephone survey's outcomes

The outcomes of the survey show that under social issues concerning the cotton industry there is a common view among growers and other stakeholders. These issues are:

- Lack of good image of the cotton industry in the broader community. Farmers feel they have a bad reputation as far as the environment is concerned and they believe that it is unsupported by evidence.
- The need for the community to take the initiative to become educated about the cotton industry.
- Social problems included rural exodus and social conflicts.
- Social conflicts within communities rose between cotton farmers, neighbouring properties and homeowners.
- Farm succession planning is an immediate important issue for 48% of the growers interviewed, while for another 2% it will become an issue the near future. Fifty percent think it is not an important issue for their management yet.

Outcomes on economic issues affecting the cotton industry are:

- Growers feel that the cotton industry contributes significantly to the economic growth of many towns. Because of the way communities view the cotton industry, a study should be undertaken to see what effects the community would suffer without it.

Major environmental issues concerning the cotton industry are:

- Environmental issues were very important such as chemical drift and water usage
- Community feel that cotton farmers use a significant amount of water
- Cotton farmers advised that they reuse their water run off from properties, and that the community should be educated about the way it is done
- Find alternatives for chemicals use in cotton.
- There should be a buffer region around all cotton farms where rural residential living is prohibited.
- Farmers are active in spray drift management. Extension and adoption of BMP is a way to overcome environmental problems. The human component which affects the adoption of BMP should be investigated.
- Chemical companies should make the results from their experiments and research available to everyone

Major government policy issues affecting the cotton industry:

- Government should set up realistic chemical and water policies.
- Farmers felt that self-regulation was the best way to go. Self-regulation failed last time because producers weren't advised or educated on what their responsibilities were.
- Farmers feel happy if the government consults them in the policy development. The Government should put rules and regulations in place only after consultation with the farmers. The farmers would then feel more involved and would find it a lot easier to follow the Government regulations.
- Growers think they should not have to pay for experiments (chemical or genetic engineering); the Government should fund research.

- Clients should direct research and provide 'on' farm tests and field tests; because it gives a more realistic approach to experiments.

Both farmers and other stakeholders feel that the approach to research should be practical and field oriented. They also expressed an active desire to be involved in the R. D. and E. programs related to the cotton industry. Cotton growers and other stakeholders are actively undertaking practices to overcome the current problems faced by the industry. They have clearly identified the roles and responsibilities of themselves, the government and general community.

CHAPTER 6
CONCLUSIONS AND RECOMMENDATIONS

The main specific objectives of this Scoping Study were:

- To determine what growers and other stakeholders see as the key issues facing them and their industry.
- To identify what areas of socio-economic and environmental research within the cotton industry have already been identified as key issues, and determine knowledge gaps in above areas;
- To identify suitable methods of conducting research with the involvement of the stakeholders of the cotton industry;
- To produce recommendations for further research projects for CRDC.

These objectives are in accordance with CRDC's mission statement *"To enhance the contribution by research and development to a viable and sustainable cotton industry for the benefit of the Australian community"* (Cotton Research & Development Corporation 1998a). It also complies with CRDC's Community Goal *"Viable regional communities in a healthy environment"*. CRDC objectives number 4 and 5b*"To ensure that cotton production and processing systems deliver identifiable social and environmental benefits to the regional and broader community"* and *"To ensure the cotton industry delivers commercial benefits to the regional and broader community"* (Cotton Research & Development Corporation 1998a) p.5; (Cotton Research & Development Corporation 1998b) are also in line with the objectives of this study.

The study used three methods, namely review of literature, focus group meetings to get some qualitative insights of the cotton industry issues, and a limited telephone survey. In all, 79 respondents (38 leading cotton farmers and 41 stakeholders representing R&D, Extension and cotton industry groups) were interviewed to collect primary data. Detailed findings from these three sources are presented in Chapters 4 and 5. Not withstanding the limitations of the small sample, some conclusions are made based on the review of literature, focus group meetings of cotton industry leaders and a telephone survey of cotton growers and other stakeholders. Some recommendations are also given in accordance with the objectives of the Scoping Study.

6.1 Conclusions and Recommendations

The outcomes from this Scoping Study were based on the review of literature, focus group meetings with cotton growers and telephone survey of farmers and other stakeholders. They clearly demonstrated the need for changes in the Research, Development and Extension (R, D & E) approach to solve the complex problems of social, economic, environmental and policy issues that affect the cotton industry.

According to an article entitled "The Future of Scientific Disciplines" written by Peter Cullen (1999), director of CRC for Fresh Water Ecology, University of Canberra;

> *Science owes much of its success to its ability to split problems up into individual processes that can be studied in detail and in some isolation. However, many of the complex problems now facing society are not amenable to solutions through disciplinary research, and require the intellectual contributions of several disciplines if progress is to be made.*
>
> *A new model of research for complex problem solving is emerging. The main characteristics of this model are:*

- ***Applied research*** *- this new mode of research is driven by the need to find useful answers to complicated 'real' problems. It is important to bring together knowledge users and knowledge producers to emphasise the role of research in addressing the practical problems.*
- ***Trans-disciplinary*** *– the new model might be thought of as trans-disciplinary rather than multi-disciplinary. It relies on frequent interaction and stimulation across the disciplinary boundary. Partnership and collaboration across disciplinary boundaries is the key feature.*
- ***Transient*** *- in this new model, often transient teams are developed to address a particular issue and disbanded at the end of the task.*
- ***Quality control*** *- peer review may cross disciplinary boundaries and include scientists from within relevant industry organisations to achieve quality control and share practices.*
- ***Leadership*** *- taking facilitation role.*

Ecological sustainable development policies have been adopted by governments, corporations and institutions throughout the world (including CRDC) due to an increasing global recognition of the fundamental links between social and economic well being and a healthy environment. These policies attempt to give substance to the idea that *"Humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs."* (World Commission on Environment and Development, 1987).

There is a concurrence among the leading cotton growers and other stakeholders of the cotton industry that there is a need to develop a comprehensive R, D & E policy to achieve ecological sustainable development of the cotton industry. The fact that several social, economic and environmental issues of the cotton industry are identified by all of the key stakeholders interviewed in this study indicates the need for an overall paradigm shift in R, D & E to achieve a sustainable cotton industry.

As mentioned above in CRDC's objectives 4 and 5 and their Mission Statement, the organisation aims to achieve a viable and sustainable cotton industry for the benefits of the Australian community. In order to achieve this, there is a need to have a special R, D & E program focusing on social, economic, environmental and policy research within CRDC.

6.1.1 CONCLUSIONS

Conclusion 1

Overall Conclusion Regarding Socio Economic, Environmental And Policy Research

The overall conclusion from this study is to develop a comprehensive socio economic, environmental and policy initiative to complement existing R, D & E efforts of the cotton industry.

Specific Conclusions

There are four specific areas that require research, either focusing on an individual aspect or integrating with technical research:

1.1. There is a need for ***commissioning sociological studies*** to understand why the cotton industry image is seen as a "dirty industry", despite the fact that it contributes to the economic stability of 25 rural communities in Australia. There is also a need to conduct communication studies, focusing on the role of media in creating an inappropriate image of the cotton industry in the urban community, and to locate the sources of information that promote this inappropriate image.

1.2. CRDC needs to fund some ***economic studies*** to understand and promote the positive impacts of cotton production on the community, and the economic barriers to the adoption of Best Management Practices (BMP) by the cotton growers and aerial spraying agencies. Environmental economists in conjunction with extension specialists can play a major role in encouraging understanding and the implementation of BMP within the cotton industry.

1.3. Several environmental issues related to the cotton industry were identified by this Scoping Study. There has been technical research done to develop better varieties and new pesticides. However, adoption of these environmental practices relies on a human dimension, hence there is a need for studies dealing with the social psychology of environmental management by various stakeholders within the cotton industry. The need is evident to test various methods of environmental education, hence ***there is a need for environmental studies*** focusing on socio economic aspects of technology adoption.

1.4. There were very few policy studies undertaken to examine the positive and negative impacts of cotton industry. CRDC could ***support policy studies*** relating to water use efficiency, pest control and tree clearance. Involving stakeholders in the policy development could be trialed to achieve industry self-regulation rather than government regulation. Again, there is a need for multi-disciplinary studies to create understanding of the complexity of the interaction between the different policies and regulations enacted by federal and state governments.

Conclusion 2

Overall conclusion regarding research approach

The findings from the study clearly support the need for stakeholder involvement in different activities of R, D & E. The data clearly indicates the enthusiasm and commitment of cotton growers and other stakeholders in getting involved in R, D & E to help develop sustainable technology and a program. The PAM model developed by Chamala (1995) could be used in designing R, D & E projects within the framework of Action Research and Action Learning.

Conclusion 3

Overall conclusion regarding roles and responsibilities of various stakeholders in solving the cotton industry problems

Several questions were asked in the telephone survey to identify the roles and responsibilities of cotton growers, communities and government agencies. It is gratifying to note that growers have taken a positive approach to resolve some of the issues faced by the cotton industry and expect both the community and government to take similar positive roles. There is a need for working together by the government agencies, commercial organisations, community in general and the cotton growers, specifically in achieving sustainable development for the cotton industry (see Tables 5.16, 5. 17, and 5.18).

6.1.2 RECOMMENDATIONS

Recommendation 1

Based on the Scoping Study results, we recommend ***the establishment of a sub-program focusing on socio-economic, environmental and policy research.*** It would be similar to the new initiative taken by LWRRDC in establishing a social and institutional research program. This sub-program could involve other R&D corporations and cotton industry stakeholders such as Cotton Australia, the Cotton Growers Association, and the cotton industry members.

Recommendation 2

Inter-disciplinary studies incorporating socio-economic, environmental and policy studies could be undertaken in an Action Research or Action Learning framework. Funding for these studies could be provided for in either post-doctoral or post-graduate research scholarships for existing and future research and extension staff in the cotton industry. This approach would increase the capacity of R, D & E staff while resolving some of the issues by practicing an Action Research approach.

Recommendation 3

Strong interest and willingness to commit resources by the various stakeholders in research and development is very encouraging. We recommend the involvement of stakeholders in R, D & E projects as this will help achieve a paradigm shift throughout the entire industry.

Recommendation 4

We recommend CRDC undertake a pilot Action Research Project, focusing on specific issues such as water use efficiency or industry image, and adoption of BMP based on the different agro-ecological regions of the cotton industry.

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8 APPENDICES

APPENDIX 1

Issues identified in Darling Down Cotton Growers Inc. Focus Group Meeting

Issues identified by Group 1

Signifies linkages

Social Issues	Economic Issues
▪ Perceived social distinction between cotton and non-cotton growers; seen as arrogant by the wider community and other farmers ▪ Disruption of the family unit because of the need to attend more meetings ▪ Image that growers have more meetings, more literature ▪ Growers have to be more efficient with paperwork e.g. at ginning time ▪ Symptomatic economic rationalisation ▪ Don't hear many positive comments from support industries ▪ Do support industries see the positives but choose not to acknowledge it in the view of negative community perceptions. Only a minority (of the community) says that the cotton industry is great. ▪ (Creates) employment - positive social aspect ▪ Major lack of understanding of chemical/environmental issue - public is ill informed ▪ Soft target (small in number but financially buoyant) creates jealousy; tall poppy syndrome ▪ Issues that came up last year we have been through before-perception not changed (they) have just become bigger because growers are perceived to (continue to) poison and perceived to be rolling in money ▪ Issues haven't changed, (they have) just because more intense, e.g. more cotton growers as neighbours ▪ Industry is its own worse enemy-continue to make stuff ups ▪ We generate problems by being so up front about "what we will do" ▪ Who is "the cotton industry"?	▪ Do we need bigger management units and so bigger farm size is required; management issues? ▪ Can only afford $X per acre to purchase ▪ Cost of implementation of industry guidelines and community expectations (who are driving industry guidelines). ▪ Cost of adjusting to compliance issues ▪ Positive economic benefits; industry spin-offs; increased employment; increased flow-on effects ▪ Decreased profitability at the moment coupled with increased cost of pest management control and water ▪ Resistance problems ▪ Farm labourer can now make good money because farming is intensive, therefore can't (afford to) screw up, so we are willing to pay more for good labour ▪ Need for us to pin down what are the flow on effects ▪ Councils basing rates on "white gold'-or is it due to water issues e.g. have raised the rates for unimproved irrigable land- access to water sees rates go up. Doesn't have to be on a water course or channel ▪ Only way of getting rate down was claiming fusarium wilt. Some places have seen a dramatic increase (Up to 40%) in rates

APPENDIX 1 continued...

Issues identified by Group 2

Environmental Issues	Political Issues
▪ Off farm spray drift ▪ Public perception of cotton growers (Chemicals they use) ▪ Public health issues. Odour v drift ▪ Community benefit from viable industry ▪ Restrictions caused by minority groups ▪ Industry held responsible, not the individual ▪ Salinity ▪ IPM ▪ Area wide management ▪ GMO issues ▪ Natural viruses-more research ▪ Government subsidy ▪ NRA chemical reviews-better organisation	▪ All AG chemical users should have the same guidelines ▪ WAMP ▪ Water use efficiency-its management will benefit the community ▪ Water storage efficiency ▪ Adverse government policy ▪ Lack of government support for the rural sector ▪ Cotton industry self regulation ▪ BMP ▪ Government inability to exercise control over bad management ▪ Health and safety ▪ Employment issues and awards

Appendix 2

Further issues identified in the plenary session in Darling Downs Cotton Growers Inc Focus Group Meeting.

Social	Economic	Environmental	Policy
▪ *Networking between cotton growers, locally and other areas e.g. "Women in Cotton"* ▪ *Cotton more accepting of women involved in all aspects of cotton growing e.g. health, safety matters* ▪ *Younger more progressive farmers attracted* ▪ *Sons remain in the industry* ▪ *Press releases "misinterpreted" by the press* ▪ *The press doesn't give the good stories about cotton* ▪ *Media sensationalism-negative towards the industry* ▪ *"Good neighbours"-was unsuccessful as it was introduced too soon.* ▪ *Cotton Week – has created better understanding, and cohesiveness between growers and the community* ▪ *Average age of farmers lower*	▪ *Cotton makes a future in farming and the rural community* ▪ *Educate on flow on effect of cotton growing-local community getting the benefit* ▪ *Significant role reversal. Socio- economic rural issues are less of an issue where cotton is grown. The money from cotton profits also supports the provision of infrastructure* ▪ *Cotton "industry" supporting community activities* ▪ *The viability that cotton brings allows for sustainability because the income is there* ▪ *Will cotton growing be viable to farmers because of potential changes to land use planning and the availability of water?*	▪ *Research on evaporation* ▪ *Salinity research linked to water sufficiency* ▪ *Spray application technology*	*Nil*

APPENDIX 3

Issues identified in Gwydir Valley Cotton Growers' Association Focus Group Meeting

Social Issues	Economic Issues
▪ Community expectations add to costs ▪ Tall poppy syndrome ▪ Dominance of cotton growers on local committees –perceived to be taking over ▪ The growers are involved in the community in two major projects-the Aboriginal Employment Strategy and the Cotton Industry Charity Race days ▪ Labour; training skilled labour. ▪ Education leading to employment in the industry (teaching people about the industry) ▪ Unions are preventing the technical education system meeting needs for industry ▪ Country towns are losing services ▪ There are public expectations of "perfection" i.e. they expect cotton to have everything 100 perfect ▪ The image problems are in the cities rather than the local towns which are supportive of their growers ▪ Target cheap chemicals-chemical company conspiracy ▪ City voters see the environment as being more important than the bush communities ▪ Need to educate city people	▪ BMP-requires more sprays required and yields lower ▪ Compliance issues-time required to meet them ▪ Chemical companies have increased prices substantially because they perceive it as a profitable industry ▪ Price of cotton is falling ▪ Development costs are increasing for the companies and this is being passed on to cotton growers ▪ Real price of cotton has been falling over the years
Environmental Issues	**Political Issues**

▪ There is a feeling that they are trying to convert NSW into one big national park
▪ BMP is resulting in more spraying and lower yields
▪ Endosulfan-discriminatory standards
▪ Questionable if Endo is a health issue, e.g. different requirements for beef and tomatoes
▪ NRA has no "on hand" experience about spraying operations yet it is making decisions that have a dramatic effect on growers' livelihoods
▪ Right to farm; the best country is along the river, but growers are now being prevented from growing too close to the river.
	▪ Endosulfan use-conflicting rules discriminatory for cotton v other growers
	▪ RLP testing stirring beef producers and abattoirs
	▪ CRDC research should remain in the fields that it has traditionally covered, with Cotton Australia focussing on education and promotion
	▪ NRA has limited knowledge about what is happening in the field (NRA senior executives visited one grower's farm that day and for the first time saw the spray in operation and was impressed with the technology used
	▪ Water –poor management DLWC expect growers to do more with less
	▪ Water rights
	  ▪ Capacity sharing-improvements needed
	  ▪ Decision makers-their power not fair
	▪ MRL's are being dictated by trade and political rules (rather than scientific fact)
	▪ "deaf ears" policy makers
	▪ Selective concern about issues e.g. GMO's OK for medicine but not for food. Mobile ph. OK
	▪ Industry publicity-doing a poor job
	▪ Lot of environmental students looking for a cause
	▪ More understanding of urban people needed
	▪ Need to educate city people

APPENDIX 4

Further issues identified in the plenary session in Gwydir Valley Cotton Growers' Association Focus Group Meeting

Social	Economic	Environmental	Policy
CRDC should assess the impact of this type of activity (AES) in improving the image of the industry	*Competition from synthetics*		*Researchers don't know how to promote (their findings) and those responsible for promotion (of the industry) don't understand the research findings*

APPENDIX 5

TELEPHONE SURVEY QUESTIONNAIRE - **Quest. N. 1 - Growers**

Cotton Research & Development Corporation
The University of Queensland

IDENTIFICATION OF SOCIO-ECONOMIC RESEARCH AREAS IN THE COTTON INDUSTRY - *SCOPING STUDY*

Brief telephone survey of the stakeholders in the cotton industry

ID			
Name		Phone	
Address		Gender	

Hello, is this Mr. or Ms. _____?
This is _____. Prof. S. Chamala and his team from The University of Queensland are conducting a brief telephone survey for the Cotton Research and Development Corporation. The objective is to find out key cotton industry stakeholders' views on what SOCIAL, ECONOMIC and ENVIRONMENTAL issues for research projects that CRDC should develop and fund, to complement the existing technological research projects.

Call again	Wrong number	Remarks

1) Could you spend about 10 minutes of your time to answer some questions?

Yes _____ (continue with survey. Go to Q.2)
No _____ (arrange a more convenient time if possible or finish if not interested)

Need recall	Date	Time	Reject	Remarks

2) What type of farm ownership structure applies to your farm?

a) Family farm ☐ b) Tenant ☐ c) Other _____ (specify)

3) What is your total area of the property? _____ ha or acres (please circle)

4) What are the major enterprises on your property? Please specify for last season.

Crops	Livestock	Others
a)_____	a)_____	a)_____
b)_____	b)_____	b)_____
c)_____	c)_____	c)_____
d)_____	d)_____	d)_____
e)_____	e)_____	e)_____

5) How many hectares of cotton did you grow last season? _____ Ha.

6) Is cotton you major enterprise? Yes No

7) What % of your total Gross Farm Income is from cotton?

Less then 50% ☐ 50% to 75% ☐ More than 75% ☐

8) How long have you been managing your farm? _____ years

9) Which group of age do you belong? (PLEASE READ OUT THE OPTIONS TO RESPONDENTS AND TICK ONLY ONE)

a) _____ 18-24
b) _____ 25-34
c) _____ 35-44
d) _____ 45-54
e) _____ 55-64
f) _____ more than 64

10) What is your educational qualification?

a) ____ Primary school
b) ____ Secondary high school
c) ____ Agriculture college
d) ____ University
e) ____ Others – describe it _____

11) Are you a member of any of the cotton industry's organizations / associations?
If NO, go to question 13.

Yes ☐ No ☐

12) If "yes" in question 11, what is your current participation in the cotton organisation?

Committee Member ☐ Non-Committee members ☐

Local level ☐ State level ☐ National ☐

13) How many people do you employ, other than your family members?

1 Permanently	Part time		Casual labour	
	Peak time	Other times	Peak times	Other times

14) In your industry and the community, over the last 5 years, what socio-economic, policy and environmental issues have been or are raised or are usually discussed? (PLEASE, DO NOT READ OUT THE OPTIONS TO RESPONDEDNT, JUST TICK ALL MENTIONED).

Please give the following as examples:

Social: The image of the industry in the community
Environmental: The effects of spray drifts
Economic: The role of the cotton industry in supporting the local economy
Intitutional and policy issues: Regulations on water uses

14.1 – Social	**14.3 – Economic**
a) _____ number of jobs created by the cotton industry b) _____ unemployment in rural areas c) _____ rural exodus d) _____ relationship with neighbors e) _____ community development f) _____ stress and health problems g) _____ women and youth's roles h) _____ availability of skilled staff i) _____ carrier opportunities in the industry for young people? j) _____ Social conflicts k) Other _____	a) _____ negotiation and marketing b) _____ financial management c) _____ financial and personal stress d) _____ employer/employee relationship e) _____ migration of casual labour f) _____ inputs supply and costs g) _____ training for staff and farmers h) _____ the use of the Internet, computers, etc. i) _____ impacts of new technologies j) _____ Multiplier or ripple effect of cotton on the rural community K) _____ Value adding, processing industries l) _____ Cotton price, costs and profits m) Other _____
14.2 – Environmental	**14.4 – Institutional and Policy issues**
a) _____ pollution with agrochemical b) _____ soil and water contamination c) _____ wild life depredation d) _____ water availability and use f) _____ Off farm impacts of cotton g) _____ Soil fertility h) Other_____	a) _____ Government policies b) _____ cotton industry's rules and policies c) _____ general infrastructure (phone, roads, other facilities) d) _____ banking e) _____ other _____

15) What are you and your group of influence doing to solve specific problems concerning the cotton industry?

a) _____
b) _____
c) _____
d) _____

16) In your opinion, in which problems you as a grower should be involved in solutions and which should be solved by the government? Which are other's responsibility?

Growers and the industry	The Government	Other groups eg. Community.

17) Which of the socio-economic, policy and environmental issues need further research?

(PLEASE TICK THOSE MENTIONED BY THE RESPONDENT ONLY)

17.1 – Social	**17.3 – Economic**
a) ____ number of jobs created by the cotton industry b) _____ unemployment in rural areas c) _____ rural exodus d) _____ relationship with neighbors e) _____ community development f) _____ stress and health problems g) _____ women and youth's roles h) _____ availability of skilled staff i) _____ carrier opportunities in the industry for young people? j) _____ Social conflicts k) Other _____	a) _____ negotiation and marketing b) _____ financial management c) _____ financial and personal stress d) _____ employer/employee relationship e) _____ migration of casual labour f) _____ inputs supply and costs g) _____ training for staff and farmers h) _____ the use of the Internet, computers, etc. i)_____ impacts of new technologies j) _____ Multiplier or ripple effect of cotton on the rural community K) _____ Value adding, processing industries l) _____ Cotton price, costs and profits l) Other _____
17.2 – Environmental	**17.4 – Institutional and Policy issues**
a) _____ pollution with agrochemical b) _____ soil and water contamination c) _____ wild life depredation d) _____ water availability and use f) _____ Off farm impacts of cotton e) Other_____	a) _____ Government policies b) _____ cotton industry's rules and policies c)_____ general infrastructure (phone, roads, other facilities) d) _____ banking e) _____ other _____

18.a) How should the research be undertaken?

Literature research ☐ Laboratory research ☐

Field tests ☐ On farm field tests ☐

18.b) What role should growers have in the research _____

_____

_____

18.c) Should other stakeholders be involved

☐ Yes ☐ No

18.d) If yes in Q. 18.c, how should they be involved? _____

_____

19) Is farm succession planning a major concern to you?

a) _____ yes
b) _____ No
c) _____ not yet, but it will be in a near future.

THANKS FOR YOUR TIME AND COOPERATION!

APPENDIX 6

TELEPHONE SURVEY QUESTIONNAIRE - *Quest. N. 2 - Other stakeholders*

Cotton Research & Development Corporation
The University of Queensland

IDENTIFICATION OF SOCIO-ECONOMIC RESEARCH AREAS IN THE COTTON INDUSTRY - *SCOPING STUDY*

Brief telephone survey of the stakeholders in the cotton industry

ID			
Name		Phone	
Address		Gender	

Hello, is this Mr. or Ms. _____?

This is _____. Prof. S. Chamala and his team from The University of Queensland are conducting a brief telephone survey for the Cotton Research and Development Corporation. The objective is to find out key cotton industry stakeholders' views on what SOCIAL, ECONOMIC and ENVIRONMENTAL issues for research projects that CRDC should develop and fund, to complement the existing technological research projects.

Call again	Wrong number	Remarks

3) Could you spend about 10 minutes of your time to answer some questions?

Yes _____ (continue with survey. Go to Q.2)
No _____ (arrange a more convenient time if possible or finish if not interested)

Need recall	Date	Time	Reject	Remarks

4) What is your involvement in the cotton industry?

a) Research ☐ b) Extention ☐ c) Management/policy ☐

d) Marketing ☐ e) Other ☐ (Please specify) _____

5) How long have you been working in activities related to the cotton industry?
_____ years

4) Are you a member of any of the cotton industry's organisations / associations?
Yes ☐ No ☐

5) If "yes" in question 4, what is your current participation in the cotton industry?

Committee member ☐ Non-Committee member ☐

Local level ☐ State level ☐ National ☐

6) In your industry and the community, over the last 5 years, what socio-economic, policy and environmental issues have been or are raised or are usually discussed? (PLEASE, DO NOT READ OUT THE OPTIONS TO RESPONDEDNT, JUST TICK ALL MENTIONED).

Please give the following as examples:

Social: The image of the industry in the community

Environmental: The effects of spray drifts

Economic: The role of the cotton industry in supporting the local economy

Intitutional and policy issues: Regulations on water uses

6.1 – Social	**6.3 – Economic**
m) _____ number of jobs created by the cotton industry n) _____ unemployment in rural areas o) _____ rural exodus p) _____ relationship with neighbors q) _____ community development r) _____ stress and health problems s) _____ women and youth's roles t) _____ availability of skilled staff u) _____ carrier opportunities in the industry for young people? v) _____ Social conflicts w) _____ Managerial skills x) Other _____	a) _____ negotiation and marketing b) _____ financial management c) _____ financial and personal stress d) _____ employer/employee relationship e) _____ migration of casual labour f) _____ inputs supply and costs g) _____ training for staff and farmers h) _____ the use of the Internet, computers, etc. i) _____ impacts of new technologies j) _____ Multiplier or ripple effect of cotton on the rural community K) _____ Value adding, processing industries l) _____ Cotton price, costs and profits m) Other _____
6.2 – Environmental	**6.4 – Institutional and Policy issues**
a) _____ pollution with agrochemical b) _____ soil and water contamination c) _____ wild life depredation d) _____ water availability and use e) _____ Off farm impacts of cotton f) _____ Soil fertility and erosion g) _____ Other_____	a) _____ Government policies b) _____ cotton industry's rules and policies c) _____ general infrastructure (phone, roads, other facilities) d) _____ banking e) _____ other _____

7) What are you and your group of influence doing to solve specific problems concerning the cotton industry?

a) _____

e) _____

f) _____

g) _____

8) In your opinion, in which problems you as a stakeholder should be involved in solutions? Which should be solved by the government? Which are other's responsibility?

Growers and the industry	The Government	Other groups eg. Community.

9) Which of the mentioned issues do you think should be further analysed by the CRDC to provide answer for these problems.

a) _____
b) _____
c) _____

10) Which of the socio-economic, policy and environmental issues need further research? (PLEASE TICK THOSE MENTIONED BY THE RESPONDENT ONLY)

10.1 – Social	**10.3 – Economic**
a) ____ number of jobs created by the cotton industry b) _____ unemployment in rural areas c) _____ rural exodus d) _____ relationship with neighbors e) _____ community development f) _____ stress and health problems g) _____ women and youth's roles h) _____ availability of skilled staff i) _____ carrier opportunities in the industry for young people? j) _____ Social conflicts k) Other _____	a) _____ negotiation and marketing b) _____ financial management c) _____ financial and personal stress d) _____ employer/employee relationship e) _____ migration of casual labour f) _____ inputs supply and costs g) _____ training for staff and farmers h) _____ the use of the Internet, computers, etc. i)_____ impacts of new technologies j) _____ Multiplier or ripple effect of cotton on the rural community K) _____ Value adding, processing industries l) _____ Cotton price, costs and profits y) Other _____
10.2 – Environmental	**10.4 – Institutional and Policy issues**
a) _____ pollution with agrochemical b) _____ soil and water contamination c) _____ wild life depredation d) _____ water availability and use e) _____ Off farm impacts of cotton f) _____ Soil fertility and erosion g) Other_____	a) _____ Government policies b) _____ cotton industry's rules and policies c)_____ general infrastructure (phone, roads, other facilities) d) _____ banking e) _____ other _____

11) In your opinion, what type of research methodology could be more useful for the cotton industry? What is the best way of doing this research?

11.a) How should the research be undertaken?

Literature research ☐ Laboratory research ☐

Field tests ☐ On farm field tests ☐

11.b) What role should growers have in the research

11.c) Should other stakeholders be involved
☐ Yes ☐ No

11.d) If yes in Q. 18.c, how should they be involved?

12) Do you think farm succession planning a major concern to farmers?
d) _____ yes
e) _____ no
f) _____ not yet, but it will be in a near future.

13) How many people do you employ in your business, other than your family members?

If not applicable, tick this box: ☐ Otherwise, fill in the table bellow.

2 **Permanently**	**Part time** Peak time	Other times	**Casual** Peak time	Other times

14) Which group of age do you belong? (PLEASE READ OUT THE OPTIONS TO RESPONDENTS AND TICK ONLY ONE)
g) _____ 18-24
h) _____ 25-34
i) _____ 35-44
j) _____ 45-54
k) _____ 55-64
l) _____ more than 64

15) What is your educational qualification?
i) ____ Primary school
j) ____ Secondary high school
k) ____ Agriculture college
l) ____ University
m) ____ Others – describe it _____

THANKS FOR YOUR TIME AND COOPERATION