Part 1 - Summary Details

CRDC Project Number: **DAQ128**

Project Title: Cotton Industry Development Officer

f: Central Queensland

Project Commencement Date: 1/7/04 **Project Completion Date:** 30/6/05

Research Program: 1 People and Knowledge

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Part 3.3 – Final Reports (due 3 months after completion of project)

Background

The direct relevance of southern research to cotton production under the conditions experienced in CQ always has been an issue of debate. In the absence of any personal experience and/or local expertise, CQ cotton growers are wary of the claimed potential benefits of new information/new technology in their own circumstances.

CRDC has recognised this problem and, from 1996 to 2004, has sponsored an extension agronomist (Mr Michael McCosker, 1996-1999, David Kelly 1999-2004) to link CQ needs to available industry information so that the lead time in dissemination of new information and local adoption of new technology are not affected by the geographical isolation of the CQ region. This investment has yielded enormous benefits to both the local and national industry as CQ has leapt to the forefront of development and adoption of innovative and sustainable technologies. Particular successes lay in the development of an area wide Integrated Pest Management Strategy for silverleaf whitefly, and development of an area wide cotton disease prevention strategy.

In recent years the project extension officer has also provided a major leadership role in the national cotton extension team.

This project maintains CRDC sponsorship of a development extension officer co funded by QDPI&F.

Exciting new challenges face the industry over the next few years; including further moves into transgenic cotton crops and associated management issues, ongoing strategies for resistance management and insecticide use, opportunities for integrated pest management, and a move towards more environmental outcomes.

Modifications required for local management practices to address these issues (among others) are complex. CQ cotton growers' understand and "ownership" of the issues will be achieved best through an "action-learning" approach using grower groups and on-farm participatory problem solving methods of research. In addition, the CQ growers need to be linked to wider national/industry issues, information and expertise through the provision of a general extension service.

Objectives

Doug Sands commenced duties as the Industry Development Extension Officer (IDO) in January 2005 following the departure of David Kelly in May 2004 to take up an extension role with Cotton Seed Distributors. During the interim period, essential regional communications with industry including Cotton Tales newsletters were maintained by cotton industry extension project officers Susan Maas (NRM extension) and Amanda love (RWUE II)

Project objectives were:

- Provide a development extension support to cotton growers in Central Queensland that is the identifiable conduit between national directions in the cotton industry and local practices.
- Crop Physiology & Agronomy:
    1. Identify knowledge gaps and weaknesses in cotton agronomic management practices in CQ with particular reference to Bollgard II requirements.
    2. Quantify the impact of sowing date, crop rotation, cultivar types, nutrition, water use and growth habit on lint yield and quality in Bollgard II production systems.
    3. Characterise the interaction between factors in (1 and 2)
    4. Develop new agronomic management practice guidelines for growers based on current research.
- Facilitate the adoption of transgenic cotton varieties and relevant Integrated Pest Management (IPM) principles by regional cotton growers.
- Provide cotton growers with a comparative analysis of local production practices to facilitate their adoption of Best Management Practice.

Project outputs and achievements are summarised in the following table.

Objectives	**Outputs**	**Achievement**
Participate in and liaise with National Cotton Extension team to promote national initiatives and directions; highlight local research needs; keep CQ growers well informed of current research through meetings and publications; collate current findings and developments in RD&E issues.	Regional extension plan developed incorporating national and regional priorities. Information disseminated to industry in the region	Regional extension plans still being developed in line with national objectives that are still yet to be set within the new CCC CRC and ACGRA.

Objectives	Outputs	Achievement
Participate in the Integrated Cotton Farming Systems project providing leadership and coordination of the agronomic components and trials.	Agronomy trials and demonstrations established in collaboration with researchers, growers and consultants. Trial outcomes determined, disseminated and discussed by industry.	Monitored and collected plant physiology data from on-farm Planting Date trials. This information was collated and graphed and presented at 2 AWM meetings and 1 farm walk as well as a Research & Technical committee meeting.(see appendix 1for results) Participated in the planning stages of new 3 year CRDC project (CQ Integrated Cotton Farming System Project) in collaboration with CSIRO. Project has been kicked off this season with first plantings already started.
Collaborate with the Rural Water Use efficiency Initiative in capacity building in irrigation optimisation	Active contribution to RWUE 2 project.	Helped gather some of the data for on farm WUE survey, until new officer was appointed. Introduced new WUE officer to growers through a number of grower meetings. Assisted WUE officer with the Centre Pivot Lateral Move Workshops. Presented some educational information on WUE to primary school students.
Collaborate with the AgSip 15 NRM extension in irrigated cotton & grains industries project.	Active contribution to the NRM extension project.	Collaborated with NRM extension officer with a number of grower meetings to get some exposure to the issues in the Land & Water Module of the BMP. Have included NRM articles in editions of the Cotton Tales newsletter.

Objectives	Outputs	Achievement
Collaborate with Cotton Australia by providing technical support to growers implementing the Best Management Practice Land and Water Management Module.	Ongoing technical advice provided to growers.	Soil and Water initiatives have been planned for next season to help facilitate this process of improved land and water management. Attended Moree Trade Show and Field Trip. Will use some of the concepts learned on this and incorporate them into future trial work in CQ. Participated in GOAGRO education tour for year 10 students, provided technical information support for CA Grower Manager.
In collaboration with local industry, continue to develop management strategies that address new issues in the CQ cotton industry.	Regional RD&E needs identified and prioritised. Management strategies developed.	Conducted several meetings with Research and Technical Committee. Reviewed issues with Planting Date and future research priorities. As a result the Bollgard II planting window has been changed for the district in light of climatic data and trial results presented to growers in 2 Research & Technical meetings, 2 AWM meetings and 2 farm walks around Planting Date trial sites. Local Research priorities have been discussed at length at Research & Technical meetings as well as some one on one grower contact. From this a list of trial priorities has been identified.

1. Detail the methodology and justify the methodology used.

The project works in a participative action learning framework through which the local industry, with extension support develop sustainable, locally developed solutions to new challenges. Much of the work is conducted with grower groups and individual growers involving workshops, meetings, on-farm trials, field days and publications.

The project has continued to foster and utilise strong links within the local industry, particularly cotton grower associations and groups (Central Highlands, Dawson Valley), Area

Wide Management Groups (East Nogoa and West Nogoa), local agribusiness (resellers, pesticide applicators, processors) and Cotton Australia.

Results

(Refer to Appendix 1 for results of 'Planting Date Trials')

Conclusions from initial Planting Date trials.

In terms of yield results we had 2 trials that came out favouring the early plantings and one trial that came out favouring a later planting. When you take an average of all the trials it shows that yields were similar across plantings in October, November and December. There also seemed a large yield penalty for planting in January. These results are probably not all that dissimilar to modelled results using the OZCOT data where there also was a significant drop off in yield for Late December and January plantings.

Being on farm trials and only small areas being utilised (4 ha or less) there were a number of management issues in running these trials. Also each trial site had slight differences in soil type, slope and length of slope. There were also different consultants managing each trial site so some agronomic decisions were not consistent across all trials.

Conclusions

The data that has come out of this work as met some good baseline expectations in terms of what might work in practice and what shouldn't be considered. For example we have identified that with Bollgard II varieties it is possible to plant within a September to December window without necessary jeopardising potential yield. As a planting date January may have proved itself to be risky in terms of sacrificing some yield.

The exercise has given us some clear cut guidelines for what we need to do in further research trials on planting date. In other words how to manage the crop in small trial areas that are at differing stages of development, and what specific data we need to collect to properly assess the impacts on physiology development, yield and fibre quality.

Outcomes

This project addressed the three outputs by providing an Industry Development extension officer in the region to facilitate and support the transfer of new technology by conducting an extension program in partnership with growers, consultants, agribusiness and the community and contributing to the district adaptation and adoption of improved management practices.

The role which extension officers play contributes to more rapid adoption of technology and promotion IPM, BMP and AWM. Growers have benefited from their involvement in AWM groups and have appreciated improved communication and learning, not only about the management of insect pests on an area wide basis, but also about other relevant topics to their farm operations such as water use, disease management, nutrition and benchmarking practices.

Economic – Profitability and international competitiveness

- Adaptation and adoption of new technology and crop management strategies.
- Collaboration in capacity building programs leads to producers making more informed decisions in relation to crop management.
- Participatory action learning and research providing solutions to local challenges which the industry has ownership of. This is particularly in relation to IPM and the management of transgenic crops. The potential here is to increase yields and reduce input costs.

Profitability and Competitiveness

- Development and adoption of Integrated Crop Management strategies that incorporate transgenic varieties will reduce the incidence and quantity of pesticide applications and hence risk of environmental pollution.
- Capacity building in Water Use Efficiency will reduce losses from the irrigation system, particularly deep drainage.
- Increased adoption of BMP.

Social – Empowered people and communities

- Improved skills and qualifications of people at all levels of the industry.
- Development and adoption of Integrated Crop Management strategies that incorporate transgenic varieties will reduce the incidence and quantity of pesticide applications and hence risk of encroachment of these substances into towns.
- A profitable local industry will provide a greater economic benefit to the local and national economy.

Project Summary

These initial planting date trials have developed further aspects of the cotton system that need to be investigated in relation to planting date. For instance total amount of allocation water used on the later plantings was certainly less then in the earlier plantings as their was a lot more rain received in the months of December and January. This has also impacted on the gross margin of the crop as it was less expensive to grow in terms of water used. The question of WUE between each planting date is something that needs further investigation.

The level of boll rot in the early planting certainly seemed higher then in later plantings because of the incidence of summer rain on open bolls. This leads to an impact on the quality of fibre produced from each planting date and will require further assessment.

Pix management was another area that seemed to change between different planting dates and would seem to have a crucial role to play in canopy structure and retention of early bolls. In CQ the role of pix is extremely important with our climatic conditions favouring fast growth therefore pix management needs to be properly assessed across all planting dates.

The impact of whitefly on later plantings is another question that is still only half answered and will require further data collection on these trials.

The above points are just a few of the issues that have been generated by these early planting date trials and hopefully the next lot of trials will go a long way to answer some of these questions.

Future Research

Future research into farming systems and more specifically planting dates is already underway with a dedicated site being established at the Emerald Ag. College to run highly replicated small plot trials that can be tightly controlled and monitored. The vision is that this trial site will become along term farming systems project where all the aspects of production of Bollgard II cotton can be examined, tested and derive some best management solutions for cotton production in CQ.

Publications

The data from the on-farm planting date trials has been distributed a number of ways. Presentations to growers in Farm walks, AWM meetings and Research & Technical meetings. The progress and results have also been distributed via Cotton Tales articles and some Newspaper articles.

Impact on the Cotton Industry

This project and the next one will hopefully provide information and solutions for CQ growers to be able to, firstly improve their production in line with other valleys, improve the efficiency of their production and maintain the sustainability of their production.

The project aims to both generate the information from on ground research as well as deliver this information into the hands of the grower in way that it is easily understood, accepted and practised.

Part 4 – Final Report Executive Summary

The extension project revolves around its ability to facilitate change in the grower community. The situation in CQ is that there has been a lot of change already in farming practises with the high uptake of BMP. However with the advent of the Bollgard II system and the cost:price squeeze on production the growers in CQ will have to continue to evolve as technology changes.

The extension project over the last six months has had both a research role as well as an extension role. These two roles fit very well together as the trial work can demonstrate the concepts and generate the data, while the extension role can deliver that data to the growers in a short period of time. This means the data is getting to growers will the trials are still fresh in the minds. This then becomes a classic action learning cycle where they can see the trial on there own doorstep , reflect on the data that it generates, make conclusions while it still fresh in their mind and plan towards incorporating their learning into their farming operation.

The issue of planting date has been a classic example this season. Growers realised last season that with Bollgard II working well it gave them the freedom to look at changing their planting date. With the support of climatic information, long term modelling data and data derived from on-farm trials the grower group decided to change their planting date and push their planting window forward by two weeks.

This extension project provided a lot of the information that became the basis for that decision and facilitated a lot of the discussion that was generated around making this decision. There is an indicator within the grower group that planting window could be shifted again if the data generated in the following research project can justify another shift. This is a good example of how local research, good extension support can lead to adoption of good practices.

This project has only been current for the last 12 months however there has been a lot of work started within this project and will be carried on into the next one which has a three year lifespan.