



FINAL REPORT

(due within 3 months on completion of project)

Part 1 - Summary Details

Cotton CRC Project Number: 5.01.21

Project Title: Queensland Extension Darling Downs and Border Rivers

Project Commencement Date: 1/02/07

Project Completion Date: 30/06/09

Cotton CRC Program: The Adoption

Part 2 – Contact Details

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Part 3 – Final Report Guide (due within 3 months on completion of project)

(The points below are to be used as a guideline when completing your final report.)

Background

1. Outline the background to the project.

Regional Cotton Extension Officer positions are part of the cotton programme carried out by the Industry Services Business Group – South Region Unit and Plant Science Units of Queensland Primary Industries and Fisheries (QPIF), Department of Employment, Economic Development and Innovation (DEEDI). These positions link into other activities within Irrigated Farming Systems extension programs. The positions are joint-funded through the Cotton CRC, Cotton Research and Development Corporation and QPIF.

Regional Cotton Extension Officer positions are the foundation positions of the Cotton CRCs National Cotton Extension Team's regional activities.

Objectives

2. List the project objectives and the extent to which these have been achieved.

The Regional Cotton Extension Officers work with producers, industry and partner organisations to achieve 'on-ground' outcomes through the development of collaborative activities and partnerships. The roles of these positions, based on the Darling Downs and in Macintyre River Valley region, are to identify and facilitate the adoption of industry best practice by developing networks and building industry capacity to improve profitability of the Queensland Cotton Industry.

The Regional Cotton Extension Officer provides a key role in improving the uptake of research within the cotton industry by jointly working with the Cotton Catchment Communities Cooperative Research Centre (Cotton CRC) and the QPIF. The extension officers are a cornerstone of regional delivery by delivering local outcomes within a national framework.

The objectives are to:

- Develop, promote and implement a regional, grower focused extension program which addresses cotton industry issues in each region through extensive consultation with local grower associations, ACGRA reps, crop consultants, industry researchers and other extension staff.
- Develop and facilitate effective delivery methods for a range of industry issues in order to build industry capacity to improve viability and sustainability of the Queensland cotton industry.
- Collaborate with producers, industry and partner organisations to achieve 'on-ground' outcomes through the development of collaborative activities and partnerships.
- Identify and facilitate the adoption of industry best practice.

Methods

3. Detail the methodology and justify the methodology used. Include any discoveries in methods that may benefit other related research.

These positions are a part of the Cotton CRC National Cotton Extension Team. This team works on an industry-wide scale and takes a knowledge management approach to deliver grower focused adoption and extension programmes. Each member of this National Extension Team has responsibilities and accountabilities to three areas; the National Priority Teams, Regional Teams and the Regional Cotton Extension Officer network. The Regional Cotton Extension Officer supports other members of the National Cotton Extension Team on a regional basis.

Extension officers need to communicate and collaborate extensively with a range of stakeholders and form a central link between research and extension staff, industry specialists, regional Cotton Growers Associations, industry bodies, Regional NRM Bodies and cotton producers. They undertake, facilitate or coordinate a range of research, extension and training activities in conjunction with key industry team members and stakeholders to achieve 'on-ground' outcomes and adoption of emerging technology. The adoption and extension programme delivery involves participative learning processes with both grower groups and individual growers including workshops, meetings, on-farm trials, demonstrations, integration of Decision Support Systems (DSS) tools, field days, publications and other innovative adoption tools.

Two key challenges of these roles are the establishment of successful relationships with growers, researchers and industry stakeholders to enable the project outcomes to be achieved and the development and implementation of effective extension strategies that result in the adoption of more effective and efficient technologies and management strategies in cotton production.

Results

4. Detail and discuss the results for each objective including the statistical analysis of results.

The project commenced in February 2007 inclusive of two regional extension officer positions on the Darling Downs based at Dalby and in the Border Rivers region based at Goondiwindi. It had been preceded by a QDPI&F funded extension position at Dalby from which Greg Salmond had transferred in September 2006 and an industry funded extension position at Goondiwindi from which Rebecca Smith resigned in June 2006.

The project was established in accordance with the 2005 Industry Extension Review with the two regional positions included in the one project in a co funded partnership between Cotton CRC/CRDC and QPIF. Salary costs have been shared on a 50:50 basis with operational funds provided by industry and overhead costs funded by QPIF.

A rigorous recruitment program resulted in the commencement of the new extension officers, Kate Charleston at Dalby and Rod Gordon at Goondiwindi in February 2007. Both officers became well established during 2007 having initiated and conducted a broad range of extension activities according to well developed regional and national extension plans. Regional priorities and needs were identified, prioritised and incorporated in work plans in collaboration with growers, consultants and other extension officers.

Unfortunately, both officers vacated their positions in May 2008. Kate Charleston transferred to an insect IPM extension position in QPIF – a role better suited to her skills and experience in contrast to her interview assessment by an industry representative selection panel. She had developed strong technical knowledge but did not adapt well to the regional extension role in which strong relationship development is so important. Rod Gordon resigned to accept the offer of a grower relationship and marketing position with Auscott Gwydir after a short but very successful tenure at Goondiwindi.

Following extensive discussion between CRDC and QPIF relating to the turnover of staff, the recruitment of new officers was deferred pending a review of the extension officer roles to consider the issue of staff retention for the longer term. The development and agreement on a Discussion Paper during 2008 led to the recruitment of the Dalby based Darling Downs position being implemented in November 2008 and the appointment of Duncan Weir in April 2009. A new project proposal was conditionally approved by CRDC in April 2009 for commencement on July 1, 2009. Accordingly, a formal review based on facilitated focus group studies conducted by Ewan Colquhoun in June 2009 has been completed.

Interim arrangements for the maintenance of the project were implemented in October 2008. Ingrid Rencken was appointed on a temporary part time basis from October 1 to June 30 to maintain essential project activities including the publication of regional Cotton Tales newsletters, the establishment of NUE monitoring sites and collaboration with consultants and Cotton Australia. Ingrid has collaborated with Jenelle Hare, David Kelly and Geoff McIntyre in this work.

Duncan Weir is rapidly establishing his regional extension role in the project since commencing in April 2009. He has maintained the regional Cotton Tales newsletters, completed the NUE site sampling and participated in a range of industry activities whilst establishing working relationships with growers, consultants and industry organisations.

The extent of achievement against each of the objectives has been constrained by the mid season commencement and short fourteen month tenure of the appointed extension officers.

- Develop, promote and implement a regional, grower focused extension program which addresses cotton industry issues each region through extensive consultation with local grower associations, ACGRA reps, crop consultants, industry researchers and other extension staff.

Sound regional extension plans were developed and implemented in both regions for the 07/08 year following consultation with the regional reference panels including growers from the regional cotton grower association and consultants. In the absence of full time officers in 08/09, essential elements from the plans were addressed by Ingrid Rencken with support from Jenelle Hare, David Kelly and project supervisor, Geoff McIntyre.

- Develop and facilitate effective delivery methods for a range of industry issues in order to build industry capacity to improve viability and sustainability of the Queensland cotton industry.

Both extension officers applied a range of extension delivery methods during 07/08. However, they both experienced considerable difficulty in engaging significant numbers of growers given the dry season which, combined with low prices for cotton and higher grain

returns, resulted in significantly reduced cotton plantings in both regions and substantially tempered grower interest and enthusiasm in many industry activities. Similar issues were experienced by other industry organisations including the grower associations, Cotton Australia and CSD had during that period.

- Collaborate with producers, industry and partner organisations to achieve 'on-ground' outcomes through the development of collaborative activities and partnerships.

The difficult 07/08 seasonal conditions limited opportunities for collaborative field activities quite substantially such that the extension effort was focussed on whole of region approaches particularly through Cotton Tales newsletter, and development of information resources.

Identify and facilitate the adoption of industry best practice,

Project team members including Kate Charleston, Rod Gordon, Ingrid Rencken, Duncan Weir, Jenelle Hare and Geoff McIntyre established a strong collaborative partnership with Cotton Australia contributing considerable support to the development of the industry BMP program with Bec Smith and Louise Adcock.

Technical information delivery has been in the context of industry best practice providing support to the BMP program.

Outcomes

5. Describe how the project's outputs will contribute to the planned outcomes identified in the project application. Describe the planned outcomes achieved to date.

Workshops, Field Days, Demonstration trials

The successful delivery of a number of workshops developed rapport with growers and industry representatives through providing relevant information to address issues or potential systems of benefit to the growers in the Macintyre valley. Verbal feedback provided from growers was positive and a number have commented on a job well done.

The Cotton CRC Groundwater workshops was conducted in Dalby and Goondiwindi providing an excellent overview of groundwater systems and all participants had an increased knowledge of such systems by the end of the workshop.

Kate Charleston participated in and contributed to the Cotton CRC Healthy Soils forums through publication and presentation of an extension paper in the proceedings at two of the forums.

Rod Gordon collaborated in the delivery of The 2007 Macintyre Valley Field Day, conducted at Parkdale with 110-115 strong crowd, addressed relevant topics of interest including:

- Diesel, managing costs and improved diesel Motor efficiencies.
- Dirt, Nitrogen and minimum till, Pale cotton Stainers, Farm Hygiene and legislation regarding spray drift.
- Dollars, Quantifying and mitigating storage losses, Quantifying Deep Drainage Losses, Storage surveys and future WUE funding and projects.

Regional development trials included:

- A mirid pheromone trial conducted as one of a number of replications across the valley in collaboration with Alice Del Soccoro and Peter Gregg's research project. The results were applied in commercial practice by growers and consultants. The results are reported in District Trial book.
- Mirid trials were conducted with Moazzem Khan as part of a national project.
- A regional sucking pest damage trail was conducted with Moazzem Khan.

Outcome: These trials provided a greater understanding of the impacts of sucking pests and helped determine thresholds for occasional pests such as Stainer bugs.

Nutrition Management

The major focus was the Plants and Soils National Priority team Nutrient Use Efficiency (NUE) program for which 13 monitoring sites were established in the Darling Downs and Border Rivers regions in collaboration with the growers and their consultants. Soils had been analysed prior to planting with plant and seed cotton sampling conducted in accordance with the protocol. Samples were analysed by soil nutrition researchers at ACRI.

Analysis of the nutrient use efficiencies has provided data which can be used by cooperating growers in the determination of future nutrient management strategies and for the development of appropriate development and extension trials and programs in the 2009/10 season.

Sites have been identified and will be sampled for a new phosphorus and potassium research project to be conducted in the northern grain cotton region conducted by Mike Bell and others in QPIF.

Outcomes: Trial data will be published in the regional trial book providing regionally adapted information for application by industry.

The results will underpin the nutrient management extension program in both regions with the objective of improved fertiliser management strategies which optimise nutrient use efficiency, enhanced profitability and minimised environmental impacts.

Cotton Tales Newsletters

A regular series of Cotton Tales newsletters has been maintained in both regions in collaboration with the national cotton extension team officers in other regions. 72 Cotton Tales were published ensuring that key industry issues for both regions were addressed and that growers and consultants were well informed of the relevant issues on a timely basis.

Positive feedback on Cotton Tales was received from a number of growers. Recent grower and consultant surveys in both regions attracted a low return rate but provided very consistent results including:

- 80% would like to receive the newsletter
- 60% read the newsletters
- 75% used the information often or sometimes

- Key topics include day degree updates, pest & resistance management information and the event notices.

Regional Trial Books

The Border Rivers Regional Trial Book providing documentation and reports of regional trials and demonstrations in previous seasons was published and distributed to industry.

The Darling Downs Regional Trial book providing regional research data and general information for the Darling Downs over the last 7 years – the period in which there has not been trial books published. The trial book was divided into numerous sections ranging from pest and disease management to agronomy, soils and irrigation featured about 40 articles ranging from crop competition winners and industry reports to scientific articles and trials related to entomology, diseases, weeds, storages, irrigation and agronomy.– most of which was conducted on the Darling Downs over the last 8 years. It was published in a CD format and distributed to 320 growers, consultants and agribusiness organisations.

Outcome: Regionally adapted information and management strategies have been applied by growers and consultants.

QPIF Web Pages

Kate Charleston conducted a full review and update of the QPIF Web cotton industry and production Web pages. The most recent statistics have recorded 412 unique page views with average time spent ranging from 1 to 43 minutes over a one month period. The most used pages were Cotton production in Qld and Varieties, planting and harvesting.

National Extension Team and National Priority Teams

All project officers have provided significant contributions to the national cotton industry extension team, collaborated extensively with industry partners including Cotton Australia, CSD and NRM regional bodies and with industry research scientists in the planning development and delivery of regional extension programs.

Kate Charleston, Rod Gordon and Ingrid Rencken have each participated in and contributed to the implementation of the Crop Protection and NRM National Priority Team plans. Kate Charleston was a member of the industry FUSCOM group.

National industry programs including BMP, IPM and IRMS have been strongly supported and advocated regionally and the extension officers have coordinated the collection of Heliocoverpa eggs and larvae as required for resistance monitoring analysis.

Resource Development & Publications

A Cotton Aphid Management document coordinated by Rod Gordon and the insects and Weeds Team in collaboration with Lewis Wilson and other researchers has been incorporated in the Cotton Pest Management Guide.

A Biosecurity document was developed by Kate Charleston to provide the general public (grower/consultants) with more detail and to develop enhanced awareness of biosecurity

issues and risks in the cotton industry. The document details the most devastating potential pests for cotton and encourages both growers and consultants to be vigilant and always be on the lookout for unusual symptoms in their cotton crops.

A Writing for Extension booklet developed by Kate Charleston provides handy tips on what not to use when writing articles and details a number of common grammatical errors. It also demonstrated techniques for converting a scientific report/article into a more general article for a specific target audience such as growers. It has been distributed to extension officers in Cotton CRC and QPIF.

A Darling Downs workshop was conducted in relation to refuges for dry land crops. This meeting, arranged by Ian Taylor and Neil Forrester, was attended by three growers, three consultants, cotton extension officer and Monsanto representative. Topics included resistance management, trial results on refuge options and discussion of options for refuge management in dryland crops. Potential refuge trials on the Downs were also discussed. The outcome of these discussions has been the conduct of trials on the Downs with the objective of evaluating suitable refuge crops and the potential for reducing the area required for refuges hence reducing the costs of refuges to growers.

A Disease management and response workshop was conducted at Indooroopilly by Ian Taylor with discussions focussing on the outbreak and management of TSV. Kate Charleston prepared a disease response plan for the workshop which highlighted the roles and responsibilities of Cotton Industry staff in case of outbreak of diseases such as TSV. The disease response plan was developed as a Disease Management Plan for endemic diseases which highlights roles and responsibilities of cotton industry staffing enabling industry to respond quickly and effectively in the event of a disease outbreak. The plan was submitted to CRDC and the FUSCOM disease management group meeting. The plan is based on the Cotton Industry Biosecurity Plan and Plant Plan and details the responsibilities at each phase of a disease outbreak from the moment an unusual disease is found through the identification stage, response and operational phase through to the stand own phase.

Outcome: The implementation of such an industry plans (based on the Plant Plan) enables industry to respond quickly and effectively to any disease outbreaks. The plan can also be modified to include pests and weeds

Rod Gordon participated in Future Cotton Leaders Program, Developing Leadership Skills in chosen field of extension. His project was focussed on the gathering current research and development in the crop protection field and development of a media plan to reach the greater cotton community most effectively. Rod was paired with a mentor, Edwina Clowes, a freelance journalist and former Executive Producer for the Rural Department ABC Radio Brisbane. Edwina was able to provide the skills necessary to successfully write a media release. The program was initiated to work on the professional development with the view to gain confidence in:

- 1) Public Speaking and Presentation
- 2) Developing a successful media plan

The objective was to enhance the activities of the National Insects and Weeds Priority team for the cotton CRC of which Rod was the team leader with a theme of 'Protecting today's technology for tomorrow'. The major benefits included being a member of a development group of people in the cotton industry, and networking and collaboration with the

prospective futures leaders of the industry which promoted a lot of energy towards being pro-active to benefit our industry.

Industry BMP

Cotton Australia BMP trial workshops with growers and consultants were coordinated in collaboration with Louise Adcock at Dalby and Goondiwindi in January 2009. Participants provided extensive comment and feedback with respect to the revised myBMP system which is critical for its further development.

Ingrid Rencken and the Environment NPT collaborated with Louise Adcock, Cotton Australia, providing substantial technical input in drafting both the minimum standards for the BMP Natural Assets section (Bronze level) and the advanced levels in the as part of the development of the revised myBMP program. The Natural Assets module of the BMP was edited with the view to reducing the number actions within the module. Some of the vegetation management under the Riparian section has been included with general vegetation management on the farm. The final version has been delivered Cotton Australia.

NRM Management

Ingrid Rencken has collaborated in the development of a proposal which has been submitted to the Wincott committee to present a workshop on how to monitor aspects of biodiversity. It was intended that this workshop could be held in conjunction with QMDC in Goondiwindi as part of their "Naturally Resourceful" workshops and proposed that future workshops could be delivered in all regions. The focus of the workshops will cover those aspects of monitoring biodiversity in the Natural Assets module of the BMP.

The proposal was developed on the basis of an awareness of Biodiversity which was raised in cotton communities as a result of the 2008 Biodiversity Calendar. This calendar presented ideas on how to improve and manage biodiversity on cultivated properties. Whilst the calendar provided some monitoring suggestions, a more detailed approach may be needed to provide these communities with the skills necessary to monitor biodiversity on their properties. Monitoring is crucial in assessing the impact of any management interventions. A robust monitoring system is required in assessing if natural resources goals have been met and is a way of measuring increases or reductions in biodiversity which may have occurred.

There is strong evidence to suggest that community based monitoring of natural resources provides useful information. Local communities have the advantage that they live in the area and have intimate knowledge of the lands and resources surrounding them. These local communities provide a useful alternative to scientists monitoring natural resources which can be expensive and difficult to sustain.

There are of course some problems with community based monitoring systems. Sizes of populations may be over or underestimated and there tends to be greater variations within community based monitoring results. There may be also problems with incorrect identification of natural resources and over simplistic analysis. Fortunately there are a number of ways to overcome these problems. Firstly, monitoring methods to be used by the community should be checked against accepted techniques. The monitoring methods themselves should help overcome the problem of over/under estimation. Small sampling sizes and a patchy spatial temporal sampling effort need to be avoided. Monitoring methods

need to be designed which avoid bias and finally the people collecting data need to be thoroughly trained.

It has been suggested that industry should focus on only a few monitoring methods which could then potentially be replicated across regions and catchments building a powerful natural resources data base. The standardisation of monitoring methods makes it easy to compare and compile the data. If all of these snapshots of information are collected, together they make up a complex mosaic of all the natural resources on properties across regions providing valuable information on the state of natural resources within the industry. Information from the monitoring effort could potentially be made available on the web, allowing NRM bodies, researchers and growers to access the monitoring results. Properties are able to work together to connect up areas of native vegetation and look beyond their boundaries. The data can be utilised by both the local communities for their own resource management decisions, NRM groups as well as researchers.

Outcomes: The BMP Natural Assets section and the biodiversity workshop will provide growers with the information and resources to address NRM issues on farm with significant benefit for the overall sustainable farm management and the region as a consequence of the aggregated local actions.

6. Please describe any:-

- a) technical advances achieved (eg commercially significant developments, patents applied for or granted licenses, etc.);
- b) other information developed from research (eg discoveries in methodology, equipment design, etc.); and
- c) required changes to the Intellectual Property register.

There were no relevant technical advances and information discoveries in this extension project and no issues related to Intellectual Property.

There is a challenge for stronger engagement with growers, consultants and agribusiness in the regional extension program. The plan is for a more strategic engagement especially with growers on an individual or small group basis for specific purposes to address regional priority issues through the implementation of field demonstration trials to evaluate and adapt new technologies. This could result in a reinvigoration of area wide management groups. The implementation of industry BMP provides an ideal framework in which to deliver these strategies in collaboration with the Cotton Australia Regional managers. The existing strong partnerships with consultants and agribusiness must be maintained and enhanced.

Conclusion

7. Provide an assessment of the likely impact of the results and conclusions of the research project for the cotton industry. What are the take home messages?

The project has successfully maintained a regional extension program though limited at times by the change of extension officers.

The regional extension discussion paper developed in consultation with CRDC and Cotton CRC combined with the subsequent focus groups review of extension in the two regions

provides strong strategies which can be adopted for the new project and future extension officer roles. Duncan Weir is developing a specialist role focussed on nutrition management - a priority industry issue.

Extension Opportunities

8. Detail a plan for the activities or other steps that may be taken:

The project is a regional extension project focussed on the Darling Downs and Border Rivers regions as detailed in this report.

Publications

9. A. List the publications arising from the research project and/or a publication plan.

Cotton Tales newsletters (73)

Border Rivers Regional Trial Book

Darling Downs Regional Trial Book

Cotton Aphid Management document for Cotton Pest Management Guide

Writing for Extension booklet

Disease Management Plan

- B. Have you developed any online resources and what is the website address?

QPIF Web Pages www.dpi.qi.gov.au

Part 4 – Final Report Executive Summary

These regional extension positions are a part of the Cotton CRC National Cotton Extension Team which has worked on an industry-wide scale to take a knowledge management approach to deliver grower focused, participatory adoption and extension programmes.

The project commenced in February 2007 with two regional extension officer positions on the Darling Downs based at Dalby and in the Border Rivers region based at Goondiwindi. It had been preceded by a QDPI&F funded extension position at Dalby from which Greg Salmond had transferred in September 2006 and an industry funded extension position at Goondiwindi from which Rebecca Smith resigned in June 2006.

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Technical information delivery has been in the context of industry best practice providing support to the BMP program.

There is a challenge for stronger engagement with growers, consultants and agribusiness in the regional extension program. The plan is for a more strategic engagement especially with growers on an individual or small group basis for specific purposes to address regional priority issues through the implementation of field demonstration trials to evaluate and adapt new technologies. This could result in a reinvigoration of area wide management groups. The implementation of industry BMP provides an ideal framework in which to deliver these strategies in collaboration with the Cotton Australia Regional managers. The existing strong partnerships with consultants and agribusiness must be maintained and enhanced.