Australian Government

Cotton Research and Development Corporation

Annual, Progress and Final Reports

Part 1 - Summary Details **REPORTS**

Please use your TAB key to complete Parts 1 & 2.

CRDC Project Number: **CRC58**

Annual Report: ☐ Due 30-September

Progress Report: ☐ Due 31-January

Final Report: ☒ Due 30-September

(or within 3 months of completion of project)

Project Title: Cotton Industry Development Officer - Gwydir Valley

Project Commencement Date: 1/07/2004 **Project Completion Date:** 30/06/2005

Research Program: 1 People and Knowledge

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

(The points below are to be used as a guideline when completing your final report. Postgraduates please note the instructions outlined at the end of this Section.)

1. Outline the background to the project.

The Industry Development Officer (IDO) of Moree (Julie O'Halloran) is part of the Australian Cotton National Extension Team. This position covers the cotton growing area around Moree and was expanded in 2004 to include the Walgett area. Julie O'Halloran has been in this position for the full 12 months of the projects duration.

As part of the Australian Cotton National Extension Team this position is involved in the planning and developing of national extension activities to address national industry issues. As well as playing a role in national extension activities, the position also has worked with local growers and consultants to develop extension programs focusing on local issues. The position provides strong links between growers, consultants and researchers to ensure information flow between all stakeholders.

Julie O'Halloran was formerly a member of the national extension focus team for weed and disease management. However, partway through this project Ms O'Halloran became team leader of the farming systems focus team where she has continued to make a significant contribution to the focus team.

This position has been successful in increasing technology adoption by local growers. The position is pivotal in the promotion of IPM systems as part of a national extension effort. This has continued with the release of Bollgard II®. The agronomic management of Bollgard II® has also been a focus.

Over the last 4 years this position has assisted in the development and facilitation of a number of grower groups in the Gwydir Valley. These grower groups also serve as a great mechanism for promotion and discussion of other industry research and issues. Water use efficiency has also been a priority given the process of water reform that has taken place in NSW. Nutrition has also been of interest.

Large scale farm trials / demonstrations form a critical component of extension activities. Involvement in these trials has allowed for the establishment and maintenance of strong links with researchers, cooperating growers and consultants as well as adapting research at a local level.

The promotion of the Australian Cotton Industry Best Management Practices program (BMP) to growers and the local community are also key components of this position. This has required good working relationships with Cotton Australia representatives.

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

Assist in developing national extension programs

As a member of the National Cotton Extension Team I actively participate in the Annual Extension Workshop for the strategic planning of extension activities. During the life of this project this included being involved in the organisation of the 2005 workshop. I assisted in determining the content for the workshop as well as the development of the workshop

agenda. I also contributed by giving presentations on several areas as well as assisting in the organisation of activities for the workshop dinner.

As a member of the National Cotton Extension Team I have also assisted in the development of national extension programs through my contributions to the focus teams. Originally a member of the Weeds and Diseases focus team at the start of this project I contributed to the development of extension publications (still in development) as well as plans to address such issues as herbicide spray drift. I took over as team leader for the Farming Systems focus team part way through this project. As Farming Systems team leader I have organised the development of strategic extension plans to address those issues that fall into the farming systems focus team.

My involvement in focus groups held in late 2004 also contributed to the development of a national extension effort for nutrition. Focus groups to extract information on research and extension gaps in nutrition knowledge were held across several cotton growing valleys. Recommendations from these focus groups will be incorporated into extension planning.

Develop extension priorities with local growers and consultants and link/adapt national extension activities into local issues.

A reference group meeting is usually held with local growers and consultants each year to determine research and extension priorities for the coming season. Such a meeting was held to identify research and extension priorities for the 2004/2005 season. The reference groups generally consist of ACGRA members, CGA executive, CCA, Cotton Australia GSM and additional growers. These meetings are facilitated by the IDO. The priorities from this meeting were then considered when planning extension activities.

Regular contact was also maintained with the Gwydir Valley CGA through attendance at CGA meetings. This allowed for the CGA to be kept up to date on extension activities as well as providing me with up to date information concerning the issues affecting Gwydir Valley cotton growers.

Herbicide spray drift has been a major issue for the cotton industry over the last couple of seasons including the Gwydir Valley. Liason between Cotton Australia, NSW DPI Disrict Agronomists, Gwydir Valley CGA and CCA has attempted to address some of the causes of this widespread damage and ways to minimise further damage throughout the season at a local level. Bollgard II® pest and beneficial identification field walks were held across all cotton growing valleys. However, the field walk planned for the Gwydir Valley was delayed by rain and the valley then entered a pyrethroid window and insects in the field dropped off. This is planned again for the coming season as there was a lot of interest.

Implement programs which promote the adoption of IPM, particularly for insect control and resistance management for both conventional and transgenic technology. This includes a number of on farm demonstration trials.

IPM has been a major focus of extension activities. Information presented in the Cotton Tales newsletter has included insect, weed and disease management options. Promotion of IPM for insect control has more recently focused on Bollgard II® crops due to the uptake of this technology by the industry. However, IPM for conventional crops is still also a large component of extension activities as the uptake of Bollgard II® technology during the 2004/05 season was only approximately 50% of the area of cotton grown.

Egg collections for monitoring the level of Trichogramma parasitism continued during the 2004/05 season. Significant levels of parasitism have been detected in the Gwydir over the last couple of seasons. These results have been promoted through Cotton Tales and grower

group meetings. Some consultants have started monitoring Trichogramma levels in their crops at different times during the season.

Field walks held during the 2004/05 season included a pupae busting field walk to demonstrate what effective pupae busting was as well as how to monitor pupae busting to determine its effectiveness. Separate field walks were held for Technology Service Providers and growers and consultants. Other field walks were held with grower groups to demonstrate attract and kill technology such as Magnet®. The Gwydir Valley IDO was involved in coordinating an area wide application of Magnet® with one of the grower groups. The Gwydir Valley field days also included the presentation of information on secondary pests in Bollgard II®.

There were several field trials during the 2004/05 season. Following on from feedback from the Gwydir Valley grower reference group further trials demonstrating compensation in Bollgard II® crops were set up. Results are still being collated and analysed and will be collated into a trial book. Another trial included simulation of different timings and levels of mirid damage. There were also further field trials for Fusarium management. These trials are an effective way to maintain and build on the communication and links between researchers, extension staff and grower cooperators.

Assist in the delivery of IPM short course and establishment / ongoing development of Grower Support Groups. (Incorporating IPM and BMP).

The IPM short course was promoted to the Gwydir Valley industry. While there was interest, numbers were not quite sufficient to successfully run the course so participants could get the most out of it. A couple of dates were set and each time the course had to be postponed due to insufficient numbers. Promotion of this course will continue until numbers are sufficient to successfully hold it.

Development and support of grower groups continued during the 2004/05 season. Pre season meetings were primarily held during August/September to determine what group members were growing, to discuss PAMP's and areas of potential interest for the group during the coming season. Meetings held during the season focused on demonstrations of attract and kill technology, WATERpak workshops and in field irrigation activities, insect management in Bollgard II®, Trichogramma parasitism levels, herbicide drift.

Assist in implementation of BMP particularly for insect pest management and water management

Assisting in the implementation of BMP has required strong links with the local Cotton Australia Grower Services Manager (GSM). The assistance provided in the implementation of BMP has primarily been promotion of the program itself as well as promotion of individual practices. This has bee achieved through Cotton Tales, grower group meetings and field days. For example, at preseason grower group meetings Pesticide Application Management Plans (PAMP's) are discussed including the legal requirement for these documents if using Endosulfan as well as promoting the use of PAMP's for any chemical application.

This position has also assisted with the implementation of BMP following the launch of the Land and Water BMP module. The assistance provided with this module is more technical in nature. I have liased with the Cotton Australia GSM to put together resources relevant to the local area that may assist growers with meeting the requirements of this module. With the permission of the individual grower and the Cotton Australia GSM I have also attended an

audit of this module to gain a greater understanding of those areas where I can assist with the implementation of this module.

The Gwydir Valley cotton crop competition is also used to promote the BMP program and best management practices. This competition is organised by the IDO and Cotton Australia GSM. Crop competition judging criteria were revised 3 years ago and are reviewed each year to complement BMP and the latest research. Best management practices of the winning growers are promoted at the presentation of awards.

2004/2005 Gwydir Valley Field Day

Co-ordinate the collection of egg samples from the local district for resistance testing Promote the use of Decision Support Systems to growers and consultants.
There is a training tour each year for Decision Support Systems (DSS). This position assists with the promotion of this training workshop to growers and consultants. The Gwydir Valley IDO has also assisted growers and consultants in one on one consultation on how they can use the various decision support systems. DSS are also promoted through Cotton Tales and at grower group meetings. HydroLOGIC demonstration trials have been held in the Gwydir and the results collated into the local trial book.

The information paks distributed through the Technology Resource centre are also promoted regularly through Cotton Tales, grower group meetings and at various field days and industry meetings. Promotion usually involves demonstrating what information can be found in these paks. During the 2004/05 season grower group meetings were held to promote WATERpak in collaboration with Mitch Carter, Irrigation Officer. These tended to work best when followed up by in field activities to demonstrate how the information in WATERpak could be used in a practical sense with what is happening in the field.

Produce a trial booklet detailing local trial results.
Trials from the 2004/05 cotton season are still being finalised. Data has been collated and is due for analysis. This trial book should be distributed before Christmas 2005.

Distribute a local grower newsletter on a frequent basis that promotes research results on current production issues.

The Cotton Tales newsletter was produced on a regular basis during the 2004/05 season for both the Gwydir Valley and the Walgett district. The information presented in the newsletters included insect, weed and disease management options, local trial results, Trichogramma parasitism monitoring, nutrition information, meeting and event notifications.

3. Detail the methodology and justify the methodology used.

The methodologies used by this position to extend research, new technologies and strategies include the Cotton Tales newsletter, grower group meetings, association meetings (CCA, CGA), field days, farm walks and media articles. The methods used are employed based on feedback from growers, either from one-on-one discussions or from grower group meetings, on preferred methods of receiving information for particular issues. Past experience of extension activities that have worked well and those that have not also determines what methods are used.

Extension Planning

Identifying priorities

A meeting with a regional grower reference group was held mid 2004 to identify extension priorities for the 2004/05 season and assist with planning of extension activities. In addition to identifying extension priorities, the reference group also provided feedback on the best activity and timing during the season to address those issues. This process of consultation ensures that extension activities are relevant to meet the needs of the local industry. Individual cotton growing regions can have local extension priorities that differ from national issues.

Focus Teams

Focus team plans were developed at the annual National Cotton Extension Team workshop. These plans can result in activities across every valley as in the case of Bollgard II® pest and beneficial identification and sampling field walks. I was involved in the Weeds and Diseases team for the first half of this project before becoming team leader for the farming system team. This has required coordination of team activities and plans.

Training

An adult learning course through the Centre for Rural and Regional Innovation was undertaken in early 2005. This course formalised the processes already used in extension as well as providing a framework to utilise when planning and developing extension activities. This course also provided an understanding of the different learning styles that are likely to be represented within our target audience and how to cater to the needs of each of these in our extension activities. The knowledge gained through this course has already been utilised in planning and developing a number of extension activities including field walks and grower group meetings.

Cotton Tales

The information presented in Cotton Tales during the 2004/05 season included trial results, season updates, event notices and concise information on insect, weed and disease management and any other topical issues. The Cotton Tales newsletter provides timely, concise and relevant information to cotton growers, consultants and industry.

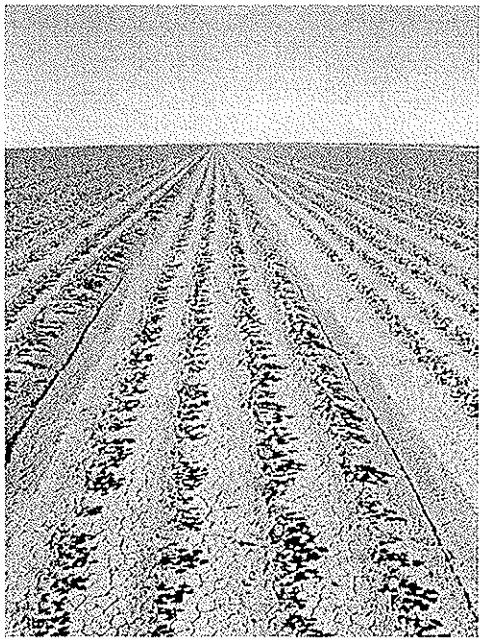
Grower Groups

There are seven grower groups across the Gwydir with 4 that meet regularly while the rest may only meet once a year. These grower groups continued in the 2004/05 season. Many meetings were discussion with neighbours regarding what has been happening while others involve field walks eg attract and kill technology Magnet®. A series of WATERpak workshops were held with these grower groups as a way of demonstrating what information could be found in this resource. Some groups then chose to go out in the field with a follow up activity eg measuring flow rates. The individual group decides how often they meet. These groups are a good method of facilitating communication between neighbours and technology transfer within the group.

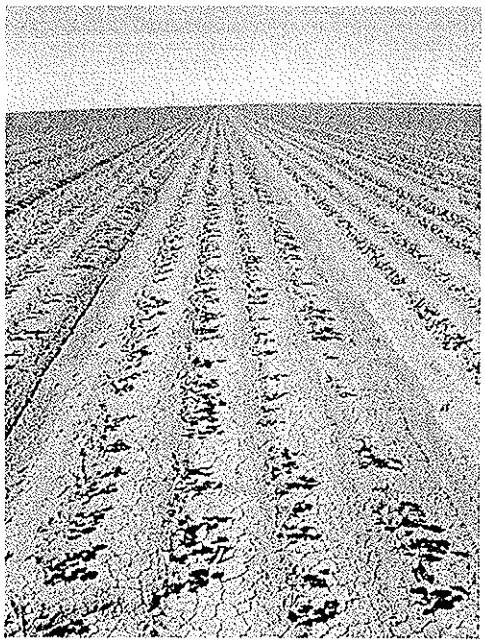
Irrigation demonstration with grower group following up on a WATERpak workshop

Trials/Demonstrations

There were several on farm trial sites in the Gwydir Valley during the 2004/05 season. These included 15 inch plant population trials, a nutrition trial, a Bollgard II/conventional irrigation trial, Bollgard II® compensation trials, a simulated mirid damage trial, Fusarium management trials and a hormone based herbicide damage trial. These trials adapt research to the local level and growers tend to find it more relevant when conducted in the local area. On farm trials and demonstrations also encourage better communications between researchers and cooperating growers.



a) 15 inch high plant population



b) 15 inch low plant population

Field Days/Farm Walks

The format of the Gwydir Valley field day was changed this year. Over the last few years grower attendance at this event had been declining. Feedback from the CGA was that this activity should continue. In an attempt to encourage increased grower attendance the format of the Gwydir Valley field day was changed from a longer event on one day to a series of short, specific field walks held at different times and locations around the region. This change in format saw significant increases in the numbers of growers attending and feedback was that this was a preferred method for holding the field day. Smaller farm walks were held with grower groups including demonstrations of attract and kill technology and in field irrigation activities to promote WATERpak. Field days and farm walks are a great extension activity for facilitating grower, consultant and researcher interaction. It demonstrates to growers the practical aspects of the research which can aid significantly in adoption.

4. Detail and discuss the results including the statistical analysis of results.

Much of the focus of this project has been on IPM and this is where there are some indications of change. The 2004/05 season saw increased utilisation of attract and kill technology such as Magnet® following demonstrations with grower groups during both the 2003/04 and 2004/05 seasons. Awareness of Trichogramma parasitism of Helicoverpa eggs has increased over the last 3 years. Egg collections to monitor the level of parasitism were used by some consultants during the 2004/05 season. There has been increased interest in beneficial identification and monitoring.

Awareness and interest in Fusarium management options has increased. This includes such considerations as rotations and stubble management has increased. This may be in response to the continued confirmation of farms with Fusarium over the last 3 years. This has also resulted in the awareness of the need for farm hygiene to prevent the spread of weeds and disease and many growers have put this into practice on their farms.

5. **Provide a conclusion as to research outcomes compared with objectives. What are the "take home messages"?**

The IDO positions are viewed as a valuable resource by the cotton industry, extending research outcomes, new practices and technologies. This position has assisted in the adoption of insect, weed and disease management options including IPM and BMP.

6. **Detail how your research has addressed the Corporation's three Outputs - Economic, Environmental and Social?**

The Gwydir valley IDO position has addressed the Corporations three outputs through the core objectives for the position.

Environmental – This project has addressed the Corporations environmental output through the promotion of IPM tools. The communication facilitated through grower group meetings and promotion of IPM tools has benefits for both chemical (greater use of 'soft', selective chemistry) and non-chemical (beneficial insects) management of pests. This position has also assisted in environmental management for sustainability through assistance with biodiversity projects. There has been extensive involvement in activities to minimise herbicide drift for both environment and production sustainability. This position has also undertaken extension activities involving sodicity issues and water use efficiency. Extension efforts to optimise nutrition programs contributes to the environmental output by minimising greenhouse gas emissions and movement of excess nutrients into groundwater.

Economic – The Gwydir valley IDO position has addressed this output through the promotion of improved farm management strategies. Integrated pest management of insects, weeds and diseases, reduces costs to the grower while manintaining production and benefiting the environment. There has also been increasing focus lately on optimising nutrition which has both an environmental (through minimising greenhouse gases and nutrient movement into groundwater and economic (cost) benefits. This has included the interaction of sodicity with nutrition and the impacts on the cotton production system.

Social – The IDO position has an integral role in addressing this output to regionally adapt research and transfer new technologies and strategies. The IDO acts as a liason between researchers and growers by maintaining good links with researchers, growers and consultants. This position is also involved promoting 'good news'' cotton stories in local media. The IDO role also assists Cotton Australia in the promotion of BMP to the cotton industry and the wider community. Last season did see widespread herbicide drift issues in which the IDO was involved in addressing. Spray drift is a community issue. Ensuring that both the environmental and economic outputs are addressed has implications for the social output. Environmentally sound practices benefit the community while ensuring that the cotton industry remains economically viable has follow on effects in terms of services and employment in the local community.

7. **Provide a summary of the project ensuring the following areas are addressed:**

   a) **technical advances achieved (eg commercially significant developments, patents applied for or granted licenses, etc.)** N/A

   b) **other information developed from research (eg discoveries in methodology, equipment design, etc.)** N/A

   c) **are changes to the Intellectual Property register required?** N/A

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

(a) to further develop or to exploit the project technology.

The Gwydir Valley IDO will continue to promote and extend research outcomes and best management practices to industry. The expansion of the extension team to include environmental extension officers and more water use efficiency and irrigation officers will provide greater technical expertise to assist in extension in these areas.

(b) for the future presentation and dissemination of the project outcomes.

Future presentation and dissemination of project outcomes could be better facilitated by improved communication between researchers and extension officers. Good links between researchers and extension staff is essential for extension to be successful. Extension officers need to be aware of the research outcomes to extend it. There has been extensive discussion about whose role it is to ensure that this happens and how to achieve it.

Results of the extension review may have implications for the future presentation and dissemination of project outcomes.

(c) for future research.

Some areas for future projects include:

Bollgard II® management – The introduction of Bollgard II® and the associated reduction in chemical applications, particularly non-selective insecticides, is likely to result in changes in the pest spectrum. This may result in emerging pests. There are also other areas of Bollgard II® management that growers have questions about including planting date, irrigation, nutrition and compensation.

Promote and assist in the implementation of the BMP land and water module – The IDO will promote and provide technical support in the implementation of the BMP land and water module.

Optimisation of nutrition programs – The introduction of Bollgard II® and the higher yields achieved in recent years have raised questions regarding the nutritional requirements of these crops to maintain the higher boll loads and yields.

Mirid management - New research is being undertaken to review current thresholds for mirids as well as management options.

Integrated weed management for Roundup Ready Flex® – The introduction of Roundup Ready Flex® will have implications for weed management. Best management practices for this weed control system will need to be extended to industry to minimise the risk of glyphosate tolerant weeds.

9. List the publications arising from the research project and/or a publication plan. (NB: Where possible, please provide a copy of any publication/s)

O'Halloran, J. (2004-2005). Regional Cottongrower reports

O'Halloran, J. (2004-2005). *Cotton Tales* Newsletter distributed to Gwydir Valley industry.

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

Cotton Tales www.cotton.crc.org.au → News/CottonTales

11. Provide an assessment of the likely impact of the results and conclusions of the research project for the cotton industry. Where possible include a statement of the costs and potential benefits to the Australian cotton industry or the Australian community.

The likely impact of this project is an increase in local cotton grower and industry knowledge of issues facing the industry and research results, strategies and technologies to address them. The implementation of trials at a local level assists with promoting and developing confidence in new technologies or strategies. Reduced reliance on insecticide application is a likely result from the promotion of the IPM tools available and assistance in developing these at a local level eg attract and kill technology, Trichogramma wasps. This is an economic, environmental and social benefit in terms of reduced chemical applications. Other specific likely impacts of the project include a better understanding of Bollgard II® technology and therefore its management to optimise yield, quality and gross margin. This will again benefit economically, environmentally and socially as growers can get the most out the technology with associated reductions in insecticide applications.

Promotion of weed and disease management options assists growers in understanding what they can do to manage and minimise the impact of weeds and diseases and their impact on production. Involvement in herbicide spray drift issues addresses production, environmental and community areas. Herbicide spray drift can cause significant economic damage to susceptible crops while drift of any pesticide is of concern to the community as a whole due to health and environmental issues.

Part 4 – Final Report Executive Summary

The position of Cotton Industry Development Officer for the Gwydir Valley is currently conducted by Julie O'Halloran. The Gwydir Valley IDO has assisted in the development of national extension programs for new practices and technologies. These programs have been adapted at a local level through on farm trials and demonstrations and other extension activities.

The Gwydir Valley IDO works in liason with the local Cotton Australia Grower Services Manager, Irrigation Officer for the Namoi and Gwydir, and other extension officers as well as the Gwydir Valley Cotton Grower Association.

The Gwydir Valley IDO position has had a strong focus on Integrated Pest Management (IPM). Components of IPM have been adopted by the Gwydir Valley cotton industry, including softer chemical options where possible and consideration of beneficial insects.

Aspects of weed and disease management have also been adopted by industry including farm hygiene to minimise the spread of weeds and diseases and the use of tolerant varieties for Fusarium and Verticillium management. On farm trials have been conducted in liason with plant pathologists, researching management options for Fusarium including seed treatments.

This role is also required to facilitate the meetings of several grower groups. Activities undertaken with these groups included the demonstration of attract and kill technology, WATERpak workshops and in field irrigation measurements. Several on farm trials and demonstrations were carried out during the 2004/05 cotton season. These included plant population comparisons in 15 inch row configurations, Bollgard II® compensation trials, a simulated mirid damage trial and a hormone based herbicide damage trial.

The Gwydir Valley IDO has continued to assist in the promotion of the cotton industry's BMP program. With the release of the BMP Land and Water module the assistance provided by the IDO's has expanded to include technical support for this module.

This position has also made a significant contribution to the Cotton CRC Farming systems focus team. As team leader for this focus team, the Gwydir Valley IDO has contributed to the planning and coordination of focus team activities which address national extension issues.

A one page newsletter, Cotton Tales, was produced regularly during the season. This newsletter presented timely and topical information including trial results, information on insect, weed and disease management options and event notices.

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