If you are participating in the presentations this year, please provide a written report and a copy of your final report presentation by 31 October. If not, please provide a written report by 30 September.

Part 1 - Summary Details

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

CRDC Project Number: **BGC01**

Project Title: Drift Management Extension Strategy for the Northern Region

Project Commencement Date: 1/7/2006 **Project Completion Date:** 30/6/2009

CRDC Program: Capacity and Community

Part 2 – Contact Details

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Signature of Research Provider Representative: _____

Part 3 – Final Report Guide (due 31 October 2009)

Background

At the commencement of this project, it was considered that despite the availability of appropriate information, training and suitable application equipment (nozzles) to minimise spray drift while maintaining efficacy, the number of claims for damage due to spray drift in many of our production areas is not decreasing. Well directed training and extension activities have helped to reduce the incidence of spray drift in several locations. However, many growers still do not voluntarily access information or attend extension activities and training that will assist them in reducing spray drift. Chemical user accreditation is currently not addressing this specific issue. This project sought to improve the quality of information on drift management received by growers and applicators at all points where they source information, training, equipment and the products associated with the application of farm chemicals.

Objectives

1. Establish working relationships with NSWFA, Chemcert, SmartTrain, Agforce and industry bodies to improve the outcomes of chemical user accreditations in relation to spray drift management.

Bill Gordon Consulting has developed strong working relationships with all of the training providers, and improved the cooperation between industry and training providers. Bill Gordon is currently a member of the national group representing these trainers, and on the technical advisory committee for Chemcert Queensland (in-kind contributions as a part of the project).

More than 12 professional development workshops have been provided to the training organisations delivering chemical user accreditations in Qld and NSW. Bill Gordon has written new material for Chemcert Queensland and provided presentations for delivery. Resources and training materials on application and drift management have been provided to all training providers delivering chemical user accreditations in the Northern Region.

Several state providers have incorporated resources provided by Bill Gordon Consulting into their training packages.

2. Evaluate (training) package and adoption by chemical user trainers

All training providers now include information related to drift management in their chemical user training programs (this was not the case when this project started).

Many of the providers are now currently or considering offering the one day application and drift management course delivered within this project as a specialist offering leading to re-accreditation.

3. Develop resource package for consultants, resellers & advisors to use to provide suitable advice on drift management

A training package for advisors was developed and modified as required. A series of presentations highlighting factors contributing to spray drift were developed during the project. These included 20 minute, 1 hour, 3 hour and full day presentation packages. All resources were made available to participants in training activities associated with the project.

Bill Gordon consulting has also provided ongoing phone and email support for consultants and advisors and their clients.

4. Provide training to consultants, resellers & advisors on how to use the resource package for drift reduction

More than 20 workshops were delivered for consultants and advisors.

These workshops were spread across the northern region for consultants, reseller agronomists and government advisors. 5 Training workshops were also provided for Qld DPI biosecurity inspectors and NSW DECC (EPA) staff.

Progress has been made towards establishing an accredited application advisor scheme.

5. Develop resource package for machinery dealers and resellers of application equipment to use to provide suitable advice on drift management.

Materials were developed and continually modified to suit individual businesses. This material was developed in conjunction with Graham Betts of ASK GB. Training materials and point of sale resources were provided to more than 15 activities for the key machinery dealers in the northern region.

6. Provide training to machinery dealers and resellers of application equipment on how to use the resource package (materials) for drift reduction.

Informal training provided during more than 15 individual activities for the key machinery dealers was provided by Graham Betts of ASK GB (14 activities) and Bill Gordon (2 activities). Logistically this proved to be the most difficult group to encourage to participate in project activities, with the majority electing to participate in workshops or training sessions only for their staff at their venue. A more uniform approach to workshops and delivery was not possible, hence each workshop was tailored to meet the needs of each business.

This is an area that will require further development, as machinery dealers tend not to be members of professional organisations or participate in professional development other than that provided by the manufacturers of equipment that they distribute.

It is envisaged that this group could also participate in an accredited application advisor scheme.

7. Establish (8) trail and demonstration sites throughout the Northern region which illustrate efficacy and drift reduction

A total of 8 trials were completed, this included 7 fully replicated efficacy trails comparing drift reduction technologies and 1 application assessment were completed, the results of 6 trials have been published in industry journals and reported at industry forums (the other two will reported on subject to further validation).

8. Conduct field days for growers and industry personnel at each trial site

One stand alone field day/ demonstration site was conducted for growers. After completion of this field day, discussions with the steering committee (approved by Ian Taylor) agreed that published results presented at industry field days would provide a suitable alternative outcome. Bill Gordon participated in 7 other industry field days presenting and discussing trial results and project outcomes (WFS Gindie Field Day, Griffith Field Day, Moree Cotton trade Show, Agquip, Poster presentation at Confarm 2008, Trial results were discussed and distributed by Graham Betts at 5 x Incitec Pivot Field days plus more than 5 other grower attended field days).

9. Present trial outcomes at industry forums, such as advisor & grower updates

Trial reports were included in the 2008 GRDC Northern Updates, and distributed at each of the Updates. Bill Gordon chaired the application sections of the 2008 GRDC Northern updates at 5 locations and presented trial outcomes at 3 locations (Dubbo, Meandarra and Trangie).

Bill Gordon also presented segments on drift reduction at a number of industry field days including the Cotton Big Day Out (Keytah Field Day), Edgeroi field day and Grower Meetings at Bularra and Jimbour,

Articles on Drift management were prepared and published in numerous industry journals and newsletters in the Northern Region, including;

- 3 articles in the Cotton Spotlight Magazine
- 4 contributions to the Ground Cover Magazine,
- 1 Article in the Australian Cotton Grower Magazine
- 1 Article in Australian Grain
- 1 Article in the ICAN consultants Corner
- 1 article in the Cotton Outlook Suppliment
- 1 Article in the CTF Newletter
- 3 articles in the CFI Newsletter
- A number of articles are also posted on the GRDC website
- Articles are also posted on the ispray website

Bill Gordon also appeared on a GRDC Harvest Radio Segment, in ABC local radio interviews, and in the television program Country Matters promoting drift reduction strategies. 2 Webinars were produced and presented on nozzle selection and drift reduction in conjunction with conservation farmers inc (CFI).

10. Provide subsidised training to growers and applicators on improved application and drift management.

The 35 contracted workshops were delivered in the Northern Region (at a cost of $30 per person to growers for resources provided), and an additional 32 workshops were delivered in the northern region with the assistance of grower organisations and catchment management authorities. It is estimated that the cash contributions and in-kind contributions from industry (facilitation, catering, venue, additional resources was worth approximately $6000 per workshop) hence the total in-kind contribution for this component of the project exceeded $400,000.

Post workshop evaluations conducted by Bill Gordon consulting demonstrated that more than 80% of the workshop participants had made positive changes in practice since attending the workshop. An independent consultant was commissioned to conduct semi-structured interviews with workshop participants up to a year after they attended the workshop, which also demonstrated that 80% of participants had made a positive practice change in managing drift after attending the workshop.

Sales figures from the Teejet Australia (the largest nozzle agent in the country) also demonstrated a change in the buying habits of growers in recent year. In 2005 only 43% of the nozzle sold would be considered to have a drift reduction capacity, however in 2008 this had increased to 72%.

11. Persue other avenues through industry organisations to effect compliance with label requirements

Bill Gordon developed the Grains BMP application module in conjunction with the Fitzroy basin Association, QDPI and Agforce as an in-kind contribution from this project (estimated value at $25,000).

Bill Gordon is a member of the National Interest Group For Training Providers who recently prepared a submission to the PSIC on harmonizing control of use legislation

Bill has liased with Cotton Australia staff extensively and worked with them on submission and media releases, and participated in filed visits to the Pilliga Region with the APVMA and LNCGA.

Bill Gordon has met with the APVMA and lobbied for improved labels and changes in the status of phenoxy herbicides.

Bill Gordon is on the technical committee of Chemcert Queensland, an Advisior to Chemcert Victoria, And has worked with all training providers in the Northern and Southern Regions.

Bill Gordon has also provided ongoing support to the Spraywise program and publications developed by Nufarm. To the NSW ground sprayers association, and to the AAAA.

Methods

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

Extension activities were developed and modified based on participant responses to the material presented, the availability of recent research in the area of application technology and drift management and in response to evaluation outcomes.

Trials evaluating the impact of drift reduction techniques on herbicide efficacy were conducted as randomised complete block experiments replicated either 3 or 4 times according to the weed population and natural variation present within the trial sites.

Various combinations of spray quality, application volume, nozzle type, mode of action and adjuvant effects were assessed in 7 trials. A single trial assessing application efficiency and target deposition was completed evaluating the weedseeker technology for fallow applications.

5 trial results were widely reported to industry, a single trial assessing in over the top applications of roundup ready in cotton has not been published yet, nor has the weedseeker evaluation. It is planned that an article will be released for each trial as we approach the upcoming summer period, where the results are more likely to be meaningful to the industry.

Results

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

All efficacy trials were analysed using a two way analysis of variance and significant differences were identified using the LSD test.

Trial results have been published in industry journals and are included in the training packages provided to workshop participants. Results are also available through the ispray.com.au website.

The trials evaluating spray quality and application volume for fallow herbicide use demonstrated no significant difference (LSD 5% level) between the level of control obtained using medium, coarse and extremely coarse spray qualities at 50L/ha total application volume (for a standard tank mix and reduced rates of Glyphosate).

Increasing the application volume to 70L/ha (with good water quality) did not improve efficacy with Glyphosate, and in some instances the use of this application volume with extremely coarse droplets demonstrated a trend towards reduced efficacy (not significant in an individual trial, but a trend across all trials).

The addition of an oil based adjuvant to Glyphosate reduced efficacy, as did increasing application volume above 50L/ha to 70 L/ha with reduced rates of Glyphosate in one trial.

In a single trial (not yet published as it has not been replicated) evaluating over the top applications with Roundup ready, it appears that a reduction in weed control occurred when using an extremely coarse spray quality, as compared to a coarse or medium. This result warrants further investigation before data is released.

Outcomes

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

Amongst the participants of training there has been a positive change in practice towards improved drift management. 80% or more of the participants have changed one or more of there practices and equipment set-ups.

There has been an increased awareness across the industry for the need to improve drift management (predominantly through increased numbers of drift events affecting cotton). The project has widely disseminated and presented information about the probable causes of the drift problems experienced by the cotton industry and techniques to minimise the risk of spray drift. While the project has not significantly reduced the incidence of spray drift, it is possible to suggest that those incidences may be more frequent, larger in scale and impacting a greater geographical area without the extension activities and outputs of this project (recognising and acknowledging the support from several other industry initiatives run in conjunction with this project).

4. Please describe any:-

a) technical advances achieved (eg commercially significant developments, patents applied for or granted licenses, etc.);

No commercially significant developments or patents are associated with this project.

b) other information developed from research (eg discoveries in methodology, equipment design, etc.); and

No other developments or discoveries of commercial significance have arisen from the research conducted within this extension project.

c) required changes to the Intellectual Property register.

No changes required to existing IP register.

Conclusion

5. 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 workshops conducted in this project for growers have demonstrated a high level of positive practice change related to improved drift management by the participants (80% or more), Hence the take home message is that quality information and training on application and drift management results in positive practice change for reducing drift potential.

Despite the high levels of practice change amongst the workshop participants we are still seeing large scale drift events affecting cotton production in a number of areas. The activities of this project were designed to obtain a maximum geographical spread across the Northern GRDC region, however Bill Gordon Consulting has been able to demonstrate that intense training within a limited area has the greatest impact on reducing the incidence of drift in that area, particularly when an area wide approach is utilised to involve as many growers and industry personnel as possible.

Extension Opportunities

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

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

Bill Gordon Consulting will continue to extend information on drift management, utilising an AWM approach for cotton production areas affected by spray drift (with anticipated further funding from CRDC and GRDC).

Bill Gordon Consulting will continue to seek the incorporation of drift management information into Chemical User Accreditations (with anticipated further funding from CRDC and GRDC).

Bill Gordon Consulting will continue to provide professional development for trainers delivering chemical user accreditations (with anticipated further funding from CRDC and GRDC).

Bill Gordon Consulting will continue to assist in building capacity amongst the primary providers of information to applicators, namely the machinery dealers, the point of sale for chemicals and nozzles, advisors and consultants (with anticipated further funding from CRDC and GRDC).

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

Bill Gordon Consulting will prepare articles on over-the-top Roundup ready application using drift reduction technologies, and one or more articles on the use of weedseeker technology before the upcoming cotton season.

Bill Gordon Consulting will maintain the associations with all groups developed within this project to extend information of drift management.

(c) for future research.

Future projects (funded by GRDC ad CRDC) will attempt to quantify the level of risk associated with spraying at night as compared to spraying under neutral conditions. Such a study has not been undertaken before and the outcome is likely to be very useful for extension activities to motivate growers who have not already adopted good drift management practices.

Anticipated future projects (funded by GRDC ad CRDC) will continue to evaluate drift reduction technologies as they become available to growers and demonstrate the strengths and weaknesses of each technology within the cotton farming system.

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

Bill Gordon Consulting has prepared articles on Drift management were prepared and published in numerous industry journals and newsletters in the Northern Region, including;

- 3 articles in the Cotton Spotlight Magazine
- 4 contributions to the GDRC Ground Cover Magazine
- 1 Article in the Australian Cotton Grower Magazine
- 1 Article in Australian Grain
- 1 Article in the ICAN consultants Corner
- 1 article in the Cotton Outlook Suppliment
- 1 Article in the CTF Newletter
- 3 articles in the CFI Newsletter
- A number of articles are also posted on the GRDC website
- Articles are also posted on the ispray website
- Bill Gordon contributed to over 12 articles in regional newspapers relating to spray drift and spray drift management.

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

Yes, online materials have been prepared and are available through the website address www.ispray.com.au

The site includes copies of articles and reports associated with the projects activities. It also has available practical tools to assist users in making decisions related to application technology and drift management.

Part 4 – Final Report Executive Summary

This project was jointly funded by the Cotton Research and Development Corporation and the Grains Research and Development Corporation. The training activities delivered within this project resulted in a positive practice change towards improved drift management by more than 80% of the participants.

Over the three year funding period 114 training activities were delivered to growers, advisors and machinery dealers in the Northern GRDC region and Cotton Growing areas This output exceeded the project milestones by 75% (the milestones required a minimum of 65 workshops to be completed). The training activities alone contributed over $400,000 value to this project through in-kind and cash contributions from the industry and participants.

A total of 8 replicated trials were completed to demonstrate equivalent efficacy and potential limitations with drift reduction technologies. Results were widely reported to industry via field days, industry updates and inclusion in training materials.

Bill Gordon Consulting prepared 15 articles for industry journals, and contributed to a further 12 regional newspaper articles, and gave radio and television interviews related to spray drift management.

The outputs of this project, in combination with other industry initiatives, have seen a significant change in the types of nozzles that applicators are using. In 2005 at the commencement of this project only 43% of the nozzles supplied by the leading distributor in Australia would be considered as drift reducing, in 2008 this figure had increased to 72% of all nozzle sales through this supplier.

Project outputs have also seen an increased awareness of the meteorological conditions that contribute increased risk of spray drift occurring. Chemical user accreditations now include to the materials developed in this project by Bill Gordon Consulting.

This project has worked in conjunction with industry to develop the capacity to continually improve the management of spraying operations and to minimise the risk of spray drift events adversely impacting on the industry.