Australian Government
Cotton Research and Development Corporation

Annual, Progress and Final Reports

REPORTS

Part 1 - Summary Details

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

CRDC Project Number: **4.2.04 AC**

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: IPM Training Coordinator

Project Commencement Date: 1st January 2002 **Project Completion Date:** 30th June 2005

Research Program: 1 People and Knowledge

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Postal Address:

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Signature of Research Provider Representative: _____

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 IPM Training Coordinator position was created to development, lead and implement a grower focused short course relating to cotton IPM. The concept for the course IPM Coordinator position and was developed from a review conducted by the Rural Extension centre, Jeff Coutts in 1997. This project was commissioned by the CRDC/CRC to evaluate the adoption and needs for IPM within the Australian cotton industry. One of the recommendations included the need to develop an easily identified package on IPM and to implement strategies which best delivered practical information to the growers and consultants of the industry. Particular emphasis should be placed on increasing grower involvement in pest management decisions.

The course aimed to increase a grower's understanding of IPM strategies and to give them confidence in implementing change on their own farms. It was intended that participants be charged to attend the course. However, it is not intended for the course to be self funding although the revenue generated from the course may provide up to 50% of the project cost. This position will also assist in the training of district IDOs, as well as in the development of national extension programs in IPM.

The IPM short course is a competency based course and accredited under the National Training Framework administered initially by the Australian National Training Authority, (now redundant) and more recently by the Department of Education, Science and Training (DEST). The unit of competency the course was accredited to was initially RUA AG4302CT A "Plan and implement long term disease, pest and weed control". This rural training package was reviewed during the term of this project and the course was re aligned to the new competency unit called RTE 50006A "plan and manage long term weed, pest and / or disease control in crops".

The IPM grower short course has had a series of coordinators; Mr Greg Kauter, Mr Bill Dalton and Mr Mark Hickman. Each establishing, individual milestones within the courses development. Only through the collaborative nature of the Australian Cotton CRC, and the leadership of Mr Kuater, it possible to collate industry and research documentation regarding IPM. This information focused on the principles behind IPM management, utilising relevant industry examples of how to implement practical IPM. Mr Dalton formulated the short course into a five day course conducted over a cotton production season. It consisted of a 2 day workshop in winter, 2 field days within crop and review meeting post season for reflecting on practice change. Mr Dalton successful acquired FarmBi$ funding for the program and was able to conduct in 2001, 3 industry pilot programs. Following these successful workshops Mr Hickman held the position of IPM training coordinator

during 2002-2005. In this period of time Mr Hickman implemented the suggestions generated from the pilot program and implemented / modified the course to suit the emerging transgenic cotton crops.

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

Objectives	Achievements
To organise and conduct a series of IPM Short Courses (5 days per course) for the production seasons 2001-02 to 2004-05 inclusive	The season 2001-02 was the pilot program year and 3 courses were held with 34 people attending. From 2002-03 to 2004-05 a further 17 courses were conducted with another 187 people. This provided the grand total of 20 courses established across the various production regions, resulting in 221 people attending. Course locations were held at Emerald, St George, Dirranbandi, Dalby, Goondiwindi, Mungindi, Moree, Narrabri, Trangie and Hillston. For training purposes, an upper limit for attendees was set at 15 participants per course (maximum). The limit was set to ensure an interactive work environment. The following composition resulted from the 221 people that attended. Growers = 163, Consultants (which includes agronomists on farm, private and reseller agronomists= 47, and 11 were classed as "other". Providing a rounded average across all sites and years of 11 people per course. A strong average although this average was short of the desired maximum.
Provide through presentations and the IPM course a reference manual and extend to the industry the most up to date research.	*Lecturers:* Researchers time to attend and deliver as guest lectures at the short course is always limited. However numerous researchers from CSIRO, DPI and F and NSW DPI provided valuable presentations and the opportunity for participants to have one to one discussions regarding local technical issues. This dialogue was a double benefit with researchers also receiving valuable feed back from the growers on their work. The list of researchers involved in the course was as follows: People from the former NSW Agriculture : Louise Rositter, Robert Mensah, Kirrily Rouke, Annie Johnson, Tracey Farrell, Julie O'Halloran, Evan Brown. People from CSIRO: Martin Dillon, Sarah Mansfield, Mary Whitehouse, Tom Lei, Warwick Stiller, Brian Duggan, Lewis Wilson and Scott Hardwick. People from the Department of Primary Industries and Fisheries : Dave Murray, Melina Miles, Brad Scholz, Paul Grundy, Carrie Hauxwell, Rebecca Smith, Greg Salmond, and.

	Additional people: Jonathon Hollway (Bayer Crop Science), Brendan Griffiths (Griffiths Agronomy Pty Ltd), Anthony Hawes (AgBiotech) David Kelly (CSD) and Steve Ginns (NRM) *Cotton Focused IPM Video:* Production of the short course IPM video was completed towards the end of the 2003-04 season. Therefore, the first real screening of the DVD version was in the 2004-05 season. Strong support was provided back from the groups as to the need for more of these videos on numerous issues, especially the grower testimonials relating their experiences. The IPM course has adapted in the presentations and technical information that is delivered at all components of the course to reflect the transition of Bollgard II cotton into the industry. Industry information shown to the groups included plant-monitoring tools such as squaring node development, the current and future use of Magnet® technology and finally the nutritional and water management of the technology.
Using IPM knowledge presented in the short course, develop and document changes in Insect management approaches	*Measurable by:* Course evaluations both written and verbal. See results section of this report for written quotes and graphical evidence. *Result in general:* Course evaluations for the 2002-03 to 2004-05 seasons inclusive revealed major attitude and management impacts as a result of the course. An evaluation form was collected after each workshop for he each location. This was done for 3 seasons and resulted in 591 questions responded to. After combining all evaluations form, participants indicated 77 % of them would strongly recommend the course to others. While 97.3% said the course meet their expectations. As a result of attending the course 72% acknowledged they were going to implement a practice change as a result of the course. Aspects nominated as this practice change included increased confidence to engage with the consultant to develop management decisions, use of plant monitoring, and an increased level of personal checking of the crop. Highlighting a major achievement of why the course was established.
Increase the confidence and knowledge of growers in the area	*Measurable by :* Course evaluations both written and verbal. *Result:* Prior to starting the course participants are asked to identify what they believe their knowledge and

of IPM	confidence levels are before the IPM course. Then after completing the course the same questions are asked. This self assessment ranking with a value of 10 as the highest and obviously 1 equals a low value. In accumulating the responses over the term of the project, the largest percentage of people ranked them self as a 5 for knowledge and confidence before the course. While after the course they ranked a 7.5 for knowledge and 7 for confidence. See graphical results
Assess and provide Accreditation to successful participants that have conducted the IPM short Course	*Measurabe by:* Number of people receiving statements of attainments from the registered training organisations *Result:* The accreditation statistics for 2001-02 to 2003-04-05 inclusive was 114 people. The 2004-05 season was still to be processed by the registered training organisation at the time of this report, however 30 more people have been assessed as competent and recommended for statements of attainments. Resulting in a total of 144 successful applicants; a 65% success rate for the life of the project. At the 2004 Moree Cotton Trade Show, Statements of Attainments were presented to local Moree and Mungindi producers by the NSW Minister of Agriculture the Hon. Mr MacDonald.
To be an active member of the Australian Cotton CRC Insect Focus Team Member	*Achievements:* As this focus team leader for the Insect Focus team, there have been numerous achievements. However the following are some highlights that overlap as IPM training Coordinator. Within this capacity I participated in the design, collection and analysis of a grower / consultant Bollgard survey. Interviews were conducted pre 2003-04 planting and the post picking interviews commenced at the start of the 2004-05 season. This pre plant data was presented by Mr Bruce Pyke in his address titled "Industry perception on management issues associated with Bollgard® II" at the 12th Australian Cotton Conference, Gold Coast Queensland (August 2004). *Mirid Workshop:* Participate in a research review meeting concerning the industry's knowledge of Mirids. With the industry moving towards an increased planting of Bollgard in the 2004-05 season, this research review was strategically significant. An output from this meeting

	involved myself and other members of the insect team is the development of two CRC research reviews dealing with Mirids ecology and management. *Moree Trade show:* The focus of the insect team is the collect and analysis data regarding grower opinions on refuge management. The data will include what management issues they have with the current refuge crops and how they rate the pigeon pea refuge crops grown in 2004-05. This rating of their pigeon pea crops was done anonymously via selecting a poster picture at the CRC stand that related to their crop the closest and placing the selection in a box. All this data will be presented to a CRDC resistance meeting in June 2005. Participants will mainly be relevant entomologist, industry representatives and extension staff.

3. Detail the methodology and justify the methodology used.

The IPM Short course is focused on delivering a practical, hands-on IPM short course that condenses the latest research in IPM into information that is applicable at the field level. To achieve this outcome, the course was broken into 4 component workshops over a 12 month period. The first component of the course is a class room setting where researchers and the IPM training coordinator present technical information over a 2 day period. Within these two days, a series of case studies, group activities and interactive displays are used to demonstrate certain aspects of the training. This workshop occurs in the winter period.

The next two components are conducted within a field situation on one participant's farm. The day starts with a BBQ breakfast, followed by field work and assessments. The day finishes with a group discussion in a shed environment to discuss management options based around class collected data. The workshop involves an entomologist that was presented at the two day workshop. The first of the field workshop occurs mid squaring to pre flowering. The obvious focus is early season crop management. The second field workshop focuses on late season management and occurs post cutout, early boll opening. Both sessions are focused on the interaction between the insect and crop in terms of compensation and development.

The final workshop is extremely popular. It is the reflective components of the course where participants report to the class on an IPM program that they being implemented over the recent summer while attending the course. The concept is to allow participants to implement an IPM practices they received during the course and receive group feedback on how to improve it for their situation.

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

Evaluation results :

As previously mentioned, an evaluation program was implemented in 2002-03, to collect feedback and opinions on how the IPM course can be improved. The following data is a summary of the core impact questions asked after each workshop. There were a total of 591response sheets analysed in this evaluation from 187 participants.

* 97.3 % of respondents either agreed or strongly agreed that the IPM short course met their expectations.

* 98.4 % would recommend the course to other growers or industry people

* When asked "Do you think what you learnt will change your farming practice", 72% said yes, 4.1% said no, 19.3 % were unsure and 4.5 % gave no response.

* Of the yes that stated YES there are farming practice changes, the top 5 areas of change were:

1. Increased role and collection of plant mapping data
2. Increased communication with consultants
3. Increased importance placed on beneficial insects
4. Increased degree or recently a commencement of personal insect scouting
5. (Equal): More consideration of pesticide selection and
   The use of beat sheet sampling for pests and beneficials.

* When asked whether the information presented in general at the course / workshops was reinforcing what they already new or was it new information, on average 45 % of responses were reinforcing information and 53.2 % said it was new information.

* Participants were asked to think of a single word that best describes the IPM short course in their opinion. The top 5 words were (in ranked order): good, informative, useful, excellent and great. A selection of other words that appeared lower on the list were thought provoking, challenging and essential.

* Quotes from participants are a good indicator the course evaluation. The following quotes are a sample of participant opinions.

> The course was 'field based and practical'. The course provided an 'informal/friendly atmosphere with practical applications'. A very positive aspect was the 'good learning field activities – hands on' approach.

A grower comment he " found the field days very practical and informative, it was just what I wanted"

"The course got me thinking about the whole farm approach"

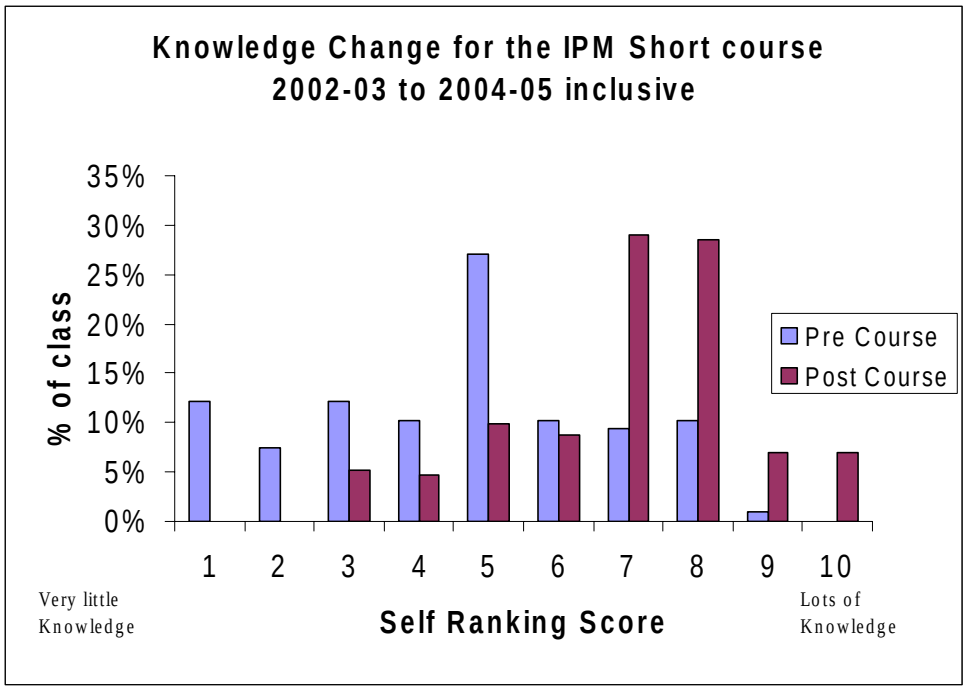
A Dalby grower commented "The IPM short course empowers us to do a better job"

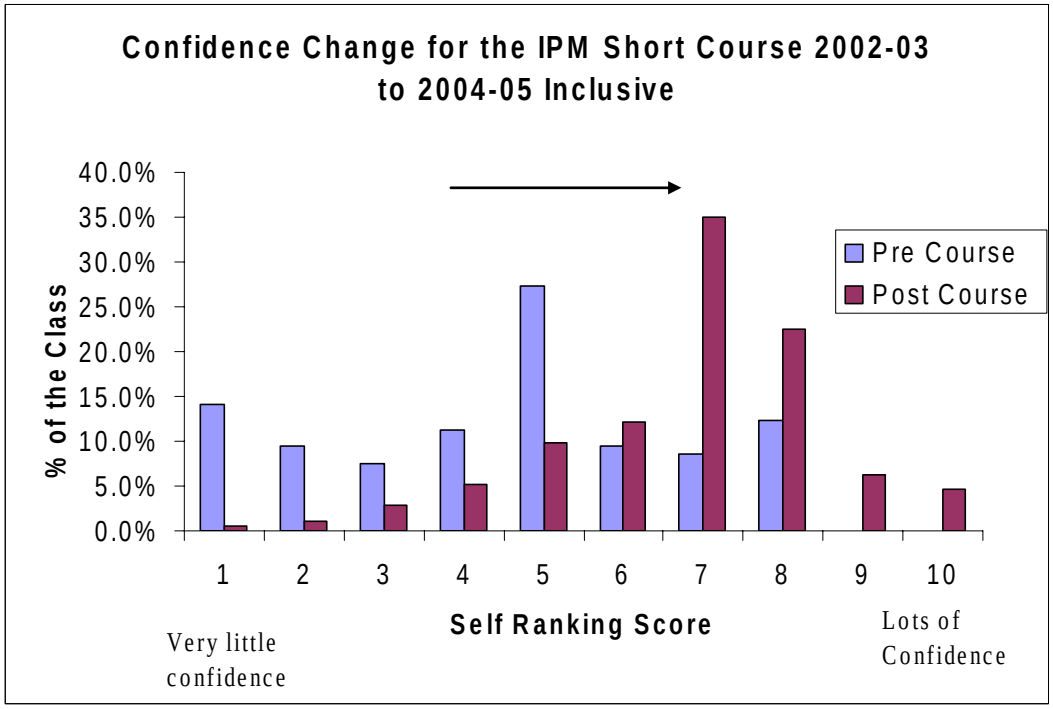
" benefit to me was you get to talk to growers that have the same problem, so we are all looking for common solutions"

* Participants demographics were only collected in the 2003-04 and 2004-05 season.

	2003-04	**2004-05**
Age of being in the Industry		
< 5 years	34 %	38 %
5-10 years	29 %	29 %
>10 years	37 %	33 %
Classification		
Grower	83 %	59 %
Consultant (combined private, reseller or on farm)	17 %	33 %
Other (industry representatives, students)	0 %	8 %
Total Number for course	78 people	43 people

* Participants were asked to self rank from 1 to 10 , how they would view their knowledge of IPM and confidence in practicing IPM both before the course started on the morning of the 1st workshop. Then again at the completion of the 4th workshop 12 months later. The most important aspect is that in both situations the bulk of the responses moved to the right. Indicating an improved knowledge and confidence level. See the below figures.





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

The main take home message from this project is competency based training is a viable extension approach for future cotton short courses. Growers endorsed the hands on approach to training and found the assessment aspects of the course acceptable. As seen by the evaluation data the project achieved the objectives for which the course was developed for. The interaction between researchers, extension officers and growers was invaluable and often lead to intense and complex discussions on various IPM issues relevant to that groups situation. A contributing

factor to why this course was also successful was the drive provided by a designate person to the course.

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

The IPM short course asked participants to volunteer a representative spray program for their property. This program is compared to the valley's average that appears in the CRDC Ingard performance reports for that season. This data is requested at the start of the course and near the completion of the project, the same data will be requested for a comparison. The project hopes to demonstrate a change in the amount and number of pesticides used after completing the course. This will contribute to both an environmental and economic benefit. Grower comments recorded both verbally and formally throughout the 3 year project will be used to demonstrate how the IPM short Course has contributed to production knowledge and the overall influence this have on management decisions.

In relation to a social output, the number of formal statements of attainments from the associated agricultural colleges will demonstrate the increase skills and knowledge base within the industry.

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.)

Not relevant

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

Not relevant

c) are changes to the Intellectual Property register required?

Not relevant

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

At the completion of the IPM training coordinator project a follow on project titled Cotton Training Coordinator was granted. The purpose of this project is to expand on the success of the IPM Short course and develop future courses using this model. As a result of this new project a revised and up dated IPM short course is a possible outcome. However, previous students of the course will be consulted for guidance on the best approach to updating or revamping the IPM short course in light of transgenic cotton.

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)

Conferences :

Hickman M.A., (2004) *Getting IPM Theory Into Practices*, 12th Australian Cotton Conference: Quality Cotton ; A living industry, In print and CD, Broadwater Gold Coast, Queensland 10th –13th August 2004.

Kelly, D., McLennan A, Pyke B, Hickman M. A. , Deutscher, Kauter G., (2004) *Industry perception on management issues associated with Bollgard® II.* 12th Australian Cotton Conference: Quality Cotton ; A living industry, In print and CD, Broadwater Gold Coast, Queensland 10th –13th August 2004.

Dalton, W, McIntyre G.T., Gibb, D., Hickman, M.A. ,and Kauter, G., **'Australian Cotton Cooperative Research Centre IPM Short Course – An Industry Learning Together'**, Third World Research Cotton Conference, 10th – 14th March 2003 Capetown, South Africa.

Gibb, D., Hickman, M.A. and MacPherson, I., **'Using Fruiting Factors as a Tool for Insect Management'**, Third World Research Cotton Conference, 10th – 14th March 2003 Capetown, South Africa.

Christiansen, Ingrid and Dalton, Bill. 2002. **Understanding IPM – Industry Attitudes, Practices and Education**. 11th Australian Cotton Conference, 13th – 15th August 2002, Brisbane, Australia

Seminars/Workshops:

Hickman M.A., (2003-05) Australian Cotton CRC IPM Short Courses (Various locations mentioned within the report)

Hickman M.A., (2003) *An Overview of IPM in cotton*, WINCOTT Organisation, Narrabri 9th September 2003

Hickman MA., (2004) *An Overview of IPM in cotton*, WINCOTT organisation, Emerald 13th January 2004.

Grower Magazines and Articles:

Cottongrowers gain pest management skills , Department Of Primary Industries Media Release, January 2004

Cotton Growers Join Forces To Combat Insect Pests , Cotton CRC Media Release April 2004

Integrated Pest Management Expands , Cotton CRC Media Release March 2004

Looking for numbers: Integrated Pest management short course, Cotton CRC Media Release August 2004

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

No

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 IPM training coordinator position is a valuable extension position to the cotton industry. The delivery of the IPM Short Course contributes to the whole extension effort delivered by the national extension team in relation to IPM adoption. The use of a competency based course allowed the intense training of a small group of growers over a 12 month period. Based on the evaluation data collected, a vast majority of these participants suggested a farming practice was to be change that was directly linked to the course. The adoption of IPM practices has social, economic and environmental benefits all outlined in the 2004 BDA economic report commissioned by the Australian Cotton CRC. The IPM Short course was a contributing example which was stated within this report.

Part 4 – Final Report Executive Summary

The Australian Cotton Integrated Pest Management grower short course was conceptualised and developed from a recommendation presented in a commission report in 1997. this report focused on the adoption of IPM within Australian cotton industry. The recommendation made from this study identified the need to develop a package on IPM that could provide practical implementation strategies for growers. Industry accepted this recommendation and development a "hands on", "practical focused", and " technical strong" short course. As well as assigning a designated IPM Coordinator to develop and implement the course.

From Left to right, IPM Training Coordinators Greg Kauter, Bill Dalton and Mark Hickman

The IPM grower short course has had a series of coordinators; Mr Greg Kauter, Mr Bill Dalton and Mr Mark Hickman. Each coordinator established, individual milestones for the course's development. Only through the collaborative nature of the Australian Cotton CRC, and the leadership of Mr Kauter it possible to collate industry and research documentation regarding IPM. This information focused on the principles behind IPM management, utilising relevant industry examples of the modern farming system to establish both grower and industry creditability. Mr Dalton formulated the short course into a five day course conducted over a cotton production season. It consisted of a 2 day workshop in winter, 2 field days within crop and a review meeting post season for reflecting on practice change. This course format and content achieve a national competency based accreditation mapped to the unit RUAAG4302CTA at a Certificate IV level. Mr Dalton successful acquired FarmBi$ funding for the program and was able to conduct in 2001 the 3 industry pilot programs. Following these successful workshops Mr Hickman held the position of IPM training coordinator during 2002-2005. In this period of time Mr Hickman implemented the pilot suggestions and modified the course to the emerging transgenic cotton crops. During this time a DVD was commissioned to NSW Agriculture and overseen by Mr Hickman to capture comments on leading IPM adopter's comments within the industry. The DVD is used in the course and generates strong support from the participants. During the delivery period of this project Mr Hickman was successful in up grading the level of competency to Certificate V in agriculture addressing the unit RTE5006A "plan and manage long-term weed, pest and/or disease control in crops".

Photo 1

Photo 2

Photo 1: Mark Hickman (DPIF) and Cleave Rogan (St George) receiving formal IPM certificate
Photo 2: Melina Miles (DPIF) identifying beneficial insects for an IPM class at Goondiwindi

Since 2001, there have been 20 courses completed across 11 of the industries production valleys. Statistics collected from the course indicated of the total 221 participants that participated (2001 to 2005), shows approximately 70% of

participants are cotton producers, 25 % cotton consultants and 5% industry representatives. Excluding the 43 participants in 2004-05 courses, since assessments had not been completed at the time of compiling this report, indicates 169 participants (2001-2004) have successful been awarded a statement of attainment from either Murrumbidgee College of Agriculture or Dalby Agricultural College relating to the above mentioned qualifications.

In the 2004, a BDA economic analysis of the Australia Cotton CRC stated research and extension in the area of IPM had an estimated benefit of $315 millions over the previous 5 year period. This project contributed towards this benefit. Participants from the course completed a self-evaluation before the course and at the completion of the course 6-9 months after starting. This indicated 72% of participants identified a practice change in their operation as a result of the course. The main areas of improvement were identified as increased and improved communication especially with the consultant. Growers felt they were empowered to enter into dialogue regarding management decisions suggested by the commercial consultants. Other growers identified a greater level of importance regarding beneficial insects when deciding on a management decision. Some growers simply increased the level of plant monitoring through mapping techniques learnt in the field days to aid in management decisions.

In conclusion the IPM course has provided two valuable outcomes for the industry. Firstly, there has been practice change at the farm level. Secondly, the competency-based framework of the course has established a workable model that can be adapted to other future training development within the cotton industry.