



# FINAL REPORT

## *Part 1 - Summary Details*

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**Cotton CRC Project Number:** 3.04.01

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**Project Title:** Promoting Science and Agriculture in Schools

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**Project Commencement Date:** 1 July 2009

**Project Completion Date:** 30<sup>th</sup> June 2012

**Cotton CRC Program:** Community and Adoption

## *Part 2 – Contact Details*

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**Signature of Research Provider Representative:** \_\_\_\_\_

## ***Part 3 – Final Report Guide (due at 31<sup>st</sup> May 2012)***

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

### ***Background***

1. Outline the background to the project.

The number of students going onto university to study sciences is declining and is well documented by DEST. The Cotton CRC has identified this as an important issue and in this project attempted to address this issue through a number of approaches including:

- Providing educational opportunities that provide a flexible path for skills and knowledge development at all levels of the industry;
- Providing up-to-date specialist short courses and vocational training for cotton consultants, agribusinesses, cotton growers and their staff; and
- Promoting science and agriculture in schools.

At the commencement of the project the Cotton CRC invested in a few small, but successful, ad hoc school projects to get some things underway. These included;

- Primary Science Matters (\$10,000)
- Emerald Go Agro (\$4,000)
- My River Darling (\$5000)
- School Prize Narrabri High School (\$100 p.a).

This project, led by a part time Education Officer based at the Australian Cotton Research Institute, Narrabri, focused on the promotion of science and agriculture in primary and secondary schools and fitted within the Cotton CRC Education and Training sub-programme. The project also had close links to the CRC Communities Programme which aimed to enable mutually beneficial interactions between industry and regional communities. The project realized these goals by developing and implementing activities with Cotton CRC partners, scientists, school teachers, the National Cotton Extension Team, catchment and government education agencies, local schools, and the community.

A major objective of the Schools Program was to develop, enhance and expand the science and environmental management syllabus in primary and high schools by providing relevant cotton information and opportunities for practical on-farm activities. By promoting science and agriculture in schools, the project aimed to encourage school children into careers in science and agriculture.

### ***Objectives***

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

a. **Integration of Cotton CRC education activities with that delivered by the Primary Industries Centre for Science Education (PICSE).**

- i. Actively engage with the PISCE program through the commencement of a Science Education Officer role.

This project objective was achieved in full. The Education Officer actively engaged with the PICSE program by helping to coordinate and implement the nationally run PICSE programs. This involved attending Science Education Officer forums, visiting classes in schools, presenting at teacher personal development days (PD's). It also involved coordinating students in the Industry Placement Scholarship, which involved placing a student for five days with a team of scientists in specific industries or research organizations. The Education Officer organized the Science Investigation Awards, which involved high school and primary school students carrying out their own scientific investigation in class or on their own.

- ii. Maintain partnership with the PICSE programme through Science Education Officer Role.

This project objective was achieved in full. As part of the PICSE team, the Education Officer assisted officers leading other activity centre's with running workshops, conducting presentations at Science Investigation Awards, and Teacher PD's.

**b. Facilitate interactions with schools in cotton communities and nearby towns.**

- i. Coordinate and deliver educational interactions between scientists and schools.

This project objective was achieved in full. The education officer has developed and established a number of activities that actively engaged schools, students, teachers, scientists, cotton industry representatives, farmers, government agencies and the community. These activities have been delivered across a wide range of communities in both NSW and Qld. They include;

- The establishment of the Enviro Stories Competition ([www.envirostories.com.au](http://www.envirostories.com.au)) involved working in conjunction with other agencies such as Catchment Management Authorities (CMA's) and PeekDesigns ([www.peekdesigns.com.au](http://www.peekdesigns.com.au)) to develop a resource for schools. The Enviro Stories Competition works on the paedology of kids teaching kids. Students from across the 9 cotton catchments were invited to write and illustrate a story based on a given environment theme. The winners were published into readers and distributed across the catchments to libraries and schools.
- River rallies and Bush Bash workshops are unique environmental education initiatives: environmental education experts from Government Agencies (e.g., DPI, CMA, CSIRO, Cotton CRC) take children out of the classroom to provide first hand learning experiences of the environment. The Education Officer facilitated and hosted these events by coordinating with the organisational group and schools to fix a suitable time and place to carry out activities.
- The organisation and facilitation of visits to the Australian Cotton Research Institute (ACRI) at Narrabri for schools (primary and high), universities, and community groups. Examples include; The Rotary Youth Agricultural Group (RYAG) from Moree High School, Wee Waa High School, and Calrossy Anglican Girls School

attended ACRI to explore science and agricultural career opportunities. RYAG is a four-day cotton camp that offers students from across regional schools an overview of the cotton industry and job availability and gives guidance and direction for career paths into the cotton industry. Throughout the project the Macintyre High School and Calrossy Anglican Girls School visited ACRI annually to learn about Genetically Modified Organisms (GMO's) as part of their curriculum.

- The establishment of a working partnership with research scientist Rene Van Der Sluijs from CSIRO Materials and Engineering to develop, organise, and facilitate a modified schools version of the cotton industry's award winning Field to Fabric Course. The course was modified to a one day workshop that recognised curriculum goals for students studying science, agriculture and textiles and design.
- The education officer instigated and facilitated major science events such as the inaugural visit of the Australian Museum to introduce 'Science in the Bush'. Previously this program was only held in large regional areas such as Albury, and Dubbo. The program brings Science activities from the city to the bush and provides avenues for the exposé of local science industries to be involved. In 2011 they presented to nearly 1000 students who travelled within a 500km radius from Narrabri. Another major event was the Science and Engineering Challenge: an outreach program conducted nationally by the University of Newcastle. This program is designed to inspire students to study science and engineering at a senior level. Each challenge day, students participate in a series of exciting competitive activities designed to demonstrate the varied and practical elements of a career in the science and engineering industries.
- The Education Officer conducted workshops, and organised displays, and presentations on cotton production and pest management to the broader cotton industry, farmers, schools and research groups. The Education Officer organised events such as attendance of high school students at the Ag emersion days at Goondiwindi, The Surat Primary School Environmental ECO Day, a teacher personal development day at St George, and field day at Warren.

**c. Develop resources that promote science and agriculture in primary and secondary schools across the cotton growing regions of NSW and Qld.**

- i. Identify and update suitable teacher learning materials for primary and high school programs.

This project objective was achieved in full. The project used already established and produced resources from Cotton Australia, the Cotton Exhibition Centre (now extinct), The ACRI, CSIRO, DPI, CMA's and PICSE. The resources were sourced and updated to reflect current changes in the industry and technology advancement within the cotton industry.

The Education Officer organised, designed and facilitated a portable cotton awareness and careers display that can be taken to careers expos, school visits, and other relevant events. The Officer also developed a brochure '*Grow your Future with Science and Agriculture: Investigate careers in agriculture and science, they offer opportunities to cultivate change and open*

*gateways for employment worldwide.*' This was developed to show the various careers available within the cotton industry.

**d. Promote Cotton CRC education activities in the media.**

- i. Work with the Cotton CRC Communications Officer to publicise the project activities.

This project objective was achieved in full. The education officer has worked with the Cotton CRC communications team and the TRC team to publicise and promote all schools projects.

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

This project was the Cotton CRC's primary mechanism for promoting science and agriculture in schools. For an effectively delivery this project used a number of approaches. The framework and methodology for delivering included:

- Lead and coordinate the project;
- Act as the Cotton CRC contact point for primary and secondary schools
- Facilitate interactions with schools in cotton communities and nearby towns.
- Identify and update teacher learning materials for primary and high school programmes
- Arrange competitions or events that will assist the Cotton CRC meet its goals.
- Work with the Cotton CRC Communications Officer for publicity opportunities
- Provide management with any necessary reports, including the Annual, May and November report and a Final project report

Students were targeted and engaged with the ultimate aim to encourage them into science and agricultural careers, especially the cotton industry which offers a wide range of career opportunities. By offering them an awareness of the opportunities, they then can further their career via two pathways either through the academic line to university and then hopefully onto post graduate studies if they are interested in being a researcher or they can choose a path via traineeships and apprenticeships.

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

**a. Integration of Cotton CRC education activities with that delivered by the Primary Industries Centre for Science Education (PICSE).**

- i. Actively engage with the PISCE program through the commencement of a Science Education Officer role.

The project education officer established an activity centre in PICSE on cotton by actively participating in Science Education officer (SEO) forums twice yearly, SEO phone forums bi monthly, and continually engaging with other PICSE SEO's and Activity Centres around Australia. These engagements were via planning meetings, and activity events such as Teacher PD's, reporting back sessions, presenting cotton production workshop at PICSE UNE Armidale's Science Investigation Awards (SIA) (2009, 2010 and 2011), presenting

similar workshops at the PICSE USQ Teacher PD (2009, 2010 and 2011) and by establishing a cotton industry based Science Investigation Awards event in Narrabri.

The Education Officer's facilitation and management of the PICSE Cotton Science Investigation Awards involved over 600 students from 5 schools across one catchment, 47 entries, and over \$2000 in sponsorship. The activity involved over 10 different organisations and 50 community members acting as judges and officials from 2009 to 2011.

The project education officer supported the PICSE programs integration into the cotton industry by coordinating industry researchers from CSIRO to supply assistance, mentoring and projects for the PICSE Industry placement Scholarships. Two successful placements were awarded (one in 2010 and 2012) and were highly viewed by participating members.

- ii. Maintain partnership with the PICSE programme through Science Education Officer Role.

The Education Officer has delivered by:

- contributing to the PICSE Network newsletters by providing cotton related articles to be distributed across Australia to 1,400 investors and stakeholders nationwide.
- speaking and presenting PICSE information packs to visiting students and teachers at various functions and events.
- briefing PICSE colleagues about the Cotton Industry, the relevant science supporting the industry, and current research programs.
- providing text and graphics to be incorporated in each SEO's PowerPoint presentation for use at their Year 11/12 class presentations in their State. This raises the profile of the cotton industry and cotton research even in regions where no cotton is grown.
- presenting at CONASTA (the National Science Teachers Conference), with the Cotton Industry research featuring in a number of presentation workshops conducted by the PICSE Team; material was provided by the PICSE Cotton SEO for the attending teachers who were from around the nation.
- continuing to assist and support PICSE colleagues with Cotton information and presentation assistance at national forums.
- weekly emails in which the PICSE staff report on their current activities

**b. Facilitate interactions with schools in cotton communities and nearby towns.**

- i. Coordinate and deliver educational interactions between scientists and schools.

The Education Officer coordinated and interacted with schools, government agencies, and industry partners across the 9 cotton catchment areas and also schools outside these areas through all avenues of communication from letters, e-mails and telecommunications.

The Education Officer arranged visits for local schools, cotton community schools, non cotton growing communities and other community groups from research and industry representatives. They have included:

- The organisation and facilitation of 20 science and research staff from 3 organisations to deliver hands on fun science related activities to the Narrabri Public School in August 2011 to over 1000 students.
- The organisation of 2 River Rallies and 1 Bush Bash workshops conducted over 2 years to 4 schools, with 200 participants.
- Providing material for projects for individuals and schools including the supply of insects for life cycle programs and personal visits to schools over a 5 week period showing students the growing cycle of the Helicoverpa moth. Since 2009 cotton samples and cotton information was supplied to over 20 individuals, and 6 schools.
- Providing 4 workshops at the ACRI to 21 home schooled students.
- Annual visits from Calrossy Anglican Girls School Tamworth and Macintyre High school Inverell agricultural classes from 2008 -2012. Exposure of over 80 students.
- In 2009, 2010 and 2012 the Rotary Youth Agricultural Group (RYAG) program exposed over 109 students from schools across the region to science and agricultural careers available within the cotton industry and how research staff have obtained their position within the cotton industry.
- Working with Dr Rene Van Der Sluijs from CSIRO Materials and Engineering to develop, organise and facilitate a modified schools version of the Cotton Industries award winning Field to Fabric Course. Of the totals below in Table 1 there were 6 different schools participating from 2 different catchments.

Table 1

<b>Field To fabric course statistics</b>						
Year	Participants	Teachers	Totals/year	Schools	Catchments	
<b>2008</b>	21	5	26	3	1	
<b>2010</b>	20	3	23	3	2	
<b>2011</b>	42	7	49	4	2	
<b>Totals</b>	<b>83</b>	<b>15</b>	<b>98</b>	<b>10</b>	<b>5</b>	

The Enviro Stories competition run in conjunction with Peek designs, the Central West CMA and NSW DPI continues to be an efficient way to interact with schools across the 9 catchments.

Table 2

<b>Enviro Stories statistics</b>							
Year	entries	Participants	catchments	schools	NSW	QLD	invites
<b>2009</b>	300	355	5	18	14	4	395
<b>2010</b>	244	353	4	12	7	5	
<b>2011</b>	226	343	7	14	9	5	791
<b>Totals</b>	<b>770</b>	<b>1051</b>	<b>16</b>	<b>44</b>	<b>30</b>	<b>14</b>	

The three year competition saw 41 different schools participate from 9 different catchments (2 non cotton growing catchments) with a total of 770 stories entered from 1051 participant authors. Invitations were sent out originally to 395 schools, which grew to 791 invitations sent out in 2011.

**c. Develop resources that promote science and agriculture in primary and secondary schools across the cotton growing regions of NSW and Qld.**

- i. Identify and update suitable teacher learning materials for primary and high school programs.

The Education Officer has continued to contact schools, government agencies, and industry partners to collaborate to find, update and develop new resources suitable for primary and high school programs.

The Education Officer has sourced relevant resources and assessed their suitability and has a working list of government and non government schools (list includes 800 schools across 4 states).

The Education Officer is continually working with the Cotton CRC TRC to update the schools and careers webpage on the Cotton CRC website. [www.cottoncrc.org.au](http://www.cottoncrc.org.au)

The Education Officer has established the role of being the main contact point for schools, parents, and local communities and community organisations for science and agricultural information. This has been achieved by fielding many inquiries concerning cotton and the cotton industry.

The Education Officer has developed an information pack that contains cotton production information sourced from the Cotton Australia website, has cotton samples ranging from seed to lint, and other information booklets from other cotton industries and organisations.

The Education Officer is working with PICSE to help disseminate their teacher resource CD that the SEO's from each full time activity centre develop each year to be distributed to high schools across Australia.

**d. Promote Cotton CRC education activities in the media.**

- i. Work with the Cotton CRC Communications Officer to publicise the project activities.

The Education Officer has continued to promote science and agriculture to schools and the community by presenting certificates and awards, representing the Cotton CRC at meetings, functions, launches, expos and information days, fielded phone inquiries, sent information packages on request, run events and competitions.

The Education Officer has supplied articles on key events to the PICSE programs Network Newsletter (3 over 3 years), CRDC spotlight magazine (2 over 3 years), and the Cotton CRC's Communities Office Newsletter (4 over 3 years).

Media releases were created for all competitions and events and advertised in local papers. The Project events were promoted through normal media outlets (papers, radio) and also through industry networks, relevant contacts, and school networks. The project delivered presentations to relevant forums and conferences such as the 2012 Cotton CRC Forums and to the 15<sup>th</sup> Annual Australian Cotton Conference 2010.

### *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.

This project was an integral component of the Education and Training sub-program to encourage an increase the number of primary and secondary students into science and agriculture based fields of study. This will not been seen in the life time of the current Cotton CRC. The project has potential alleviate some of the common misconceptions and misunderstandings that exist in schools and the community, surrounding science and agriculture especially with regard to the cotton industry.

The project was complimented by other Cotton CRC education projects which specifically focus on professional and tertiary education. The benefits to the industry from this project are long term but would hopefully lead to a continued supply of educated workers to the industry and a more science and agriculturally aware community. It will increase adoption of new knowledge and enhanced decision making capability of people working in or with the cotton industry, its catchments and communities. This allows for mutually beneficial interactions between industry and regional communities.

6. Please describe any:-
  - a) Technical advances achieved (e.g. commercially significant developments, patents applied for or granted licenses, etc.);
  - b) Other information developed from research (e.g. discoveries in methodology, equipment design, etc.); and
  - c) Required changes to the Intellectual Property register.

The project has benefited the industry by securing an advantage for the industry in the future through access to better educated, professional and loyal employees, and through a community that better understands one of the key industries that underpin its economy.

This project has also benefited the community as a whole by attracting and retaining qualified workers and building a professional, profitable and sustainable community.

### *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?

## Key activities

**Enviro stories:** Excellent and efficient way to cover primary schools (public & private) across cotton regions and areas close to cotton growing areas. Schools are factoring it into their school year. The competition is curriculum based with education kits and information packs available through the Education Officer and the web. This activity is a stepping stone in introducing science and agricultural related concepts.

**PICSE:** Primary Industry Centre for Science Education: National program to promote Science & Agriculture to high schools (public & private). Being able to fit into an exciting program is invaluable. The program consists of Class visits, Science investigations, Industry Camp, Industry placement, Teacher Pd, CD resource development. This activity engages students and teachers to participate in science and agriculture areas with a 'hands on' approach and gives them a solid back ground in what careers are available within the cotton industry.

**Field to Fabric:** A Collaboration of Cotton Industry representatives to supply a working, 'hands on' workshop that has curriculum links for high school students and teachers is invaluable. It is a great way to deliver all aspects of cotton production to schools, and provides excellent information for HSC test examples. This activity is great in its ability to be portable to cover more schools across more regions.

Please note that a number of organisations and visitors to Narrabri now rely on the Cotton CRC to host, assist and guide visitors due to the closure of the Cotton Exhibition Centre.

Note also that these events have gained momentum and the 'word' is getting out about the quality, usefulness and effectiveness of activities especially those that have curriculum links.

### *Extension Opportunities*

8. Detail a plan for the activities or other steps that may be taken:
  - (a) to further develop or to exploit the project technology.
  - (b) for the future presentation and dissemination of the project outcomes.
  - (c) for future research.

Future opportunities and ongoing initiatives in education could include:

- o continue the Enviro Stories competition to expand to further schools in and around cotton growing communities and metropolitan areas
- o continue to work with Dr Rene Van Der Sluijs to extend the Field to Fabric one-day schools course to being an established component of the school curriculum
- o obtain support for Science in the Bush to make the program an annual event
- o continue Enviro Beat Conferences, River Rallies and other educational programs
- o representatives of cotton industry to attend expos, Ag emersion days and career days to increase community awareness of the cotton industry and updates on technological advances

- provide support for Cotton Grower Associations to develop local initiatives with schools
- create opportunities for undergraduate support in the field of agricultural research by co-ordinating
  - a summer scholars program
  - a support horizon scholars program (eg., liaise with RIRDC to identify industry mentors & placements)
  - Post-grad program (coordinate field tours etc.)
- build opportunities to coordinate education activities with Cotton Australia & Primary Industry Centre for Science education (PICSE)

### ***Publications***

9. A. Publications relevant to this project.

'Grow your future' brochure for school students

#### Peer reviewed articles / books

None.

#### Non-peered reviewed articles

None.

#### Presentations (conference, field days, workshops etc)

Cotton Catchment Communities Science Forum 2008  
'Promoting Science and Agriculture in Schools'

Australian Cotton Conference 2010  
'Developing Future Cotton Industry Workforce'

Cotton Catchment Communities Science Forum 2012  
'Promoting Science and Agriculture in Schools'

B. All other publications by project team during this period.

#### Peer reviewed articles / books

None.

#### Non-peered reviewed articles

(NB: Where possible, please provide a copy of any publication/s)

None.

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

In conjunction with the Cotton CRC, Mr Dave Larsen and Miss Yvette Cunningham, the Education Officer has developed a section on the Cotton CRC website that houses all relevant information for the program and links to relevant sites .

#### ***Part 4 – Final Report Executive Summary***

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Provide a one page Summary of your research that is not commercial in confidence, and that can be published on the World Wide Web. Explain the main outcomes of the research and provide contact details for more information. It is important that the Executive Summary highlights concisely the key outputs from the project and, when they are adopted, what this will mean to the cotton industry.

This project was an integral component of the Education and Training sub-programme as it aimed to encourage an increase of primary and secondary students into science and agriculture based fields of study. This project has potentially alleviated some of the common misconceptions and misunderstandings that exist in schools and the community, surrounding science and agriculture especially with regard to the cotton industry.

The project complemented other Cotton CRC education projects which specifically focused on professional and tertiary education. The benefits to the industry from this project will be long term but would hopefully lead to a continued supply of educated workers to the industry and a more science and agriculturally aware community.

The project has benefits to the industry by securing an advantage for the industry in the future through access to better educated, professional and loyal employees, and through a community that better understands one of the key industries that underpin its economy.

The project has benefits to the community as a whole by attracting and retaining qualified workers and building a professional, profitable and sustainable community.

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