



FINAL REPORT 2015

For Public Release

Part 1 - Summary Details

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

CRDC Project Number: **UNE1302**

Project Title: UNE Cotton Production Course

Project Commencement Date: July 2012 Project Completion Date: June 2015

CRDC Research Program: 4 People

Part 2 – Contact Details

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Date Submitted:

30.09.15

Part 3 – Final Report

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

Background

1. Outline the background to the project.

The broad aim of the ‘UNE/CRDC Cotton Course’ has been to provide students with the necessary scientific and practical skills for sustainable cotton production. The units are designed with industry consultation for those people already in the cotton industry and for those wishing to enter the industry. Students learn how the cotton crop grows, how to manage the crop and the factors that affect the sustainability of cotton production in Australia. Assessment is by a combination of assignments, involvement in a residential practical school (one 3-4 day school per unit) and an examination. The type and weighting of assessments varies in each unit.

The ‘Cotton Production Course’ is made up of the following units.

- Applied Cotton Production
- Cotton Protection
- Cotton and the Environment
- Cotton Farming Systems

These units can be studied flexibly at undergraduate or postgraduate level. Students receive the same set of notes and presentations from industry experts and only differ in the required workload and level of assessment.

Brendan Griffiths has held the role of lecturer of the Cotton Course at UNE for the duration of this project. Brendan has spent nearly twenty five years working as a field agronomist, researcher, and consultant in the cotton industry and has also worked in both agribusiness and manufacturing sectors. Brendan has spent the past fifteen years operating a private consultancy business based in Goondiwindi, Queensland and is in the latter part of a PhD in irrigated agriculture.

It is through Brendan’s experience and industry linkages, as well as modern teaching technology, that new ideas have been brought to both the delivery and content of the Cotton Course. Collaboration with industry researchers and others, in writing and reviewing notes and giving presentations to students, will ensure continual relevance and a process of improvement. Over the three teaching years we have made significant changes to the cotton production course’ teaching material, a process that is ongoing. We have included topical issues facing the cotton industry, such as carbon and climate change, natural resource management, and water reform, as well as updating material with respect to plant nutrition and changes in current agronomic practices.

Objectives

2. List the project objectives and the extent to which these have been achieved, with reference to the Milestones and Performance indicators.

Objectives of the project have been:

- To review and update course content incorporating the latest CRDC and other research and industry practice.
- To maintain academic rigour and practical application using the quality educational controls delivered through UNE.
- To allow students to receive up to date information as industry and governmental policies are revised.

The following milestones were then devised to assist in the benchmarking of the project in achieving the above objectives.

Milestone 1 – It is difficult to ascertain the number of students completing the course as the stand alone undergraduate certificate qualification is no longer offered. This has been replaced by a diploma of agriculture, meaning no undergraduates actually receive recognition of completing ‘the cotton course’, as is recognised by the industry.

Total enrolments for the four ‘cotton’ subjects for the past four years were 2012 – 56 students, 2013 – 100 students, 2014 – 82 students, 2015 – 75 students. Not included in these numbers are the UNSW students studying cotton where there have been around twenty students for each of the above years as well. UNE continues to provide support for these students and convenes a three day ‘cotton tour’ in Trimester (Trim) 1 of each year that includes the Sydney based students.

The cotton course offerings have received extremely favourable feedback following a UNE survey of subject offerings for Trim 1 2014. The results of the survey are attached, with COTT 300 – internal, performing within the top 10% of all offerings across UNE for that time, according to the criteria of the survey. Feedback from the Deputy Vice Chancellor has also been received, outlining this result being achieved; this has also been attached to this report.

Milestone 2 Popularity for the internally offered COTT 300 – ‘Cotton Production’ elective has increased over the duration of this project as well. This is, I believe, is largely related to the continual improvement of teaching material and the applied manner in which the science is delivered. Student numbers for the past four years in this unit have been 2012 – 9, 2013 – 17, 2014 – 15, and 2015 – 25.

Milestone 3- As stated in Milestone 1, the relationship with UNSW continues, with 42 students from UNE and UNSW participating in the ‘undergrad tour’ held in January 2015, which also included attendance at the Macintyre Valley Cotton Field Day, something that was very well received by both the students and the industry.

We have commenced communication regarding cross-institutional arrangements with both USQ and UQ, as both institutions will be offering agricultural science awards as of January 2015. These conversations have been in collaboration with contacts previously established by Warwick Waters of CRDC, although are currently on hold whilst questions regarding the funding of the course exist.

Milestone 4 – The course notes, specifically for units COTT 302/502, Cotton and the Environment, and COTT 300/500 Cotton Production, were both reviewed for Trimester 1 2014. COTT 302/502 underwent a complete rewrite with engagement from Roth Rural, and Jon Welsh of CRDC. These changes were also very well received by the 2015 class. Further review of this material will be conducted and included in 2016. As mentioned the COTT 300/500 teaching material has been revised again for 2015, with good reviews from the students. This process of review will now become continuous and Tim Napier of Border Rivers Food and Fibre has been engaged to conduct a complete overview of the topic of groundwater and water reform in the COTT 302/502 unit, to be completed for delivery in Trim 1 2016.

Milestone 5.1 – The cotton course lecturer will continue with collaborative research with Incitec Pivot and University of Queensland with soil and plant nutrition, and cropping rotations. For 2015 the CRDC approved project UNE 1501, ‘Phosphorus Availability in Raingrown Cotton’ as is currently being conducted in collaboration with Prof. Mike Bell, Assoc. Prof. Chris Guppy, and Incitec Pivot Ltd, at the ‘ Incitec Pivot - Colonsay long term nutrition site’ on the Darling Downs. A further submission has received approval – UNE 1603,

‘Spatio-Temporal Visualisation of Irrigated Cotton Root Development in Eastern Australia’, which will be an initiative of the UNE Cotton Hub, including researchers from the UNE Precision Ag Research Group. Further funding to this project is being provided by the CRC for Spatial Innovation, with the cotton course lecturer being the lead researcher on this project. The cotton lecturer also has a time commitment to UNE 1601, ‘Soil System Research – Physical, Chemical and Biological Processes for Plant Growth and Nutrient Cycling down the Whole Soil Profile’, working with Dr Oliver Knox, Dr Nellie Hobley, and PhD students Eckhard Ferber, and Katherine Polain.

Milestone 5.2 – The cotton lecturer is currently supervising Kate Lumber and Luke Simpson, BRurSc honours students, who are both working on UNE 1501, ‘Phosphorus Availability in Raingrown Cotton’. For 2016 we will have the Peter Gregg cotton scholarship recipient, MScAg student - Alice Devlin, working on a cotton based research project. We have other projects for 2015/16 working with Dr Chris Dowling investigating critical values for tissue analysis of K nutrition in cotton, and potential for ground-truthing investigative work in collaboration with the ‘Spatio-temporal Visualisation of Irrigated Cotton Root Development in Eastern Australia’, project.

The cotton lecturer is also in an advisory capacity for the PhD student project of James Botfield – Douglas McMaster PhD Research Scholarship, titled ‘Optical, Thermal, and Satellite Sensing for Sub-field Irrigation Management’

Milestone 6 – Marketing has been largely conducted through industry specific print media.

Conclusion

Development of Human Capacity in the cotton industry is of paramount importance, more so now than ever as the industry continues to rebuild its intellectual base following a period of drought which saw a large number of highly experienced and senior industry personnel leave the industry. The cotton industry’s reliance on the professional sector is something that is atypical of other agricultural industries and the current deficit in capacity in this area is something that must be addressed as a matter of urgency. It is acknowledged at industry level that attraction of new staff is key to the future success of our industry. Of equal importance is the training and retention of these staff. The cotton course clearly addresses all of these points. As an industry we must continue to move forward to achieve industry and environmental compliance requirements whilst maintaining the high levels of adoption of new farming systems methods and technology in order to achieve the productivity outcomes that the industry has enjoyed since the inception of modern production practices. Education also plays a pivotal role in improving awareness of industry problems and solutions whether perceived or real within any community or industry. Many of the negative attitudes to cotton production stem from an inaccurate or outdated understanding of modern cotton production practices. The cotton course provides a human conduit for improved awareness of modern practices and the industry’s successful implementation and adoption of BMP.

A highly skilled workforce, with up to date knowledge of modern scientific research and agronomic methodologies can only assist in making the cotton industry more competitive. With the ‘cost – price squeeze’ and other industry pressures including drought and the need to continually improve our environmental profile, we need our industry workforce to be motivated, and have the know-how, to continually improve our ‘input use efficiencies’ from not only an environmental point of view, but also one of profitability. These points, in conjunction with producing the highest quality product, using the most up to date agronomic methodologies, are the key focus of the ‘cotton production course’. Course recipients are provided with the knowledge to produce the most cost and input efficient, highest yielding, and highest quality product in the cotton producing world.

Part 4 – Final Report Executive Summary

The broad aim of the ‘UNE/CRDC Cotton Course’ has been to provide students with the necessary scientific and practical skills for sustainable cotton production. The units are designed with industry consultation for those people already in the cotton industry and for those wishing to enter the industry. Students learn how the cotton crop grows, how to manage the crop and the factors that affect the sustainability of cotton production in Australia. Assessment is by a combination of assignments, involvement in a residential practical school (one 3-4 day school per unit) and an examination. The type and weighting of assessments varies in each unit.

The ‘Cotton Production Course’ is made up of the following units.

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The cotton course offerings have received extremely favourable feedback following UNE internal student surveys. Student enrolments have increased dramatically in the above cotton subjects for the duration of the 2012-2015 project. Of particular note is the increase in enrolments from on-campus students studying the cotton offerings as elective subjects in a range of undergraduate courses.

The course notes have been extensively reviewed under a process of continuous improvement in an effort to make the cotton material as contemporary as possible. The delivery of the material continues to have a strong focus on the science, however it is delivered in an applied manner by a practising cotton agronomist and researcher. The changes to this course material have been very well received as has been reflected in the enrolment numbers over the past three years.

The cotton course lecturer will continue with collaborative research with Incitec Pivot and University of Queensland with soil and plant nutrition, and cropping rotations. Also, work is about to commence with the UNE physics department investigating the application of precision agriculture tools to assist in the measurement of cotton root physiology and subsoil constraints.

The cotton lecturer will also continue to assist in the supervision of cotton based research students, with five students currently working with the cotton course lecturer on a range of projects.