Australian Government
Cotton Research and Development Corporation

TRAVEL, CONFERENCE or SCIENTIFIC EXCHANGE REPORT 2016

Part 1 - Summary Details

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

CRDC Project Number:

Project Title: The World Cotton Conference 6 – Goiania Brazil 2016

Project Commencement Date: May 2106 **Project Completion Date:**   June 2016

CRDC Research Program: 4 People

Part 2 – Contact Details

Administrator:	Guy Roth
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Signature of Research Provider Representative:
Date Submitted: **20 June 2016**

Part 3 – Travel, Conference or Scientific Exchange Report

(Maximum two pages)
1. A brief description of the purpose of the travel.
The purpose of the travel was to attend and present a paper at the World Cotton Conference, Brazil 2016.

2. What were the:
  a) **major findings and outcomes**
  b) **other highlights**

The 6th World Cotton Conference was held in May 2016, Goiania, Brazil. The conference is held every four years and was attended by about 400 people from about 40 countries.

Agriculture in Brazil
In the 1960s Brazil was a food importer but has since grown into an agricultural production powerhouse. Brazil is the world's largest exporter of sugar, coffee, chicken, orange juice, beef and soybean. It is also a major producer of maize, tropical fruits, pork and cotton. A speaker from Embrapa (Brazilian Agricultural Research Corporation) attributed this transformation to genetic improvements, liming the acid soils, development of a soybean farming system in the tropics and made special mention of the significant Japanese Government investment 40 years ago in relation to global food security. Brazil's rainfed cotton yields are impressive.

In terms of challenges facing Brazilian agriculture these include; road transport congestion and long distances to sea ports, rising labour costs, unstable political system and some security issues around farms, boll weevil and resistance to GM traits and a changing climate affecting rainfall patterns.

Conference Program
The conference was held over five days and had eleven scientific themes. The conference web site is http://wcrc-6.com/.

Dr Roth presented a paper in the "Measuring sustainability in cotton farming systems session", which was on Day 1. The PowerPoint presentation and abstract are attached to this report *(Measuring sustainability in Australian cotton farming systems, Guy Roth[1], Angela Bradburn[2], Nicola Cottee[2], Jane Trindall[3], Allan Williams[3).]* . In the same session were two related papers on the USA approach using a grower survey information and another on the life cycle analysis of cotton. A presentation was also made on Paraguay.

A wide range of topics were discussed and it was not possible to attend all sessions. Some snippets of interest include;
  ▪ there were no irrigation water use efficiency presentations, although occasional questions to speakers,
  ▪ One researcher suggested the establishment on an international cotton research centre like CGIAR.
  ▪ Several presentations on extension challenges ranging from modern countries like Australia to India/Africa with vast numbers of poor farmers.
  ▪ Paper on the variability of fibre quality in the plant and how HVI does not explain all the variance.
  ▪ Couple of interesting studies on the role of women in cotton farming and sustainable fibres eg South America FAO study.
  ▪ Excellent paper on motes and cotton seed linters and how much extra value could be unlocked here.

- Considerable discussion around resistance management for transgenic crops and the global variance. Knowledge gaps such as VIP3A efficacy, planting windows, non host crops.
- A former Cotton CRC PhD student now working in Argentina presented research on radiation impacts on flowering.
- Cotton Inc – Global LCA research would be of interest to people in this discipline. There appears to be no LCA research on man made fibres. Social LCA is a growing science.
- The rise of China and challenges it faces. China has 47 measures of sustainability and a target of zero growth in fertiliser and pesticide use. A lot of use of transplanting and plastic films. Growing "home invented" mechanisation. Growth in multidisciplinary sciences.
- There were a heap of papers on cotton genetics and breeding
- Soil changes over time. eg Impact of high summer temperatures on bare fallows on soil biology.
- Cotton Cultivated website of Cotton Inc. Webcasts. Plant Management links.
- I went on the conference tour to the nearby Embrapa Research Station. Embrapa appears to have had a very significant impact on Brazilian agriculture. It has 47 research centres. The main cotton research centre was nowhere near the major cotton producing regions as the regional distribution of cotton in Brazil has changed over time. The centre we visited was a major soybean facility, but had some rice and cotton experiments. There seem to be a strong desire to integrate cotton into the soybean facility and farming system. This is definitely an R&D provider worth monitoring. https://www.embrapa.br/en/international.

3. **Detail the persons and institutions visited, giving full title, position details, location, duration of visit and purpose of visit to these people/places. (NB:- Please provide full names of institutions, not just acronyms.)**

See above comment on conference tour.

4. a) **Are there any potential areas worth following up as a result of the travel?**
   b) **Any relevance or possible impact on the Australian Cotton Industry?**

- There seem to be a very good opportunity for CRDC to collaborate with Cotton Inc on a range of topics including sustainability reporting. Some good meetings were held during the conference.

- Embrapa (Brazilian Agricultural Research Corporation) is worth monitoring in terms of cotton research but also for developments in other cropping industries.

5. **How do you intend to share the knowledge you have gained with other people in the cotton industry?**
- A radio interview was conducted with ABC Radio Tamworth upon return.

- Some postings were made on Twitter.

- Mention will be finding/observations in workshops, meetings where appropriate.

- I do have a number of photographs of Australians presenting papers if they are of interest.

		Amount		
	Total			

Please email your report by 21 June 2016 to: research@crdc.com.au

Attachment

Measuring sustainability in Australian cotton farming systems

Guy Roth[1], Angela Bradburn[2], Nicola Cottee[2], Jane Trindall[3], Allan Williams[3]

1 Roth Rural, PO Box 802 Narrabri, NSW, 2390, guyroth@roth.net.au.
2.Cotton Australia, Sydney, NSW, www.cottonaustralia.com.au.
3 Cotton Research and Development Corporation, Narrabri, NSW, www.crdc.com.au.

Key Words
Sustainability, cotton, economic, environment, social

This abstract reports on the use of the Global Reporting Initiative sustainability reporting framework (GRI 2013) and the principles of International Cotton Advisory Committee Expert Panel on Social, Economic Environmental Performance of Cotton Production (2013) to measure the sustainability of the Australian cotton industry. Measurement of cotton industry sustainability requires consistent approaches across multiple farms, regions and sites, repeated over long periods of time. There are many market driven sustainability initiatives around the globe that expect good data to be available, which is not always easy to achieve. Any ongoing review of selected indicators needs to be balanced by the needs of external stakeholders and challenges of collecting long term data sets. The iterative nature of the process, especially with external stakeholder involvement is time consuming and challenging.

An inventory of potential cotton farming sustainability indicators was developed which reviewed the material issues of stakeholders and the literature (Roth 2010). This set of potential sustainability indicators was assessed and updated by the Australian cotton industry's environmental assessment working group, taking into account more recent developments in international supply chain sustainability initiatives such as the Better Cotton Initiative, Cotton LEADS™, and the Expert Panel on Social, Environmental and Economic Performance of Cotton Production of the International Cotton Advisory Committee (SEEP 2013).

A list of more than 100 potential sustainability indicators was compiled. These indicators were then prioritised using an objective ranking system which scored indicators against six selection criteria. These criteria included; materiality to cotton industry stakeholders, materiality to external stakeholders, cost effectiveness of data collection, technical difficulty of data collection, data integrity and confidence, and accuracy in the data collection.

Forty five indicators were shortlisted as high priority material metrics for the cotton industry to collect, collate and report on. An analysis of data was then compiled from a range of sources including the scientific literature and industry reports. The full report is published as the Australian Grown Cotton Sustainability Report 2014 (Cotton Australia / CRDC 2014; Roth et al 2015).

References

Cotton Australia and CRDC (2014) Australian Grown Cotton Sustainability Report 2014. Cotton Australia, Sydney, www.cottonaustralia.com.au or http://crdc.com.au/publications/australian-grown-cotton-sustainability-report

Global Reporting Initiative (2013) G3 sustainability reporting guidelines, Global Reporting Initiative, www.gri.org.au

Roth G (2010) Economic, Environmental and Social Sustainability Indicators of the Australian Cotton Industry. The University of New England / Cotton CRC, Narrabri, NSW. http://www.insidecotton.com/xmlui/handle/1/321

Roth G, Bradburn A, Trindall J ,Williams A (2015) A synthesis of cotton agronomy for productive, diverse and sustainable landscapes. http://agronomyaustraliaproceedings.org/images/sampledata/2015_Conference/pdf/agronomy2015final00170.pdf

Social, Environmental and Economic Performance of Cotton Production (SEEP) 2013 "Measuring sustainability in cotton farming systems: Towards a guidance framework." 2013. Expert Panel Report to International Cotton Advisory Committee. https://www.icac.org/getattachment/Home-International-Cotton-Advisory-Committee-ICAC/measuring-sustainability-cotton-farming-full-english.pdf

Dr Guy Roth, Paper Presentation World Cotton Conference, Brazil 2016.

Measuring sustainability in Australian cotton farming systems

Guy Roth[1], Angela Bradburn[2], Nicola Cottee[2], Jane Trindall[3], Allan Williams[3]

1 Roth Rural, PO Box 802 Narrabri, NSW, 2390, guyroth@roth.net.au.
2.Cotton Australia, Sydney, NSW, www.cottonaustralia.com.au.
3 Cotton Research and Development Corporation, Narrabri, NSW, www.crdc.com.au.

Measurement of cotton industry sustainability requires consistent approaches across multiple farms, and regions repeated over long periods of time.

There are many market driven sustainability initiatives around the globe that expect good data which is not easy to achieve in a consistent framework.

Raises the question

Defining sustainability

Methods

An inventory of `100 potential cotton farming sustainability indicators was developed which reviewed the material issues of stakeholders and the literature.
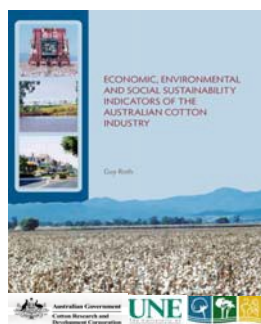
Various supply chain initiatives

These sustainability indicators were reviewed to account more recent developments in international supply chain sustainability initiatives such as the Better Cotton Initiative, Cotton LEADS™, and ICAC SEEP.

"Materiality" – Important
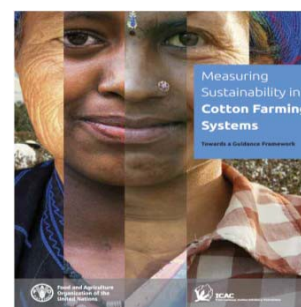
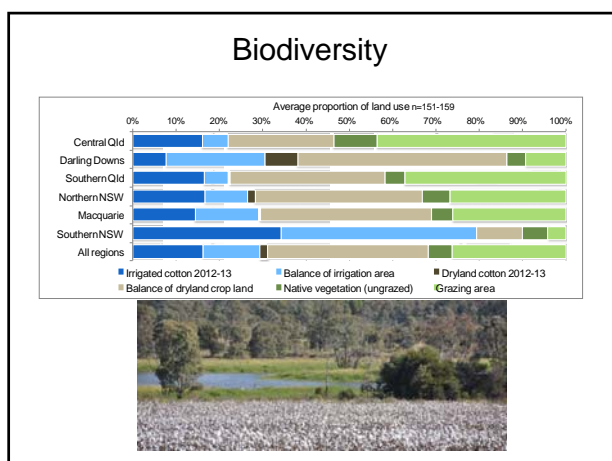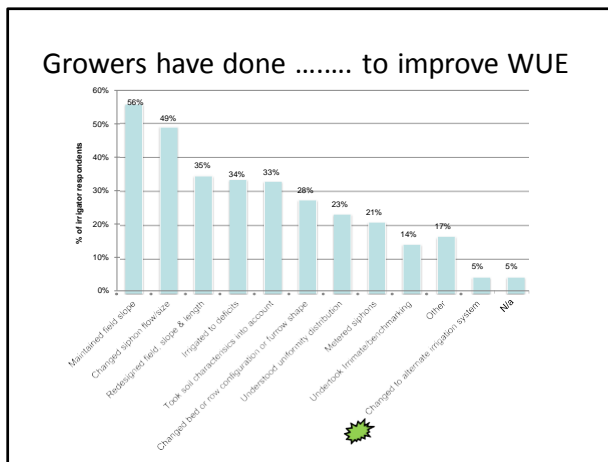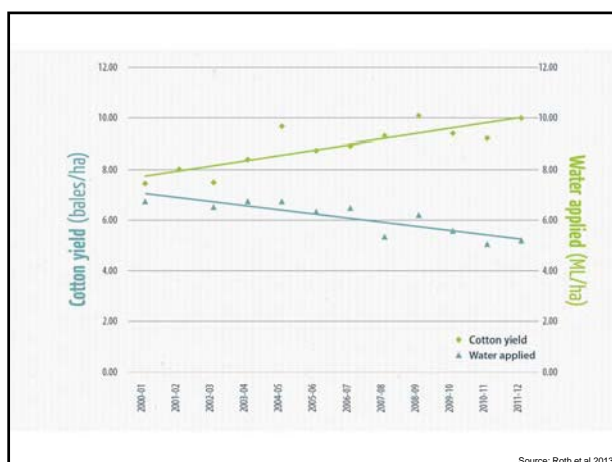| Selection Criteria (each scored) |
| --- |
| 1) Materiality (a) (relevance to cotton industry stakeholders) |
| 2) Materiality (b) (relevance to external stakeholders including market, government, community) |
| 3) Cost-effectiveness of data collection |
| 4) Technical difficulty of data collection |
| 5) Data integrity/confidence |
| 6) Accuracy in data collection |

Process for Indicators

100 → 130 → 45
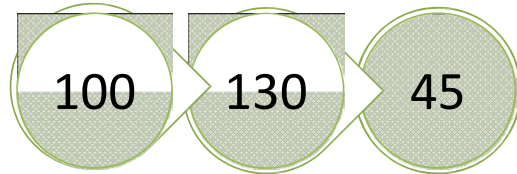
Key aspect	Economic Indicator
Cotton industry production statistics	Planted area (ha) - Irrigated
	2. Planted area (ha) - Dryland
	3. Yield (bales/ha) - Irrigated
	4. Yield (bales/ha) - Dryland
	5. Fibre Quality
	6. Metric tonnes of cotton produced
	7. Grower numbers
	8. Average/median farm size
Economic value	Cotton price/bale ($/bale)
	10. Gross value of the cotton produced in Australia ($)
	11. Cotton exports % or $ by country (lint and seed)
	12. Cotton's % of region gross value
	13. Australia's % share of global cotton lint trade
	14. Cotton proportion of global textile market
Profitability	15. Gross margin/ha
	Income/ML water

Key aspect	Environmental Indicator
Soil health	1. Organic carbon %
	2. Practice change. % growers adopting soil health best management practises
	3. Soil sodicity (ESP)
On farm water use efficiency and productivity	4. Gross Production Water Use Index
	5. Irrigation Water Use Index
	6. Practice change
	7. Whole farm Water Use efficiency (%)
Groundwater	Groundwater levels (rising or falling)
	9.Groundwater quality (EC, pH, SAR)
Biodiversity / riparian	10. Area of native vegetation managed under best practice (ha/km)
	11. Vegetation condition and connectivity
IPM	12. % growers using Integrated Pest Management practices
Chemical use	13. Herbicide Use (active ingredient kg/ha)
	14. Insecticide use (active ingredient kg/ha)
GHG emissions	15. Energy use (kj/kg cotton lint or bale)
	16. Nitrogen Use Efficiency (N use/yield)

Key aspect	Social Indicator
Education	Highest post school qualification of cotton growers
Employment	Number of people employed - farms
	Number of people employed - industry
	Number of people employed - regional
Workplace health and	Workers receiving regular health and safety training
	Workers health & safety programs in place
Demographics	Grower age
	Gender participation in industry
Social capital	9. Australian Cotton Conference delegate numbers
	10. Financial membership in regional cotton grower associations
Innovation	11. Investment levels in R&D
	12. Growers adoption of technologies
Legal compliance & responsibility	13. Fines imposed upon cotton SMEs by regulatory authorities

3

Source: Roth et al 2013

Growers have done …….. to improve WUE

Biodiversity

// More than 42,000 birds representing 45 species were found on farm water storages in the Gwydir Valley[xxxii].

// 153 bird species were found in natural vegetation in the Namoi Valley[xxxiii].

// 450 species of invertebrates have been recorded in one cotton field during the summer[xxxiv].

Insecticide Use

Complaints

Figure 28 Highest qualification of cotton growers from ABS Census data 1991-2011

Source: Data from 1991, 1996, 2001, 2006, 2011 ABS Census
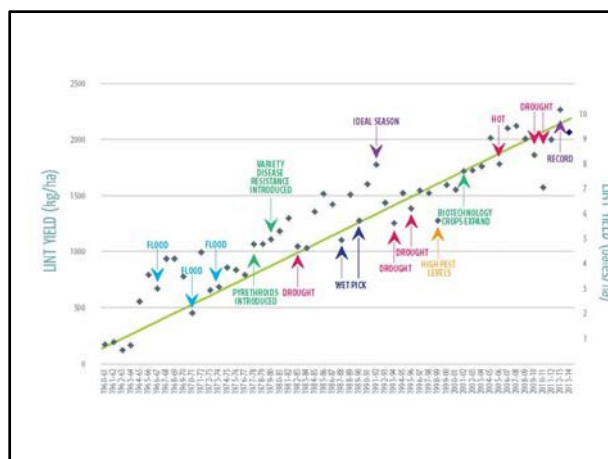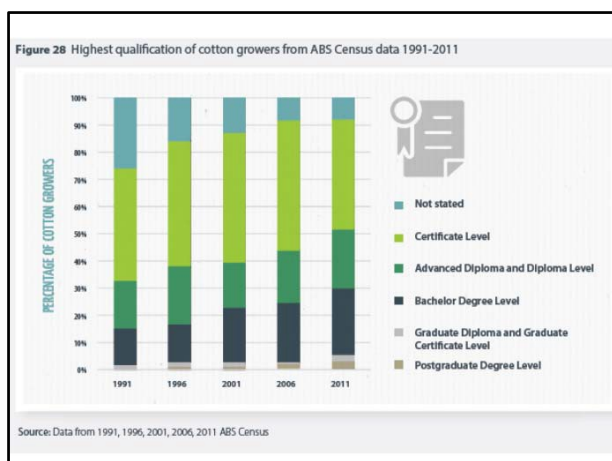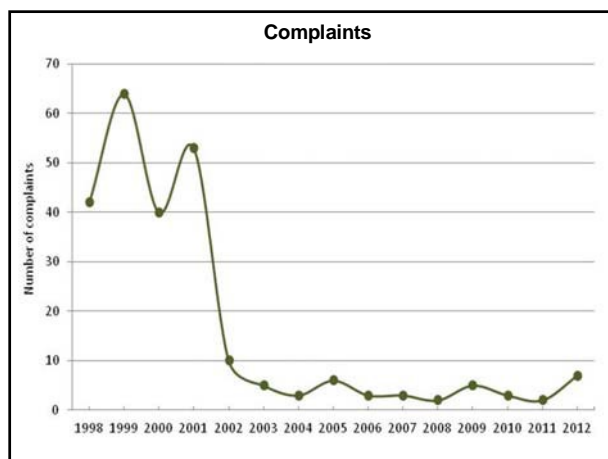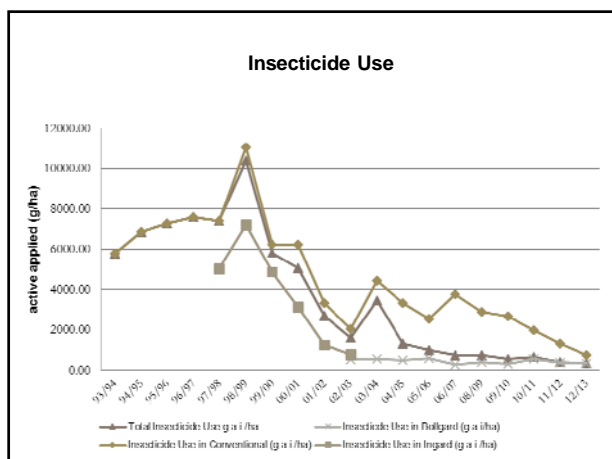
Key challenges for reporting

- Defining material aspects

- Defining sustainability indicators

- Gathering long term data especially on some metrics

- Being prepared to disclose it !

- Engaging stakeholders

Summary

- Australian Cotton has committed to reporting its sustainability performance every 5 years.

- Linked to a number of other supply chain and global initiatives.

- Will be a journey, not a destination.

- Reports on www (see abstract)

AUSTRALIAN GROWN COTTON
SUSTAINABILITY
REPORT 2014

For more information

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Full dams.

Farming on edge of Goiania.

Goiania city

Speaking podium

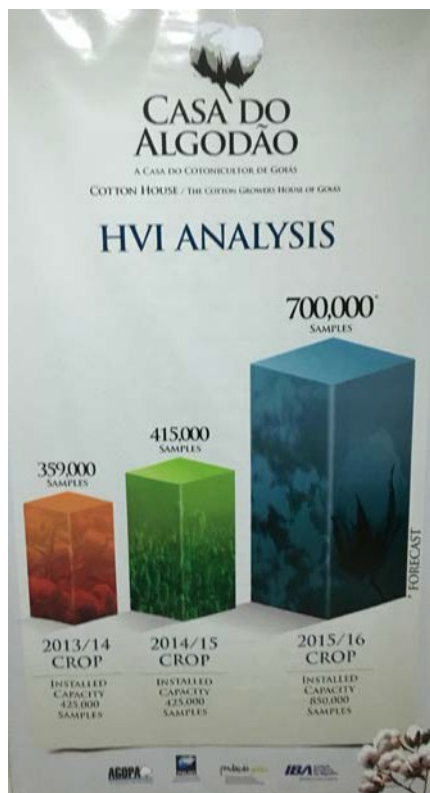*Contrasting world cotton systems*

HVI in Brazil

Welcome

Embrapa Farming systems experiments