



FINAL REPORT 2013

Part 1 - Summary Details

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

CRDC ID: **DAN1102**

Project Title: Human Capacity Assessment and Benchmarking

Project Commencement Date: 18/08/2010 **Project Completion Date:** 30/06/2013

Research Program: Human Capacity

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Part 3 – Final Report

Background

The cotton industry has invested very heavily over many years in the development of a wide range of technology and services to enhance the farming, management, marketing and support systems driving industry productivity and sustainability. The research and development investment has been complemented by a broad based extension and training program delivered across both the private and public sectors which has resulted in strong adoption of new ideas, systems and technology.

The cotton industry has in place mechanisms to monitor and analyse the effectiveness of research investment in improved farming systems, environmental management and other innovations. Monitoring of outcomes across all programs has allowed a good picture of return on investment to be developed and maintained. By contrast, the cotton industry has been investing heavily in human capacity development but has never directly or formally monitored and analysed changes in the skills and knowledge of the population.

The Human Capacity Assessment and Benchmarking project is a system to gather data and provide an analysis tool to monitor the effectiveness of cotton industry extension and training activities. This will provide the industry with a tool to collect benchmarking data on changes in Human Capacity over time thus better informing decisions about investment in extension and training.

In order to grow capacity for any industry there needs to be a rigorous and transparent benchmarking approach to assess existing capacity. The Human Capacity Assessment and Benchmarking process will allow industry to clearly articulate and demonstrate existing skills, competence and capacity as land stewards and, more importantly, strategically invest in capacity building by identifying any areas of skill deficiency. Auditing and benchmarking capacity across all levels of industry will allow targeting of training programs to address identified gaps and leverage off existing skills resulting in an increased return on training investment.

Training and extension activities are very expensive and measurement of outcomes can often be difficult to achieve in terms of practice change. Benchmarking of industry human capacity using a Skills Audit model on an ongoing basis will allow changes in the industry competence profile to be tracked and the outcomes of training to be monitored over time - linking training to practice change in industry. This will provide a much richer picture of the impact of training and return on investment in training and extension activities.

Objectives

Objective 1

Develop and deliver an online system for skills assessment for personnel at all levels across the cotton industry from operational workers to senior managers. This system will consist of a rapid assessment module and a detailed assessment to validate results. The system to be based on a model of Skills Recognition assessment developed and refined by Tocal College over a 10 year period and applied across all areas of the agricultural and land management sector. This model has been applied in the implementation of the Accredited Cotton BMP Manager program. The system will be linked to the new myBMP web site and cotton industry staff will be able to access the Quick Skills Check utility and the detailed Skills Recognition material fully integrated with the my BMP processes

Extent to which this has been achieved

Total College has developed and delivered an online Human Capacity Assessment and Benchmarking system which is hosted on the web at www.agskills.com.au. This system is based on the Units of Competence from the nationally endorsed Agriculture Horticulture and Conservation and Land Management Training Package (See <http://training.gov.au/Training/Details/AHC10>). This web address and the online system are owned by Cotton Research and Development Corporation.

The Cotton Industry Skills Benchmarking is a web based system that allows participants to carry out a self assessment in a wide range of relevant skills which are categorised into 21 Skill Areas. These skills are all based in Units of Competence from the Agriculture, Horticulture and Conservation Training Package (Agrifood Skills Australia, 2011) as a tool to carry out an audit of skills and knowledge and give a broad picture of human capacity in the industry and therefore align to what is considered to be current industry best practice. The Skill Areas are as follows:

1. Farm Hygiene Skills
2. Business Administration Skills
3. Business Planning Skills
4. Business Marketing Skills
5. Quality Assurance Skills
6. Crop Production Skills
7. Chemical Application and Management Skills
8. Emergency Response Skills
9. Gravity Fed Irrigation Skills
10. Pressurised Irrigation Skills
11. Human Resource Management Skills
12. Livestock Management Skills
13. Natural Area Management Skills
14. Machinery Maintenance Skills
15. Machinery Operation Skills
16. OHS and other Risk Management Skills
17. Pest Management Skills
18. Soil and Water Conservation Skills
19. Repairs and Maintenance Skills
20. Weather and Climate Skills
21. Industry Leadership Skills

For each skill in each of these Skill Areas, participants are asked to do the following:

1. Answer a range of questions stating whether this accurately describes their skill.
2. State whether they are interested in training in each of these Skill Areas.
3. Indicate a reason for interest in training or otherwise.

On completion of this self assessment the results are available for viewing as a series of tables and graphs as illustrated below:



Figure 1: Cotton Skills Benchmarking web page

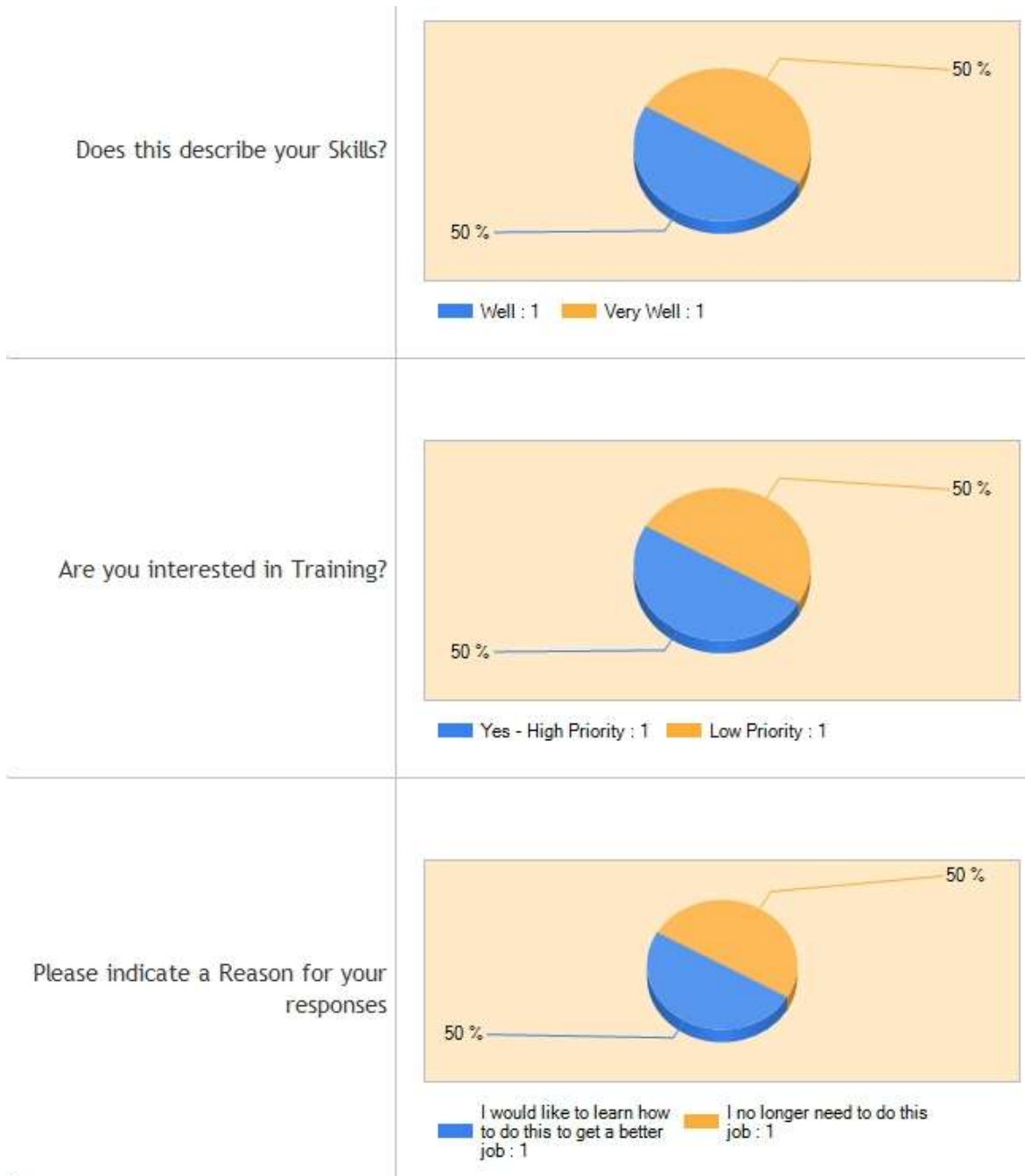


Figure 2: Graphic reports available to farm managers

The Cotton Industry Skills Benchmarking system is structured to not only provide industry-wide information on skills, but to also be used as a tool that farm managers can use to develop a profile of the skills of their own staff. This information is available for farm managers to inform making decisions about investment in training and could also be used as a recruitment tool.

Each enterprise owner or manager participating in the Benchmarking system registers their business and all of their staff members to commence the process. Once workers have completed the assessment process the manager can view a report for all of their staff presented in a graph format. A farm manager will only have access to data about staff working on that farm.

This same information can then be used on an industry-wide basis to develop a picture of the skills profile and identify any areas of skills gaps which may be addressed with new training programs. All data collected by the system used to generate industry-wide information will be made anonymous so the privacy of individuals and businesses will be completely protected.

Objective 2

A pilot Quick Skills Check of a representative group from the Cotton industry and a detailed skills audit of 5 candidates at AQF level 3, 5 candidates at AQF Level 4 and 5 candidates at AQF Level 5 will be implemented and results reviewed to validate the system before the extension of availability of the audit system across the whole industry. Dept Industry and Investment NSW Tocal College has extensive experience in industry capacity building and is a leader in assessment of competence using Skills Recognition (RPL). This project will build on the industry project funded under the National Flexible Learning Framework in 2009 which developed an online system to assist with assessment of the Accredited Cotton BMP Manager certification program which is integrated into myBMP.

Extent to which this has been achieved

The Cotton Industry Skills Benchmarking hosted at www.agskills.com.au has been live and available to the cotton industry since July 2012. The system has been thoroughly tested by a number of users and revised to ensure ease of operation by candidates to carry out their skills audit. (See Attachment 1 Hunter S, Agskills Report 2012)

Despite promotion through CRDC and Cotton Australia industry networks (See Attachment 2 agskills.com.au Promo Brochure, Attachment 3: example – TNA Flier Narrabri), the uptake and use by the industry has been very limited with cotton industry staff and employers showing little interest in the assessment process. Consequently limited assessments have been completed and limited data is available.

Skills Recognition assessment interviews of 5 candidates at AQF level 3, 5 candidates at AQF Level 4 and 5 candidates at AQF Level 5 were carried out in October and November 2013 to moderate and validate the data and results accumulated through the online system. This process proved to be unsatisfactory as there was too small a sample of participants in the online system and too many gaps in the data to draw any meaningful conclusions.

To address this problem the decision was made to integrate the validation of Cotton Industry Skills Benchmarking into the Skills Needs Analysis component of the Cotton Industry Skills Development (CISD) project – a Cotton Australia partnership with Tocal College funded by the National Workforce development Fund. This proved successful in generating some participation and use of the Cotton Industry Skills Benchmarking system as the candidates were motivated by the opportunity to receive a subsidised training place.

Methods

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

Human Capacity Assessment and Benchmarking comprises the following components:

1. Cotton Industry Skills Benchmarking online system which allows candidates to rapidly self rate their competence using a 1 to 5 scale against a set of task descriptors drawn from Agriculture Horticulture and Conservation (AHC) Training Package units of competence. The Quick Skills Check will adopt and refine the model developed in association with CRDC with the assistance of funding from the Australian Flexible Learning Framework in 2009.

Self assessment as a tool to enhance the education process is well developed, valid and has a strong theoretical basis (See Boud D, *Enhancing learning through self assessment*, Routledge Falmer, 1995). Self assessment for formative purposes is well accepted and effectively applied across school education, VET and the Tertiary sector. Within an institutional context self assessment processes

both assist students with reflection on progress and allow teaching staff to monitor student progress.

The Cotton Industry Skills Benchmarking covers a very broad range of operational and management level skills aligning to Units of Competence from the AHC Training Package. Competencies specific to the cotton industry will be the main focus, but a wide range of ancillary and complementary skills and knowledge are included.

2. The initial plan for a Detailed Skills Recognition assessment of a sample of candidates who complete the Cotton Industry Skills Benchmarking to validate data generated and moderate results did not prove successful.

An alternative mechanism for moderation and validation of results collected by the online system was identified by integrating the moderation and validation process into the Cotton Industry Skills Development Project (CISD) – Phase 1: Skills Needs Analysis.

The Skills Needs Analysis was carried out to collect and analyse feedback from the cotton industry which would in turn be used to structure and select content for the training to be delivered under this program. This aligns well with the data collected by The Cotton Industry Skills Benchmarking in the areas of training needs and allows valid comparison results generated by the online system.

The Skills Needs Analysis was carried out using the ToP® Group Facilitation Method (http://c.ymcdn.com/sites/www.ica-usa.org/resource/resmgr/ToP/ToP_Brochure_8-4-09.pdf)

Groups were convened in the following locations:

Narrabri
Goondiwindi
Griffith
Hillston
Darlington Point

In addition, to the workshops using the Group Facilitation Method, data was also collected by phone interviews and through a previous survey carried out by Wincott.

The workshops were facilitated and discussion focused on the following questions:

1. What are the current challenges facing your business?
2. What changes do you see affecting your farm in the next 5 years?
3. Who forms the basis of your workforce?
4. Do you have peak times where requirements change?
5. At what level are these workers operating?
6. What are the key skills required for a proficient operator to carry out operations in your business?
7. Who provides these skills?
8. What are the additional skills required by supervisors and managers?
9. When and how would you like to access training for these skills?
10. Details about off-farm training?

Results were recorded by a Tocal College staff member who was not an active participant in the discussion and development of group consensus.

Results

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

Objective 1:

Total College has developed and delivered an online Human Capacity Assessment and Benchmarking system which is hosted on the web at www.agskills.com.au. This domain name and the online database system is the property of CRDC and is freely available to industry.

Objective 2:

Testing of the beta version of the Cotton Industry Skills Benchmarking system was carried out independently by Sally Hunter of FundBase. Sally facilitated a group of farm managers and workers in reviewing the system and provided excellent feedback to the developers in order to revise the system and improve functionality. (See Attachment 1 Hunter S, Agskills Report 2012)

Validation of the data generated by Cotton Industry Skills Benchmarking system was revised from the original plan to carry out Skills Recognition interviews as this did not produce any useful data for comparison. Integration with the CISD Project as adopted with the focus for validation of data to be on the Training Preferences identified by the participants who completed the Cotton Industry Skills Benchmarking process.

As also described above, uptake of the system by the broader industry has been disappointing and the majority of the traffic through the system has been driven by participants motivated by inclusion in the Cotton Industry Skills Development Project. The number of participants who have completed the Cotton Skills Benchmarking is as follows:

Total completions: 77

Number of valid and useful data sets: 55

Results generated by the Cotton Industry Skills Benchmarking system

Data was extracted and analysed using a simple spreadsheet to focus on ranking the Training Preferences in the 21 Skill Areas within the Cotton Industry Skills Benchmarking system. Data from 29 participants was discarded as incomplete, not relevant or “artificial data” created by testers. Training preference generated by Cotton Industry Skills Benchmarking are shown in Table 1 below:

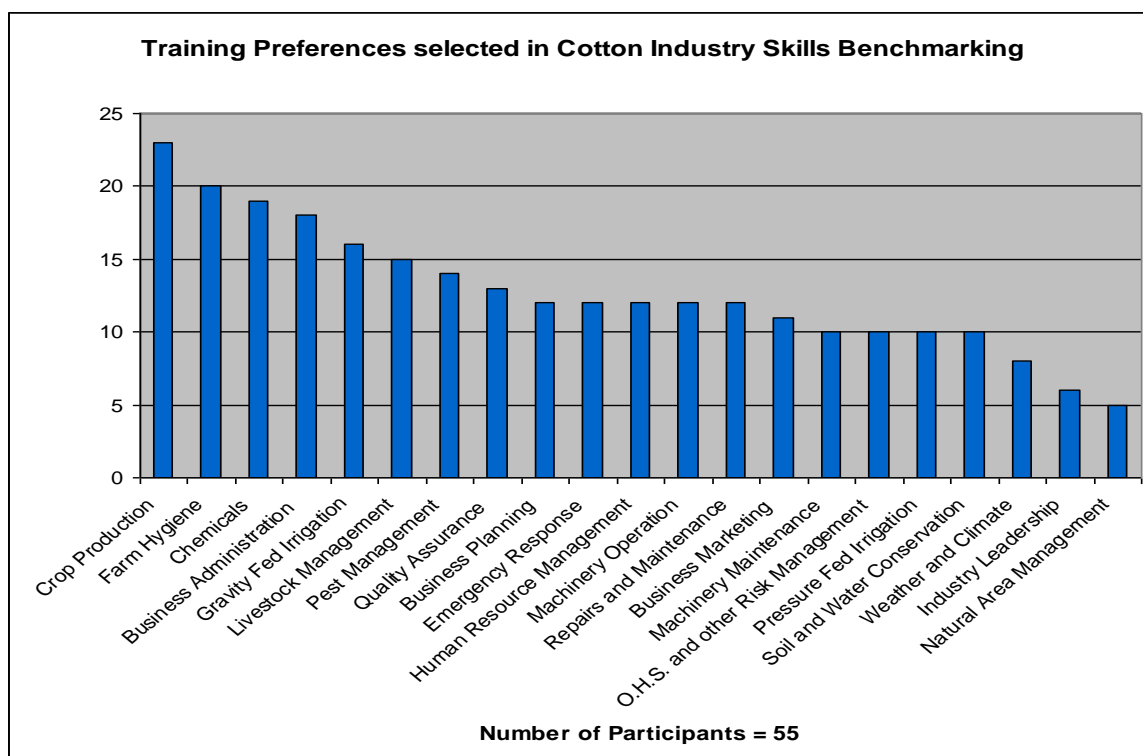


Table 1: Training Preferences data generated by the online Cotton Industry Skills Benchmarking

Results generated from the Skills Needs Analysis

Skills Needs Analysis Workshops were convened and attended as follows:

Location	Total	Employers	Workers/Supervisors
Narrabri	12	6	0
Goondiwindi	6	5	0
Goondiwindi (Wincott meeting)	11	6	0
Griffith	5	3	6
Hillston	7	2	3
Darlington Point	9	1	1
Total	50	23	10

Note: The balance of the workshop numbers comprised industry and service provider representatives.

In addition the Wincott Survey provided data from 59 participants who returned a written survey.

The list below summarises the analysis of the Skills Needs Analysis workshop notes provided the following priorities for training from the participants, ranking their priorities for training as follows:

1. Workplace Safety
2. Machinery - maintenance and operation
3. Crop establishment and maintenance
4. Irrigation
5. People management skills (including communication)
6. Vehicle operation (4x4 and quadbikes – mainly a workplace safety issue)
7. Use of technology
8. Chemical
9. Biosecurity

When these Training Preferences are compared to those generated by the Cotton Industry Skills Benchmarking system there is limited correlation:

Ranking Cotton Industry Skills Benchmarking system	Ranking Skills Needs Analysis Workshops	Correlation
1. Crop Production	3	Good
2. Farm Hygiene	9	Poor
3. Chemicals	8	Poor
4. Business Administration	-	
5. Gravity Fed Irrigation	4	Very Good
6. Livestock Management	-	
7. Pest Management	8	Very Good
8. Quality Assurance	-	
9. Business Planning	-	
10. Emergency Response	-	
11. Human Resource Management	5	Poor
12. Machinery Operation	2	Very Poor
13. Repairs and Maintenance	2	Very Poor
14. Business Marketing	-	
15. Machinery Maintenance	2	Very Poor
16. O.H.S. and other Risk Management	1, 6	Very Poor
17. Pressure Fed Irrigation	-	
18. Soil and Water Conservation	-	
19. Weather and Climate	-	
20. Industry Leadership	-	
21. Natural Area Management	-	

Discussion

The limited correlation between the results generated by the Cotton Industry Skills Benchmarking and the results generated by analysis of the CISD Skills Needs Analysis is largely due to limited overlap in the population being sampled by the two systems. This results from:

1. Greater participation and influence of farm managers in the Skills Needs Analysis workshops
2. Greater participation of Operators and Supervisors in the Cotton Industry Skills Benchmarking

The differences in the group are summarised as follows:

	<i>Participants in Cotton Industry Skills Benchmarking</i>	<i>Participants in CISD Skills Needs Analysis Workshops</i>
Operator/Supervisor	37	10
Manager	18	37

This difference in the ratios of management to operational staff explains the differences in the Training Priorities articulated. The most notable example of this is the much greater emphasis management are placing on workplace safety and communications/human resource management.

These shortcomings in the data used for validation of Cotton Industry Skills Benchmarking are largely due to the small sample size which has resulted from poor uptake of the system by industry. It is our hope that better data will be available as the amount of usage of the system by industry increases.

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.

Cotton Industry Skills Benchmarking has delivered a fully tested and functional online tool for the cotton industry to assess and monitor the skills base in the industry on an ongoing basis. Over time this system will allow the industry to monitor the development of skill and address any areas of skill shortage by targeted investment in training and other mechanism for skills development.

Validation of Cotton Industry Skills Benchmarking has been partially successful and has demonstrated that some degree of confidence can be placed on the Training Preferences across industry produced by the system – while accepting the significant differences in perceptions of training requirement articulated by management versus operational staff.

4. Please describe any:-

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

Cotton Industry Skills Benchmarking has not produced any technical advances. The system uses readily available online resources and the database was developed using industry standard processes and structures.

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

Nil

- c) required changes to the Intellectual Property register.

CRDC owns the IP of online database Cotton Industry Skills Benchmarking and the domain name www.agskills.com.au

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?

Cotton Industry Skills Benchmarking has been developed, tested and partially validated by industry. It is freely available to the cotton industry as a tool to assist with the assessment of skill and to monitor changes over time. Uptake of the system by industry has been poor to date and this has limited the value of data collected

Cotton Industry Skills Benchmarking has the potential to be a valuable tool for the cotton industry if usage rates are increased. These key values are:

- As a tool for farmers and managers to carry out an audit of the skills base of their business
- As a tool for recruitment of new staff
- As a tool assist the business to develop training and personal develop programs for staff
- As a tool for industry to monitor skills acquisition and identify skill gaps
- As a tool for industry to monitor skills and direct investment in development and delivery of training programs.

Cotton Industry Skills Benchmarking will need to be integrated into industry programs in order to increase uptake by farmers and managers. CRDC and other industry stakeholders may need to develop a strategy to promote uptake and encourage greater usage by industry in order to achieve the potential of the system.

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.

Tocal College will continue to support Cotton Industry Skills Benchmarking. We strongly recommend that CRDC and other cotton industry stakeholders develop a promotion and industry engagement strategy in order to improve industry uptake and derive the potential value from the system.

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

Tocal College is preparing a paper for inclusion in the 2014 Cotton Conference Proceedings. College staff are happy to provide information and make presentations to industry stakeholders to explain and promote Cotton Industry Skills Benchmarking.

(c) for future research.

It is essential that the cotton industry maintain or increase investment in Human Capacity in order to maintain and develop the industry skills base to address future challenges.

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

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

1. Bell C, *You can do more than just training with training packages*, Proceedings, Cotton Conference 2012
2. Bell C, *Skills Benchmarking and Training Needs Analysis in the Australian Cotton Industry* (In development for proceeding Aus Cotton Conference 2014)

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

www.agskills.com.au

Part 4 – Final Report Executive Summary

Human Capacity Assessment and Benchmarking project funded by the Cotton Research and Development Corporation through the Human Capacity program has resulted in the development and delivery of the Cotton Industry Skills Benchmarking system. This is a web based system that allows participants to carry out a self assessment in a wide range of skills relevant to cotton production which are categorised into 21 Skill Areas. These skills are all based in Units of Competence from the Agriculture, Horticulture and Conservation Training Package (Agrifood Skills Australia, 2011) as a tool to carry out an audit of skills and knowledge and give a broad picture of human capacity in the industry and therefore align to what is considered to be current industry best practice. Please see www.agskills.com.au

The Cotton Industry Skills Benchmarking system is a 'self serve' online package which allows cotton farmers to create an account for their business and identify and segregate different farm skills within the enterprise if needed. They can subsequently identify and segregate all of the staff employed on different farms. Each enterprise owner or manager participating in Cotton Industry Skills Benchmarking system registers their business and all of their staff members to commence the process. Once workers have completed the assessment process the manager can view a report for all of their staff presented in a graph format. A farm manager will only have access to data about staff working on that farm. This information can be used by management for a range of purposes including:

- Recruitment
- Development of training and personal development plans
- Allocation of duties on the farm

The system is also structured to provide industry-wide information on skills. This information collected at the individual and enterprise level can be aggregated and analysed on an industry-wide basis to develop a picture of the skills profile of the industry. This will identify any areas of skills gaps which may be addressed with new training programs. All data collected by the system used to generate industry-wide information will be made anonymous so the privacy of individuals and businesses are completely protected.

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Attachments:

1. Hunter S, Agskills Report, Fundbase 2012
2. agskills.com.au Promo Brochure
3. TNA Flier Narrabri
4. Bell C, *You can do more than just training with training packages*, Proceedings, Cotton Conference 2012