Australian Government
Cotton Research and Development Corporation

FINAL REPORT

Part 1 - Summary Details

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

CRDC Project Number: **1701**

Project Title: 2016/17 Cotton Map

Project Commencement Date: 2/11/2016 **Project Completion Date:** 31/5/2017

Part 2 – Contact Details

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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 Cotton Field Awareness Map is an industry initiative which has been designed to highlight the location of cotton fields. The service is provided free of charge with the purpose of minimising off-target damage from downwind pesticide application, particularly during fallow spraying.

Farmers, farm managers, resellers, consultants, agronomists, applicators and contractors are encouraged to input their cotton fields (Figure 1). Users can also access the Cotton Map to check the location of the paddocks they may be planning to spray to assess the proximity of the nearest cotton crop. Since the introduction of Cotton Map, reported herbicide damage to cotton has remained below 3%, compared to 11% in 2009 (before introduction of Cotton Map)

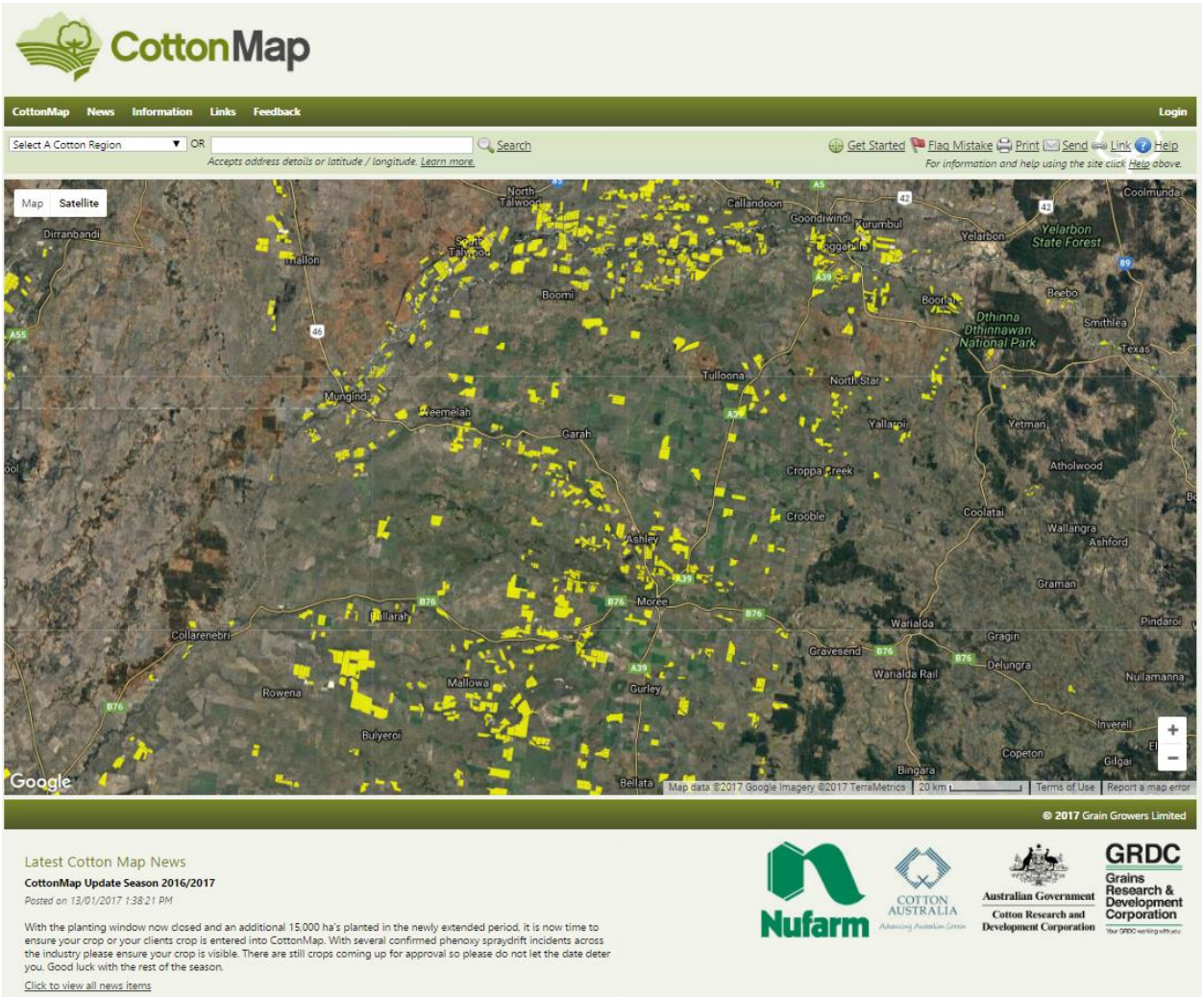


Figure 1 Spray applicators can identify nearby sensitive cotton crops (marked in yellow) when fields are registered to the CottonMap.

Objectives

2. List the project objectives (from the application) and the extent to which these have been achieved.

This project provides for CRDC support to the Cotton Map initiative. This initiative provides ongoing support for an online tool that enables cotton growers to communicate the location of cotton to reduce the risk of off-target damage associated with misuse of Group I herbicides.

Mapped area for the 2016-17 season

- Planted area: 582,888 hectares was planted, including 472,548 green hectares.
- Planted area is higher for 2016-17 compared with 2015-16 (Table 1).
- Mapped area: 473,770 hectares was mapped over 4,130 fields by 309 users (Table 1).
- Approximately 81% of the planted cotton area was mapped to CottonMap (Table 1) which is significantly lower than previous years, and may be attributed to a significant portion of first-time growers for the 2016-17 season.
- Strategies to address inaccuracies associated with the 'area mapped' continue to be investigated by the service providers.
- Approximately 14 fields were mapped per user (Figure 2) which may indicate that a number of consultants/TSPs are mapping on behalf of multiple growers.

- On the 1 November 2016, only 35% of the crop was mapped however, by the 30 November 2016, approximately 75% of the crop was mapped (Figure 2). Further encouragement of early season mapping may increase the effectiveness of the CottonMap campaign.

Table 1. Summarised usage data for CottonMap between the 2009-10 and 2016-17 seasons.

Season	No. users	No. fields mapped	Area mapped	Planted hectares	Area mapped (%)
2009-10	214	2,017	173,644	182,000	95.4
2010-11	408	5,326	579,990	607,780	95.4
2011-12	368	5,381	640,394	655,064	97.8
2012-13	214	3,706	383,826	426,494	90
2013-14	207	3,707	420,237	436,470	96.3
2014-15	212	2,287	214,553	205,482	104.4
2015-16	259	2,780	270,181	303,097	89.1
2016-17	309	4,130	473,770	582,888	81.3

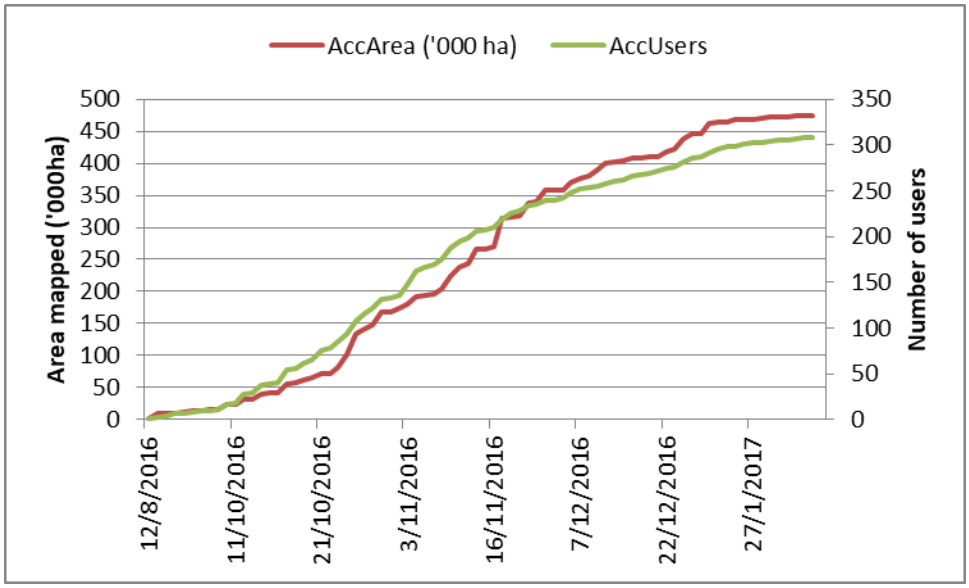


Figure 2 Accumulated hectares mapped and number of CottonMap users for the 2016-17 season

Methods

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

Outcomes

4. Describe how the project's outputs will contribute to the planned outcomes identified in the project application. Describe the planned outcomes achieved to date.

The project output continued access to the CottonMap website for cotton growers and chemical applicators. Provision of this voluntary online initiative has aided in creating an awareness of sensitive cotton fields, reducing the risk of off-target herbicide damage to these crops.

Research and awareness applications

Data underlying the cotton map continues to be made available for research purposes including;

- Illustrating expansion of the cotton industry into new regions
- Awareness of local cotton areas to inform spray drift workshops
- Imagery for crop type identification
- Identification of nearby cotton crops for apiarists
- Modelling transport route options based on commodity production maps
- Long term modelling for pest abundance

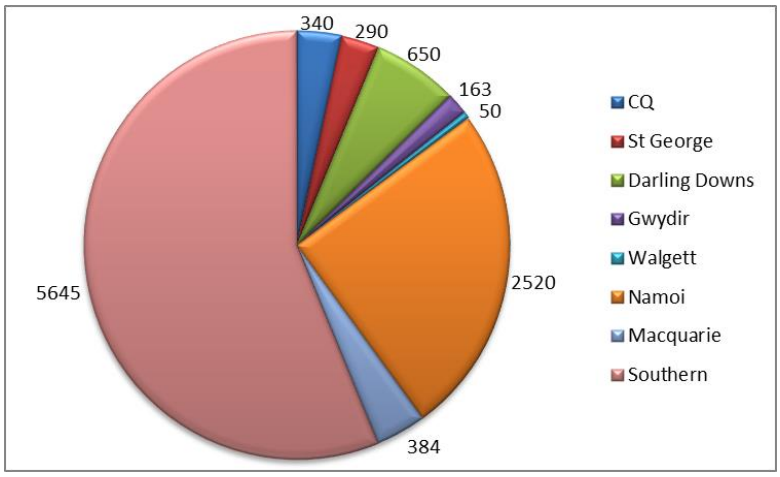
Spray drift incidences for 2016-17

- Cotton Australia was officially notified (via Cotton Australia spray drift report) of approximately 10,000ha cotton affected by Group I herbicides (Table 2), which equated to approximately 1.7% of the total cotton planted area.
- Anecdotal evidence indicates that up to 45,000ha cotton was affected by Group I herbicides, which equates to approximately 7.7% of total (Table 2).
- Damage was reported across most cotton valleys, with the exception of the Dawson/Callide.
- Under-reporting of crop damage was particularly evident in the Macintyre valley, where by anecdotal evidence suggests that the majority of crops were impacted, but no official reports were submitted to Cotton Australia (Figure 3).
- The Southern Valleys and Lower Namoi Valleys had the highest level of reported damage (Figure 3).
- Damage was reported throughout the season, between the 11 November 2017 and the 8 February 2017.
- The majority of incidences reported damage symptoms detected from January 16-19 (n=8), or from January 27-31 (n=7).
- The majority of reported area damaged was associated with symptoms detected from November 21-30 (2600ha), or January 16-19 (1300ha), or January 19-31 (4300ha) (Figure 4).
- The majority of reported incidents coincided with periods of widespread rainfall throughout the NSW and Qld cotton growing valleys.
- Approximately 25% of reported damage was consistent across the field, suggesting attribution to application under temperature inversion conditions, rather than direct drift.
- The majority of reported crop damage (92%) was of low to medium in severity.
- A summary of Cotton Australia's broader efforts around spray drift mitigation during the 2016-17 season can be found at http://cottonaustralia.com.au/uploads/resources/Cotton_Australia_spray_drift_2016-17.pdf

Table 2. Total area damaged by Group I spray drift, as a percentage of the total planted area.

Season	Area damaged (ha)	Total area damaged (%)
2008-09	15,910	10.6
2009-10	1,740	1
2010-11	0	0
2011-12	12,144	0.8
2012-13	12,218	2.7
2013-14	780	0.2
2014-15	3,956	1.8
2015-16 (CA reported)	11,000	4.1
2015-16 (anecdotal)	60,000	22.2
2016-17 (CA reported)	10,000	1.7
2016-17 (anecdotal)	45,000	7.7

Figure 3. Area affected (hectares) by damage associated with Group I herbicides for the 2016/17 cotton season, reported through the official Cotton Australia process.



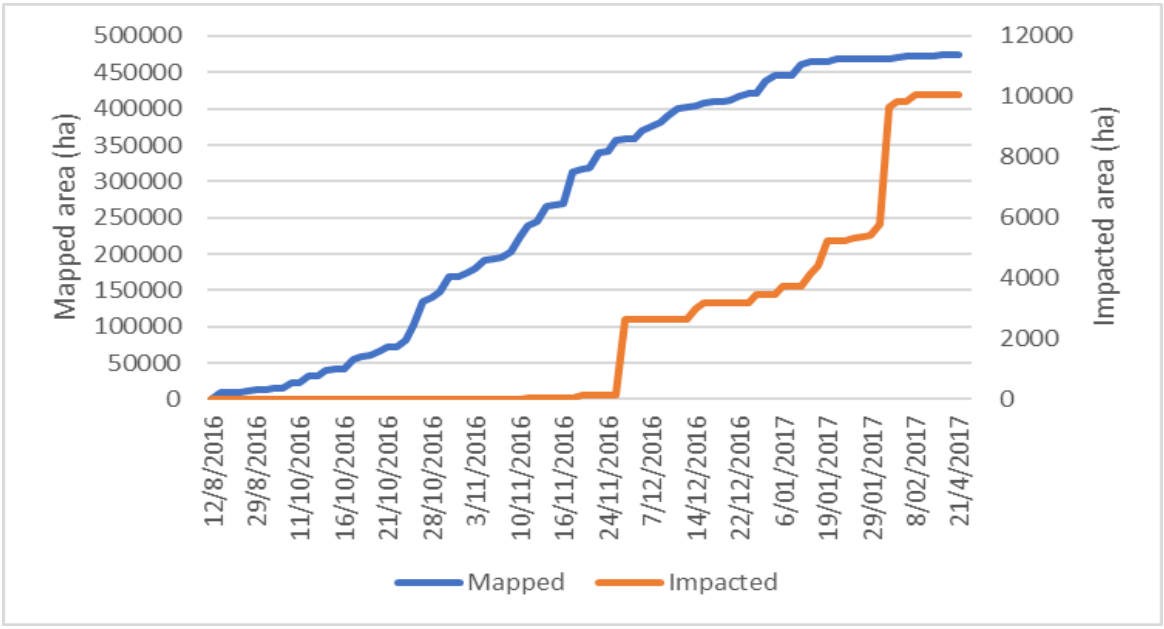


Figure 4 Accumulated area mapped to Cottonmap and accumulated area reported to show symptoms of Group I herbicide damage.

5. Please report on any:-

a) Feedback forms used and what the results were
b) The highlights for participants or key learnings achieved
c) The number of people participating and any comments on level of participation

Feedback from growers

Feedback was received from users of CottonMap regarding the following

- Difficulty in viewing fields
- Requests for users to be able to identify fields impacted by spray drift on the cotton map
- Confusion over whether fields exceeding 300ha could technically be mapped
- Requests to include a circle function around mapped fields that extended out for a 10km radius
- Requests to map all sensitive crops

- Connectivity with other platforms (e.g. weather sites, BeeConnected)
- Requests to print maps in the local papers
- Increased awareness for dryland and broadacre chemical applicators

Of the 175 respondents to the spray drift section of the 2016 Cotton Grower Survey;

- Approximately 55% of respondents used the CottonMap website to access information relating to spray drift
- Approximately 85% of respondents considered CottonMap to be of some use in managing the risks associated with off-target drift.

Level of participation

- Traffic through the CottonMap website has been increasing since 2012-13, with a maximum number of page views recorded for the 2016-17 season (Table 3).
- The proportion of CottonMap users accessing the website through mobile platforms has steadily increased between the 2010-11 and 2016-17 season (Figure 5).
- A total of 23,922 page views were recorded for the map of cotton fields, which is approximately 81% of all page views.
- The average session time for the cotton map was approximately 3 mins.
- Session durations were higher for users on computers compared with tablets, which may indicate that users prefer a desktop to map cotton fields.
- Average session durations were lowest for mobile devices, which may indicate that chemical applicators are checking the cotton map predominantly using mobile platforms.
- A total of 991 page views were logged or sections of the CottonMap website that hold additional resources (e.g. information and news).
- Approximately 9% of page views were associated with landing pages, changing passwords, and page administration.

Table 3 Analytics overview for www.cottonmap.com.au

Season	Users	Avg. Session Duration	Sessions	Pages / Session	Page views
2016-17	8060	113	14,667	2	29,391
2015-16	3638	169	8,150	2.4	19,346
2014-15	2526	192	5,184	2.7	13,961
2013-14	2309	223	4,811	3.1	15,103
2012-13	1843	191	3,411	2.5	8,571
2011-12	2994	210	6,557	2.5	16,181
2010-11	3301	165	7,906	2.3	17,938
2009-10	182	69	294	1.4	410

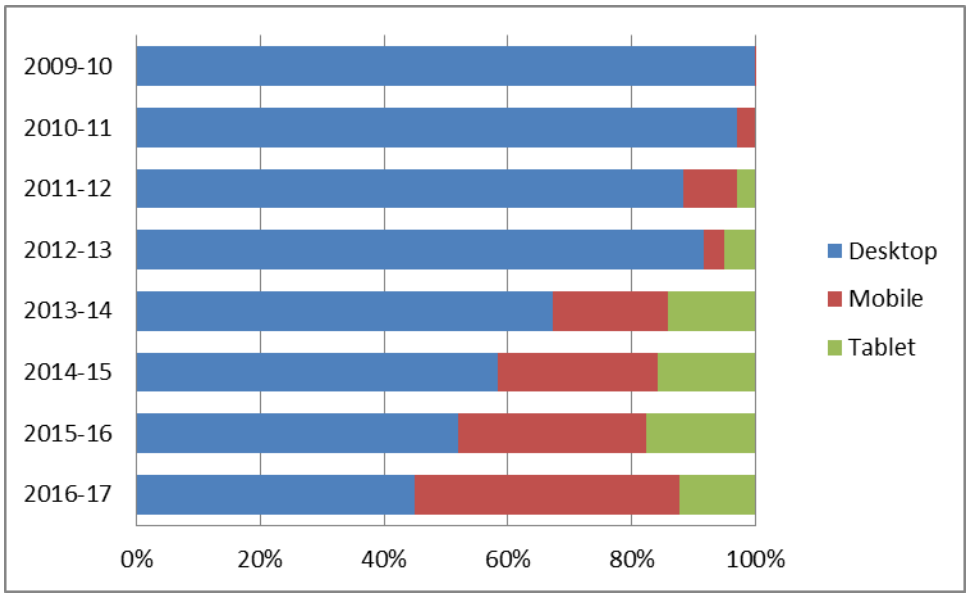


Figure 5. Number of users accessing www.cottonmap.com.au through mobile devices

Budget

6. Describe how the project's budget was spent in comparison with the application budget. Outline any changes and provide justification.

The project's budget was spent in accordance with the application budget.

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?

- Uptake for CottonMap is currently good
  - Approximately 80% of the total planted area was mapped
  - Approximately 24,000 page views for the CottonMap
  - Approximately 1,000 page views for additional resources hosted on the CottonMap website.
- A significant proportion of the total planted area was not included on the CottonMap for 2016-17. This could be associated with a large number of new growers, particularly in areas that are not traditional cotton growing areas.
- Despite significant investment in spray drift mitigation by the cotton industry, cotton crops continue to be impacted by herbicide misuse.
- Feedback for improvements for the CottonMap website continue to be investigated by Cotton Australia and NuFarm Australia.