Australian Government
Cotton Research and Development Corporation

FINAL REPORT 2016

For Public Release

Part 1 - Summary Details

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

CRDC Project Number: DAQ1302

Project Title: Australian cotton production and best practice documentaries

Project Commencement Date: 1/7/13 **Project Completion Date:** 30/6/16

CRDC Research Program: 4 People

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Signature of Research Provider Representative: _____

Date Submitted: _____

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 world wide web has revolutionised the way in which people access and use technical information. Multimedia platform providers such as YouTube are increasingly being utilised by government and businesses to extend detailed messages to clients.

This project will test the potential for using the internet to communicate and extend ideas and concepts in a way that adds value to existing written industry guidelines and web tools by developing an extensive series of short documentaries covering a range of crop production, protection & best practice topics in an informative and entertaining way and host them on the internet where they can be readily accessed.

The use of internet hosted video to communicate complex ideas or market concepts has undergone extraordinary expansion in recent years due to the improved accessibility of high speed internet and the advent of easy to use hosting platforms. This form of multimedia is becoming increasingly recognised as a source of ideas and practical demonstration of all types of human skills and presents a unique and potentially cost effective opportunity for cotton industry extension.

The industry already has a considerable investment in many individual written and web software products such as the cotton production guidelines or various infoPAKS, and videos would add value to this existing repository of information. The project will not aim to compete with the digital video efforts of CSD whose material generally has a 'hot topics' or seasonal update emphasis, but rather focus on producing a searchable archive of production topics from pre-planting to post-harvest that a grower or advisor might use in the same way as a crop production manual. The emphasis would be on producing documentaries with a significant shelf life.

The cotton industry's joint extension program, CottonInfo, is designed to service the commercially unmet cotton research and development information needs of growers and to support industry efforts to improve practices, productivity, competitiveness and environmental performance. The development of video content will assist CottonInfo's communication efforts – thus supporting the CottonInfo strategic goal of making R&D information, trusted advice and specialist technical R&D knowledge readily available through a variety of different communication channels.

The expected outcome of this project is the creation of a user-friendly resource for extending cotton best production practices to growers, advisors, students and general public via an increasingly popular communication method that is currently being under-utilised by the cotton industry. It is anticipated that this extension tool could also become commonly used to communicate outcomes from industry funded projects and that researchers would be asked to nominate project highlights that may be suited to the creation of short documentaries as part of normal reporting processes.

Objectives

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

The primary objective of the project was to create a repository of easily accessible short multimedia (video) files that would communicate scientifically-based crop production, crop protection and best practice principles to a diverse audience. Table 1 summarises the objectives, milestones and performance indicators from the research proposal.

Table 1. Project objectives, milestones and performance indicators.

Objective	Milestone	*Performance Indicator*
1. Establish project working team and appoint project staff member	Establish project working team and appoint project staff member	*Project staff appointed and working group identified and convened. Working group convenes regularly throughout project*
2. Develop comprehensive list of documentary topics and develop filming and web hosting work plans	Documentary topics, timeline and hosting channel developed	*List of documentary topics identified, hosting website secured. Work plans and documentary topics developed for creation of videos*
3. Script, Film, Edit and host cotton documentaries	Creation of documentaries	*At least 20 documentaries scripted, filmed, edited and posted annually.*
4. Seek industry feedback on project progress and make improvements to video format where necessary	Seek targeted feedback on documentary content and quality	*Annual surveys of potential users to gauge effectiveness of hosting channel and documentaries hosted.*
5. Report detailing documentary archive and viewer feedback	Final report and viewer survey	*Complete final report detailing project activities and documentary viewer survey results*

1. Establish project working team and appoint project staff member

The project working team consisted primarily of QDAF staff, who participated in regular informal meetings to discuss progress on individual video topics, brainstorm future topic areas, identify additional footage requirements, and edit scripting ideas. The team liaised with a range of other industry professionals on individual video topics relevant to their areas of expertise, and maintained regular contact with CRDC and CottonInfo communications staff regarding planning and approval processes.

2. Develop comprehensive list of documentary topics and develop filming and web hosting work plans

The initial list of project topics developed continued to be refined and added to as additional industry members suggested topics or volunteered as presenters. Work plans varied between topic areas and presenter preferences, from highly scripted presentations or voiceovers, to a more casual interview or chat style. Additional suggestions for priority topics were considered when developing each season's filming and production schedule, and additional topics were filmed opportunistically.

To support future video editing, original footage was catalogued with a range of relevant metadata, including file references, descriptions and audio transcripts, dates, locations, presenters, camera operators, keywords, and other useful notations, to improve ease of finding relevant cover footage for future productions, and ensure appropriate acknowledgement of sources. More than 2800 original video camera shots (>300 GB of footage) taken by the project team were catalogued by June 2016.

3. Script, Film, Edit and host cotton documentaries
Since late 2013, 61 videos on how-tos or production concepts, including a short interview opinion piece from the cotton conference have been generated (primarily filmed and produced) by the project team and uploaded to the public component of CottonInfo's YouTube channel (youtube.com/CottonInfoAust). The team also produced a video on the power of videos for the CottonInfo Stand at the Australian Cotton Conference (2014); and for the Australian Cotton Research Conference (2015), a video promoting the conference, a video poster promoting the project, and a video showcasing the Australian Cotton Industry played in the opening session.

As well as focusing on the primary objective of best practice documentaries on specific industry topics, the project team has provided valuable assistance to other cotton industry members, from editing and production assistance to branding, transcribing and uploading videos and webinar recordings created externally to the project but approved by CRDC to the CottonInfo YouTube channel. In ten other videos available on the CottonInfo channel the project team has contributed to either editing or branding, and in a further 5, the team has matched closed captions to the uploaded video material (see section 9 for a full list of video titles).

Work is still continuing on a number of drafts at various stages of completion from material filmed within this 3 year project, and some previous drafts, footage, or topic ideas have been put on hold, and may be re-shot or components utilised in future video or podcast productions.

4. Seek industry feedback on project progress and make improvements to video format where necessary
Feedback from presenters and members of the CottonInfo team has been integrated into the video topics list, video content, and visual expression. Quantitative statistics currently available for videos on the CottonInfo YouTube channel include number of views, estimation of minutes watched, audience retention and engagement, and other viewer information. Overall YouTube audience viewing and retention figures are generally higher for specific topic documentary videos than field day promotional material, so the project team maintained its focus on the production of production concepts and how-tos, while providing general support to other industry members for promotional material uploads as required.

As this resource had not been widely promoted before the official completion of the project (June 2016), a broader 'traditional' industry-wide viewer feedback survey has not been attempted.

Methods

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

Identifying video topics
The project team used a range of sources to compile a list of potential video topic areas, identifying key points within that topic area, the best time of year to obtain footage, and potential industry contacts. The original list has been regularly updated over the life of the project, and used as a guideline when planning each season's filming.

Cover footage and presenters on individual topics were also filmed opportunistically. Some topic areas (e.g. pest management or weather-related issues) are not present every season, and topics not in the season's plan were filmed if a presenter or opportunity became available.

Identifying hosting requirements
The project compared the relative benefits and disadvantages of various hosting platforms.

Self-hosting of the videos on an existing partner organisation's website was dismissed due to likely file size, bandwidth and server speed issues, and potential difficulties in future access (if eventual maintenance responsibility for the collection was allocated to a person outside the hosting organisation).

Popular hosting platforms were investigated, and the two most likely to be suitable compared in more depth. YouTube (owned by Google) is a very popular free platform, and encourages videos at both an amateur and professional level, with a focus on entertainment. Vimeo (an anagram of movie) receives less traffic overall, but is preferred by the music industry and many businesses for their public relations videos. Table 2 provides a comparison of the major features of these two popular hosting platforms.

Table 2. Feature comparison of major hosting platforms.

	YouTube	Vimeo Free	Vimeo Pro
Hosted videos	460 million	>1 million	
Views/day	7 billion	1 million	
visitors unique /m	>50 million	>15 million	
Maximum resolution	7680x4320	1920x1080 (4K introduced in 2016)	
3D capable	yes	no	
Replacement of uploaded videos	no	yes	
Copyright infringement	account closed after 3 strikes	video deleted	
Private linking	yes	no	yes
Advertising	yes (if monetised)	yes	no
Price	free	free	$220pa
File uploads	unlimited	½ GB/week	20 GB/week

The CottonInfo YouTube channel was created on 22 August 2013. YouTube was chosen as the most suitable platform primarily for its overall public popularity and familiarity within the industry and the general public. Many agricultural organisations were already utilising YouTube channels (Cotton Australia, Australian Cotton Conference, CSIRO, GRDC). Also in its favour was the ability to easily embed video within other websites, and the detailed analytics available.

The CottonInfo channel is not monetised (and therefore advertisement-free), and the more severe penalty of account closure with repeated copyright infringements (see Table 2) has been avoided by stringently checking for potential copyright issues when producing the videos.

Many of YouTube's features (including quality statistics and private linking) are not available with the free Vimeo option, and although the paid hosting options are feature-rich, the project aim was to create a video collection that would be available in the longer term (beyond the life of the project), and an ongoing subscription potentially created administrative complexity.

The main advantage of a (paid) Vimeo account over YouTube was the ability to replace videos leaving the same url. A stringent review process was therefore put in place for video approvals (from the presenter, a technical specialist within CottonInfo, and CRDC communications, to minimise the chances of an uploaded video needing replacement.

Video genres
The majority of videos produced by the project were presenter-centric how-tos or topic overviews. A general discussion of the topic area with prompt questions to cover key points and provide introductory and concluding statements became the preferred approach after early attempts at scripting did not produce optimum results.

Teleprompting via iPad was initially tested, but discontinued as too unwieldy and difficult to use under field conditions. Using scripted notes also often resulted in a presenter becoming flustered if they could not remember exactly what they had written, and scripted material usually sounded stilted and unnatural (the style of language used in written and spoken material can be quite different).

Video footage and audio acquisition
The majority of filming was arranged around other fieldwork and travel to maximise efficiency and minimise costs. Potential presenters were contacted, and time allocated for filming. Often several presenters were filmed in a single day.

Video equipment used included a Panasonic shoulder-mount AVCCAM camcorder, a smaller hand-held Panasonic camcorder, Brinno timelapse camera, Dinolite pro digital microscope, and DJI Phantom and Inspire model UAVs with GoPro or integrated camera units.

Paul Grundy acquiring video footage using AVCCAM camcorder. Photo by Ruth Redfern

The majority of footage was taken by Paul Grundy, however the project has incorporated video and photos taken by others, in particular Stuart Bray and David Larsen (NSW DPI) and Ruth Redfern (CRDC). Microscope footage was predominately taken by Tonia Grundy. All material provided by others is acknowledged within the video (e.g. as text on single photographs) or on the closing credits screen. Some videos feature cartoons by Stephanie Kramer (QDAF), who has kindly drawn them specifically for this project.

Sound quality was maximised with the use of lapel microphones to provide even audio levels and minimise background noise, particularly wind. Lapels had to be carefully placed if the presenter was moving while talking, as jolting of the unit sometime resulted in loud 'POP' noises in the audio recording.

The background music used for the majority of the videos was adapted from a track provided with the Sony Movie Studio software. Occasionally other music was utilised - either commons licencing with attribution or purchased royalty-free material.

All raw shots with potentially usable footage or audio have been indexed in a database with searchable metadata, and could be utilised in future videos, either in combination with other presenters, or with journalistic-style narrative voiceovers.

Video editing
With a wide range of video software available, Sony Movie Studio was chosen as it was reasonably priced with a wide range of features, and was already utilised by a couple of Departmental employees, providing a handy source of initial hints and tips. Some raw footage (including time-lapse and go-pro cameras) has been re-coded and fish-eye effects

removed using software such as Adobe Media Encoder and GoPro Studio to ensure codec and visual compatibility with the editing software.

Manipulation of graphics and generation of diagrams has been primarily done using Adobe Photoshop and Adobe Illustrator.

Presenter-focussed videos were usually created by manually transcribing the audio of all takes (including ums and repeated words), selecting the clearest sentences or statements, and re-ordering them into a narrative. The video files are then cut and arranged to provide smooth spoken audio, and relative volumes adjusted. Visual layers are added to enhance or reinforce the audio and/or cover visually where the presenter has been stitched mid-sentence. Any additional cover footage requirements identified were sourced from the presenter (photographs, graphs, diagrams etc), or generated within the project. Overlay text was added where additional emphasis or clarity is required, and music and branding applied.

Approvals
Videos at advanced draft stage are provided to the presenter for comment to ensure they include all key points and that the presenter has not been taken out of context. Videos are then provided for approval to a technical specialist within CottonInfo, and CRDC communications for content checking and any additional comments or suggestions.

Final versions
Once approved, the videos are rendered to high definition, rechecked for visual/audio consistency and correct acknowledgements and spelling. The final file is transcribed, and uploaded to YouTube, where metadata (title, description, keywords) is added. The transcript file is uploaded and manually matched to the video to create closed captions (YouTube's auto-generated captions are rather inaccurate and often unintentionally amusing).

Approved videos are made visible to the public on the CottonInfo YouTube channel unless there is a specific reason for them to remain unlisted. They are then available to be utilised on the CottonInfo or other websites using the embed code provided by YouTube or linked to directly from industry newsletters. Additional cross-promotional opportunities are available via the CottonInfo team's accounts with other social media such as Twitter (@CottonResearch).

Evaluation
YouTube Analytics have allowed an in-depth exploration of video views, watch times, and audience retention and demographics (see results section).

As the majority of the project period has been focussed on producing enough videos to provide a sufficiently wide range of topics to make the YouTube channel worthwhile promoting as a channel. In the last few months of the project, links to videos were beginning to appear in industry newsletters (CottonInfo's eNews and Moisture Manager) and in Tweets. As the channel had not been widely promoted until then, a specific industry-wide user survey had not been deemed sufficiently useful to be attempted.

Results

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

Industry support for the project has been excellent, with 50 individuals from 24 different organisations participating as presenters or contributors. This does not include conference delegates or field day attendees who provided short comments in some videos.

By June 2016, the project had produced 61 videos for public viewing on the YouTube Channel, plus several more for promotional purposes relating to cotton conferences. We had also assisted with videos for other groups or individuals, with services from editing and production, to branding and closed captions. A full list of videos is available in section 9.

The following information on channel views has been extracted from YouTube's internal analytics software, and examines the period between 1 July 2014 (when consistently branded material began to be uploaded) and 30 June 2016, unless otherwise indicated.

Views and watch time

Average daily views have increased over time (Figure 1). A couple of initial videos (on symphyla and farm hygiene) caused minor viewing spikes in August and November 2013 respectively, and CRDC used the Channel to link to a video Christmas message in December 2013. Viewing levels then remained low until uploads to the channel using common branding and background music began with '*Cotton growth stages: first square*' on 23 July 2014. Two years later (during July 2016), the channel averaged 58 views per day.

Daily watch time average increases are similar to daily views. The two viewing peaks seen mid 2015 (Figure 1) are due to a nutrition/emissions webinar series (peaking on 29/6/15 for parts 1 & 2 and 25/7/15 for part 3). Individual webinar recordings often run for close to an hour (compared to several minutes for the documentaries), directly influencing watch time totals and averages.

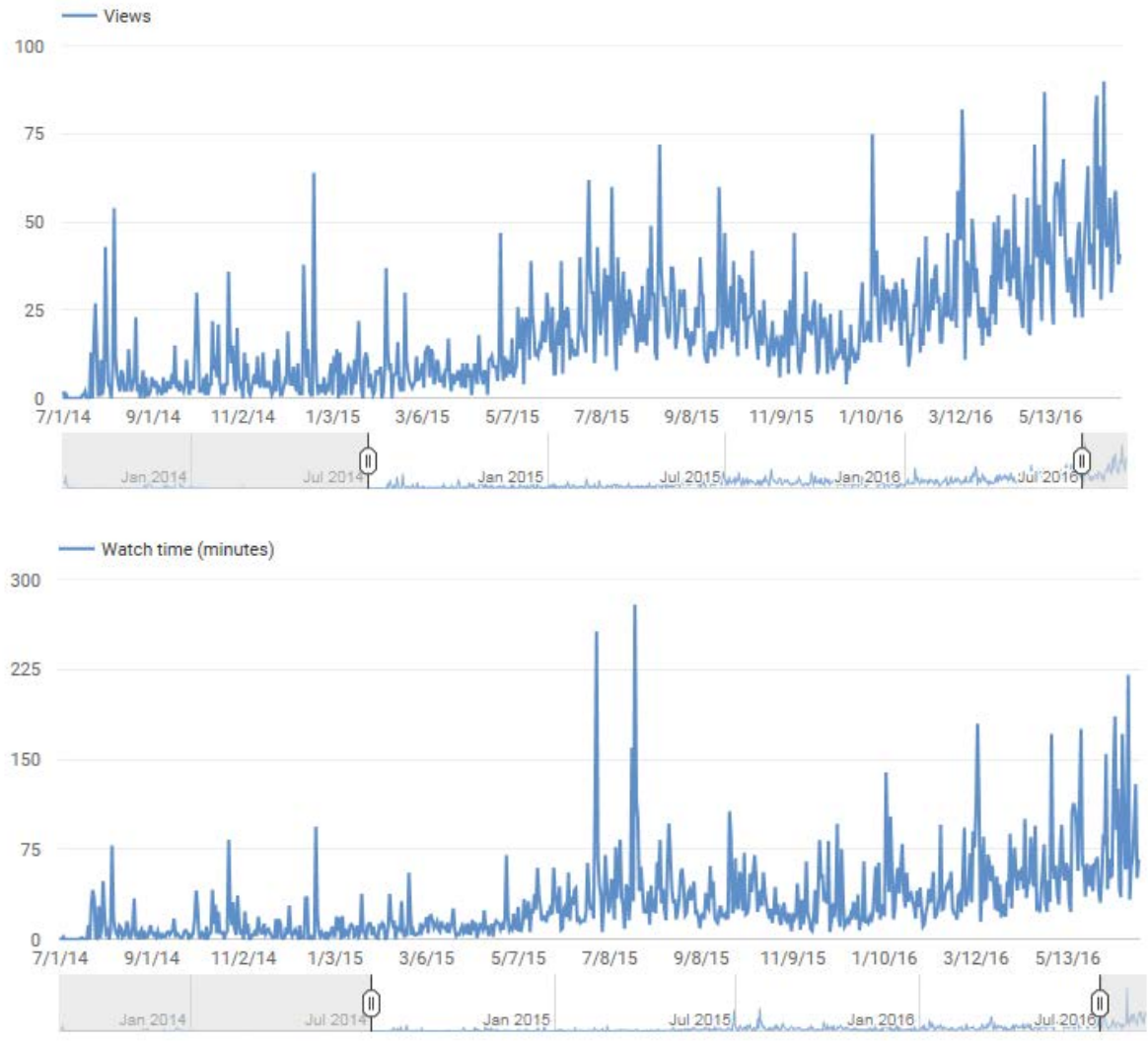


Figure 1. Daily views and watch time (minutes).

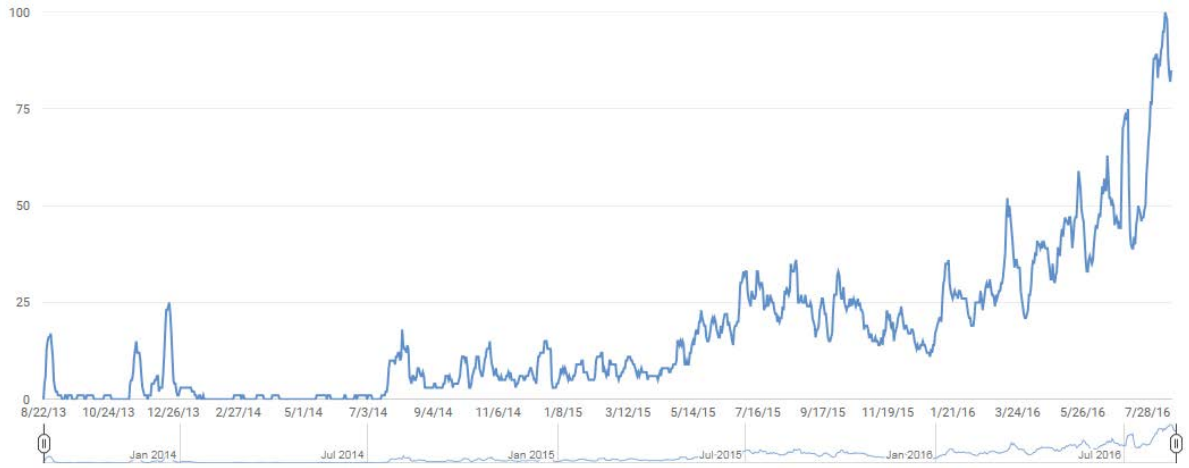


Figure 2. Rolling seven day average of views for lifetime of the channel (to 30 June 2016)

Over the life of this project, the number of available videos has steadily increased, and with improved promotion of the channel, the views are increasing dramatically. During the second quarter of 2016 (April-June), the channel was averaging over 40 views per day, up from 15 views/day in the same period during 2015. During the month of July 2016, this had jumped to nearly 60 views/day (Table 3), and by August 2016, had increased to over 95 views/day.

Table 3. Average daily views

	April-Jun (91 days)	July (31 days)	August (31 days)
2014	0.3	5.0	6.7
2015	15.3	26.6	26.7
2016	42.7	58.1	95.4

Part of the increase has been due to recent direct links from CottonInfo's eNews and CRDC tweets, and spikes in views that can be correlated with specific communication efforts are commonly seen. Project videos played at the Cotton Conference in August 2016 are also likely to have increased awareness of the channel. Through the next production season, the views would be expected to rise even more significantly, as many topic areas that were not present for linking last season are now available to supplement other extension material.

While the videos on the CottonInfo channel have been produced for the cotton industry, some have full or part relevance in other agricultural industries (for example many of the irrigation videos), widening the potential audience.

As at 30 June 2016, the channel had received 14,431 views, with a total estimated watch time of 22,421 minutes (equivalent to 2.2 weeks).

Audience retention and engagement

Average audience retention across all videos from 1 July 2014 to 30 June 2016 is 46% (Figure 3). Individual video watch time can exceed 100% if viewers re-watch some or all of the material in a single viewing session.

During this period, the channel gained 52 subscribers, 51 likes and 64 shares. More than half the shares, and almost half the likes were Australian-based, and Facebook was the most popular location for sharing (27%).

Figure 3. Audience retention (average percentage viewed per day).

The majority of the short documentary videos engage their audience for at least two thirds of the video, while webinar recordings average less than 15% (Figure 4).

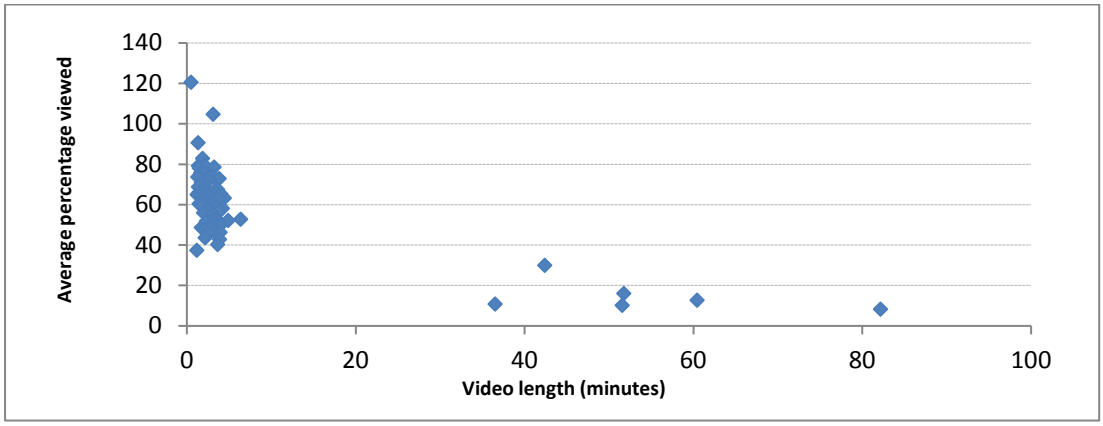


Figure 4. Audience retention as a feature of video length.

Audience demographics

Over the life of the channel, viewers have been predominantly male in the 25-44 years age bracket, with males making up over 80% of total views (Figure 5).

Videos with a high proportion of female viewers included The Cotton RiverCare champion (55%), If I could say one thing… (47%), Healthy rivers (45%), Using IrriSAT for irrigation scheduling (40%), and Strategies to manage limited water (32%).

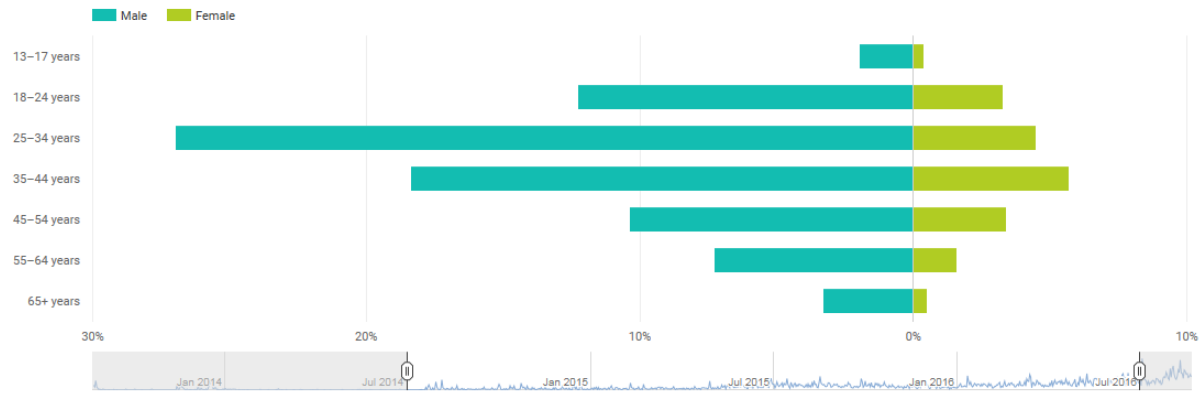


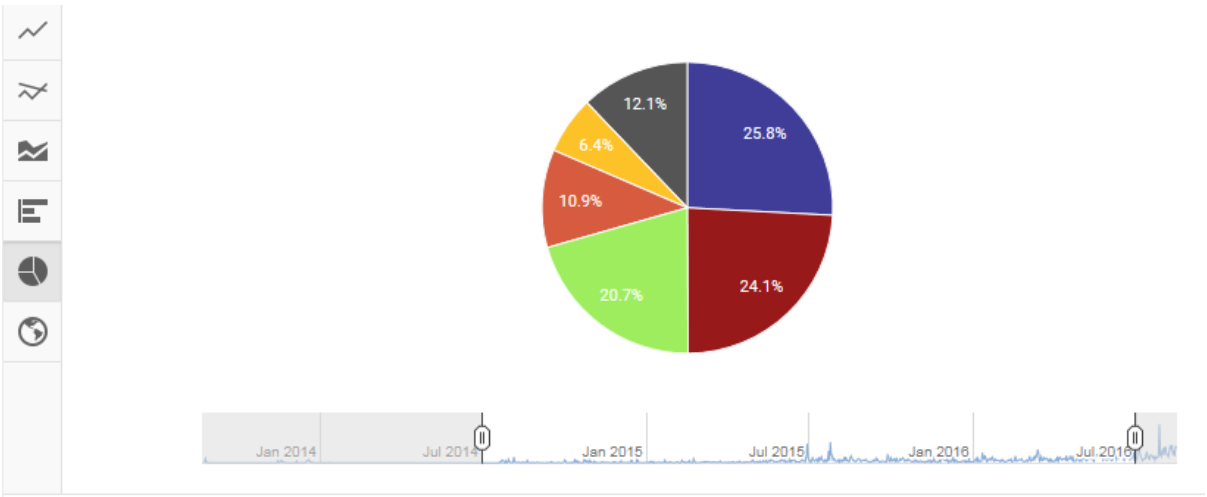
Figure 5. Proportion of total views by gender and age.

Australia is the leading source of views, with the USA views increasing rapidly in recent months (Table 4). Views have come from major cotton production regions around the world (including India, USA, Pakistan, Brazil, Turkey, Greece and Mexico).

Table 4. Views by geographic location and age.

Top locations	Views ↓	13–17	18–24	25–34	35–44	45–54	55–64	65+
Australia	5,247	3.4%	12%	18%	31%	19%	13%	3.9%
United States	4,091	2.4%	16%	35%	18%	13%	9.0%	6.7%
India	1,026	1.8%	24%	36%	26%	8.9%	2.7%	0.9%
Greece	356	3.3%	11%	34%	45%	4.1%	3.3%	0.0%
United Kingdom	241	1.5%	20%	29%	24%	20%	1.5%	4.5%
Pakistan	219	0.0%	15%	66%	16%	2.6%	1.3%	0.0%
Turkey	214	1.5%	9.0%	45%	11%	16%	18%	0.0%
Canada	158	0.0%	12%	39%	20%	14%	12%	2.0%
Philippines	154	0.0%	36%	32%	26%	3.2%	3.2%	0.0%
South Africa	111	0.0%	23%	35%	19%	15%	7.7%	0.0%
Egypt	97	0.0%	20%	45%	18%	13%	5.0%	0.0%
New Zealand	96	0.0%	26%	16%	52%	0.0%	3.2%	3.2%
Brazil	90	11%	15%	44%	11%	15%	3.7%	0.0%
Israel	82	0.0%	0.0%	14%	11%	14%	54%	7.1%
France	71	2.9%	29%	12%	18%	32%	5.9%	0.0%
Mexico	70	0.0%	29%	13%	25%	17%	17%	0.0%
Indonesia	68	0.0%	21%	54%	17%	4.2%	4.2%	0.0%
Saudi Arabia	65	0.0%	4.8%	19%	14%	43%	19%	0.0%
Malaysia	42	0.0%	18%	44%	18%	8.6%	8.6%	4.3%
Denmark	33	0.0%	0.0%	100%	0.0%	0.0%	0.0%	0.0%

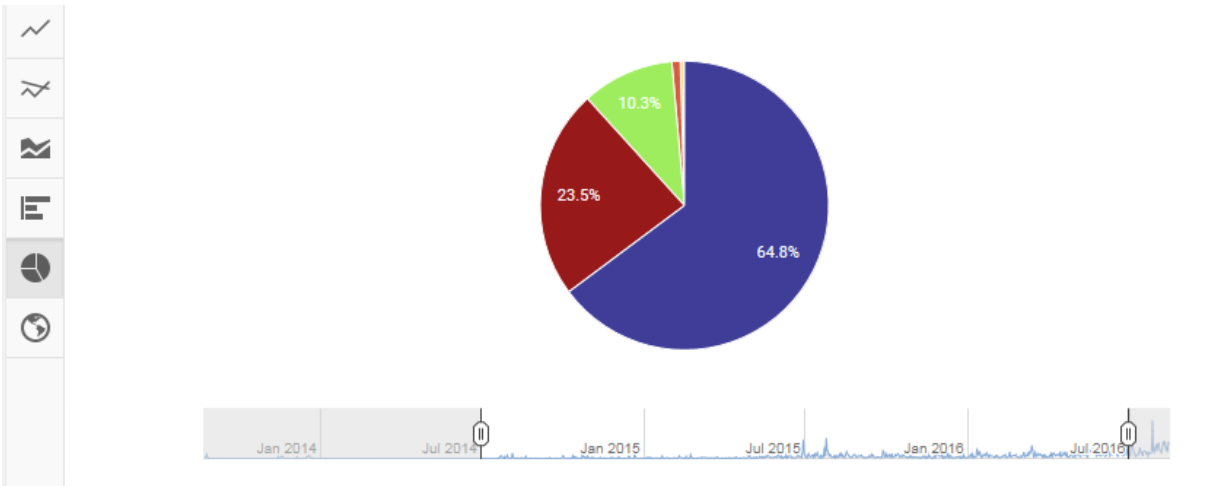
Videos are primarily being accessed via their individual watch pages, directed there by a combination of search and suggested videos within YouTube. External and direct links (from newsletters, websites and twitter) are also an important source of visitors (Figure 6).



Traffic source*	Watch time (minutes)	Views ↓	Average view duration	Average percentage viewed
YouTube search	5,627 (26%)	3,997 (29%)	1:24	57%
Suggested videos	5,250 (24%)	3,294 (24%)	1:35	45%
External	4,505 (21%)	2,777 (20%)	1:37	36%
Direct or unknown	2,371 (11%)	1,216 (8.8%)	1:56	48%
YouTube channels	1,391 (6.4%)	909 (6.6%)	1:31	39%

Figure 6. Source of traffic to the video pages.

The majority of views on the CottonInfo channel are still on regular computers, although mobile devices now make up about one third of views (Figure 7).



Device type | Operating system

Device type	Watch time (minutes)	Views ↓	Average view duration	Average percentage viewed
Computer	14,121 (65%)	8,774 (64%)	1:36	42%
Mobile phone	5,112 (24%)	3,496 (25%)	1:27	59%
Tablet	2,252 (10%)	1,341 (9.7%)	1:40	56%
TV	203 (0.9%)	122 (0.9%)	1:40	67%
Game console	68 (0.3%)	43 (0.3%)	1:34	46%

Figure 7. Device type videos are displayed on.

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.

The CottonInfo YouTube channel was created on 22 August 2013. As of 30 June 2016, it hosted 85 videos; 61 of them were cotton documentaries produced by the project. The remainder included project-produced promotional material, videos edited and produced (but not majority filmed) by the project, videos produced by others, and webinar recordings.

Over the life of this project, the number of available videos has steadily increased, and with improved promotion of the channel, the views are increasing dramatically. Part of the increase has been due to recent direct links from CottonInfo's eNews and CRDC tweets. Through the next production season, the views would be expected to rise significantly, as many topic areas that were not present for linking last season are now available to supplement other extension material.

6. Please describe any:-

a) technical advances achieved (eg commercially significant developments, patents applied for or granted licenses, etc.);
b) other information developed from research (eg discoveries in methodology, equipment design, etc.); and
c) required changes to the Intellectual Property register.

In response to the potential for aerial photography to enhance the viewing experience, Paul Grundy successfully gained CASA certification for the Department of Agriculture and Fisheries to fly remote piloted aircraft (unmanned aerial vehicles or UAVs). This certification has allowed others within the Department to investigate the potential of utilising UAVs for videos, still photography and other research applications.

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?

In its first 3 years, the CottonInfo YouTube channel had been watched over 17500 times, with views increasing exponentially as awareness of this resource improves.

This project has demonstrated that video can be utilised as an extension tool to enhance audience engagement and provide additional value to existing information and extension networks.

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.

It is proposed that raising the profile of the CottonInfo YouTube channel as a whole, and promoting individual videos should be actively undertaken by the CottonInfo partner organisations: CRDC, Cotton Australia and CSD. Other various industry communication vehicles such as Spotlight and Cotton Grower may be willing to consider pro-bono advertising of this resource.

It is anticipated that if this project enjoys success as a communications tool that CRDC might consider adding an additional question to all project reports asking researchers and extension staff whether or not they have a topic of interest that may be communicated with a cotton documentary

9. 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)

Videos produced by the project team are listed in Table 5. Other videos where the project team has provided varying degrees of assistance are included below the table.

Table 5. Videos majority filmed and produced by the project.

	Video	https://youtu.be/	Presenter	Length
1	Has this pest been snacking on your seedlings?	pXrJs83z6mo	V: Tonia Grundy	1.43
2	Mavis and Edna Aphids winter vacation	EWnRrcFjeUs	V: Susan & Naigre	1.17
3	Irrigating with siphons	cMVFCeoysXc	Renee Anderson	1.63
4	Rogue cotton plants in the farming community	CJP14_swggE	Paul Grundy	3.25
5	Checking the farm for volunteer plants	9C2Utf5mUxk	Susan Maas	1.45
6	Planting tips for cotton	m6uo7-77yi4	John Marshall	2.33
7	Pre-season planter maintenance	n5QP8ihw1vs	Andrew Whitby	2.7
8	Using a beat sheet in cotton	vl-Y8qj_xXs	Paul Grundy	1.48
9	Cotton growth stages: first square	aQlk65auIyg	Paul Grundy	1.55
10	Cotton growth stages: square retention	4kxiL2xaWnQ	Paul Grundy	1.82
11	Cotton growth stages: first flower	UVR8da6s-IE	Paul Grundy	1.37
12	Cotton growth stages: nodes above white flower (NAWF)	Ny7W88qR3Gc	Paul Grundy	1.7
13	Maintaining healthy refuges	Ge7ki9NNNWI	Mary Whitehouse	1.7
14	The science behind cotton refuges	RZA2ClAdn2c	Mary Whitehouse	1.75
15	Mealybug hotspots in cotton	r4aeGPcVHk0	Paul Grundy	2.32
16	Conserving beneficials in cotton	g3GYrt6QoN8	Lewis Wilson	2.45
17	Spider mites in cotton	oUcatfAOOQM	Lewis Wilson	3.12
18	Sampling spider mites in cotton	2hB84S7p6vY	Lewis Wilson	3.83
19	Vegetative growth rate (VGR) in cotton	cDh0ezLwnH4	Sandra Williams	2.52
20	Assessing the maturity of a cotton crop	JFvpSH8WIBE	Sandra Williams	2.73
21	Silverleaf whitefly sampling in cotton	-xGrU2-h6Vs	Dave Kelly	2.75
22	Recent survivors in Bollgard II: are they resistant?	Szm4sKRVLmA	Sharon Downes	1.3
23	Cotton branch types	GgHOZQ3IrqU	Rose Brodrick	1.48
24	Broad mites in cotton	PexkYjLQnoU	V: Tonia Grundy	1.97
25	If I could say one thing... (Cotton Conference 2014)	GFVYTy3_ymM	Various	2.82
26	Siphon sizes and flow rates	d_JIREnmgzU	Lance Pendergast	2:45
27	Siphon placement	wswKV4kSzn8	Lance Pendergast	1:23
28	Do fruiting sites formed after last effective flower contribute to yield?	PjQV-mH1Lb8	Rose Brodrick	2:10
29	Evaluation of overhead irrigation systems	X1VGIwbxB9w	Lance Pendergast	3:56
30	Soil moisture monitoring with the EM38	WS-EQ3yxqzk	Jenny Foley	2:43
31	Waterlogging in cotton	08vnL2sT3io	Mike Bange	3:24
32	First irrigation	T-aqy2Tr70s	Mike Bange	2:08
33	Using IrriSAT for irrigation scheduling	ccvJizT4Iw0	John Hornbuckle	3:09
34	Healthy rivers	7I-fqMjJXSw	Stacey Vogel	3:53
35	Riparian areas	VKbxXwGJpIs	Stacey Vogel	3:21
36	Row spacing in raingrown cotton	0mc0jMVtdz4	Mike Bange	2:21
37	Weed resistance demonstration	y7Jj1IaiSLk	Jeff Werth	2:27
38	Cotton growth stages: cut-out	IYL9kslWOcg	Paul Grundy	2:09
39	Helicoverpa resistance testing	SrtMOQQz9JA	Sharon Downes	3:48
40	Aphids in cotton	Vi07GhSoQtg	Lewis Wilson	1:58
41	Aphid sampling and management	L9N64u1yi8E	Lewis Wilson	3:02
42	Effective end of season crop destruction	rO-JAX7s7jg	Paul Grundy	3:01
43	Making the decision to defoliate	kHVcRBPGIAI	Jamie Street	2:37
44	Variety development	brFuFFP_MUA	Warwick Stiller	6:22
45	Cotton automation tour: Southern growers	oSO-4MePNNg	mixed	2:50
46	Cotton automation tour: Northern growers	I6aRtPCIls0	mixed	4:05
47	Planter components	yGZ9JIo8G6U	John Marshall	1:51
48	Solenopsis mealybug in cotton	vOTJ2XkAsug	Paul Grundy	3:12
49	What does cotton do at night?	N3JSCl0ario	Warren Conaty	2:09
50	What is pix?	clFpyymWW6Q	Mike Bange	1:48
51	Monitoring vegetation changes over time – photo points	xFTE246xpkg	Mark Palfreyman	2:04
52	Hidden hunger	DVzz2rRbzLQ	Chris Dowling	1:18
53	Seed placement	kypMqI5F51s	John Marshall	2:15
54	Important considerations when making planting decisions	y5f2qn3qc_k	John Marshall	3:20
55	Sclerotinia in cotton	yt_542Kj3_0	Linda Smith	2:26
56	Sampling for plant nutrient analysis	XrN3X_cNgBo	Chris Dowling	4:52
57	Managing nitrogen applications	7cXnJZJ1O50	Oliver Knox	3:51
58	The Cotton RiverCare champion	OVykQliglow	Mark Palfreyman	4:25
59	Enhanced efficiency fertilisers	nV_2LHjpjeQ	Dio Antille	1:11
60	Identifying cotton bunchy top disease	xrp1420cjlk	Murray Sharman	3:07
61	Cotton bunchy top management	3DOS61-wqqA	Murray Sharman	3:36

Other project-generated videos (outside original project specifications)

- Video project promotion: Australian Cotton Conference 2014 (Unlisted)
- Pre-conference promotion for Cotton Research Conference 2015 (Unlisted)
- Australian Cotton Research Conference 2015 – Introduction (images set to music: not for distribution)
- Video project team promotion: poster for the Australian Cotton Research Conference 2015 (Unlisted)

Videos produced by others that the project has assisted with (editing/branding/etc):

- CottonInfo meeting – team video (Amanda Thomas) images set to music (not for distribution)
- Macquarie nitrogen trial 2013 (Amanda Thomas): edited timelapse images
- Limited water management research (Stuart Bray): branding & CC
- Strategies to manage limited water (Stuart Bray): branding & CC
- Taking research to growers: 2015 CottonInfo irrigation technology tour (Stuart Bray): branding & CC
- Solar the hot topic at CottonInfo Big Day Out, St George (Seedbed Media): branding & CC
- Renewable energy on the agenda at CottonInfo Big Day Out, Gunnedah (Seedbed Media): branding & CC
- 2015 cotton irrigation technology tour at 'The Wilgas', Nevertire (BrayLee): branding & CC
- CRDC Grassroots Grants: Walgett weather stations (Sally Hunter): full editing & CC
- Energy efficiency audit delivers cost savings and emissions reductions (Seedbed Media): branding & CC
- Climate modelling information assists with cotton decision making (Seedbed Media): branding & CC

Videos produced by others that the project has assisted with (upload and closed captions only):

- Come Clean Go Clean (Stuart Bray)
- The expansion of cotton in southern NSW (Stuart Bray)
- Challenges for new growers in the MIA (Stuart Bray)
- Automated small pipe irrigation system (BrayLee)
- Moving to an autonomous irrigation system (BrayLee)

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

Videos created by the project have been hosted on the CottonInfo YouTube channel (https://www.youtube.com/CottonInfoAust) and are available for linking via direct urls or embedding into website pages.

Part 4 – Final Report Executive Summary

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 has produced a collection of short videos covering a range of crop production, protection & best practice topics that are hosted on the CottonInfo YouTube channel (youtube.com/CottonInfoAust) where they can be readily accessed. These videos add value to existing written industry guidelines and web tools by presenting information in an entertaining multimedia format that has become increasingly popular in a digital world.

The project captures specialist knowledge in a practical and visual way. The focus has been to produce documentaries that have a significant shelf life and create a searchable archive of crop production information.

The CottonInfo YouTube channel was created in August 2013, and by 30 June 2016, this project had filmed and produced three-quarters of the videos hosted by the site and provided assistance to 15 others. By mid-2016, the channel had received 14,431 views, with a total estimated watch time of 22,421 minutes (equivalent to 2.2 weeks of viewing).

Views are increasing exponentially, and in the two months after the reporting period (by 31 August 2016), the channel had received an additional 4759 views. This included a daily record of 276 views on 29 August, corresponding to CottonInfo eNews promoting the planting-themed videos.

Having a well-educated industry that is adopting best practices is an essential part of ensuring the cotton industry's continued success. The project assists the extension of practices that improve productivity, farm profitability, and contribute to environmental stewardship.

This project has enabled the use of short production-focussed videos for cotton extension in the Australian cotton industry. The video collection will be of value to new growers, consultants and established growers who want to know more about cotton production, protection and best practices. It will also serve as an important resource for students and interested members of the public, and achieve better engagement with the broader community by presenting factual information about industry practices.