



FINAL REPORT 2018

For Public Release

Part 1 - Summary Details

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

CRDC Project Number: DAQ1702

Project Title: Videos: documenting the production of best practice Australian cotton

Project Commencement Date: 01/07/2016 **Project Completion Date:** 30/06/2018

CRDC Research Program: 4 People

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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.

Over the past decade, information extension has moved from being predominantly hard copy publications and face-to-face presentations to an eclectic mix of material, both print and multimedia. Online content is now a major resource for many in the agricultural community, with downloadable publications, interactive apps, and multimedia platform providers such as YouTube increasingly being utilised by government and businesses to extend detailed messages to clients.

The cotton industry already has a considerable investment in many information products such as the cotton production guidelines and infoPAKS, and videos add value to this repository by utilising vision and audio to communicate and extend ideas and concepts in an informative and entertaining way.

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 videos produced in this project are CottonInfo-branded, 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 project's focus is to expand the searchable archive of production and industry-related topics currently available on the CottonInfo YouTube channel (youtube.com/cottoninfoaust).

DAQ1702 has continued to build on the collection of short video documentaries produced by DAQ1302, with an emphasis on expanding the range of topics available.

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 build on the repository of easily accessible short multimedia (video) files created in DAQ1302 that 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. Develop detailed list of potential topics	Documentary topics planned in conjunction with CottonInfo	<i>List of video topics identified and reviewed annually</i>
2. Produce videos	Script, film, edit, transcribe and host cotton videos	<i>At least 40 videos produced during project.</i>
3. Regularly report on video viewing statistics and viewer feedback	Collate viewer statistics	<i>Viewer statistics included in CRDC progress reports.</i>
4. Complete final report	Final report submitted	<i>Complete final report detailing project activities and viewer survey results</i>

1. Develop detailed list of potential topics

The list of project topics developed was reviewed annually but has remained flexible, with adjustments made as industry members suggested topics or volunteered as presenters. Some topics were filmed opportunistically at quick notice. Priority was given to hands-on 'how-to' topics.

2. Produce videos

Videos were produced using a range of methods; from 'talking head' general topic discussions, to product or equipment demonstrations, to fully scripted productions. After presenter, technical and communications approvals, the edited videos were rendered in high definition and uploaded to the CottonInfo YouTube channel, along with an audio transcript that was manually mapped to the audio for use as closed captions.

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. Nearly 1200 original video camera shots (>19 hours of footage) taken by the project team were catalogued between July 2016 and June 2018.

Since July 2016, an additional 43 videos on how-tos or production concepts 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). A further three videos were created by the project team specifically for the 2016 Australian Cotton Conference.

As well as focusing on the primary objective of best practice documentaries on specific industry topics, the project team has provided valuable support 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 (see section 9 for a full list of video titles).

Work is still continuing on several drafts at various stages of completion from material filmed within this two 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.

3. Regularly report on video viewing statistics and viewer feedback

A range of viewer statistics, including viewing numbers, watch times, and audience demographics and engagement (primarily sourced from YouTube's internal analytics) have been provided in project progress reports. Additional statistics on specific videos have been provided on request to presenters.

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. 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-to' videos, while providing general support to other industry members for promotional material uploads as required.

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 has focused on identifying topics not currently covered in the CottonInfo video collection. The topics list was also informed by CottonInfo communications calendars, and adapted to ideas from potential presenters. Filming selections were influenced by the best time of year to obtain footage, emerging industry issues, and efficient travel arrangements by the camera operator (filming often occurred on the back of an industry event, such as a field day or meeting). The original list has been regularly updated over the life of the project, and is reviewed and used as a guideline when planning each season's filming.

In addition to the planned list, 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.

The hosting platform

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, but also the high level of back-end analytics available at that time.

A stringent review process was put in place for video approvals (including the project team, the presenter, a technical specialist within CottonInfo, and CRDC communications), to minimise errors and to avoid potential copyright issues or the chances of an uploaded video needing replacement.

Video genres

The majority of videos produced by the project were presenter-centric ‘how-to’s or topic overviews (often referred to as ‘talking heads’). An initial general discussion of the topic area by the presenter followed by prompt questions to cover key points and provide introductory and concluding statements became the preferred approach for most topic presenters after early attempts at scripting (even by presenters themselves) did not produce optimum results. Teleprompting via iPad was found to be too unwieldy and difficult to use under field conditions. Scripted notes usually resulted in a presenter becoming flustered if they could not remember exactly what they had written, and pre-written material often sounded stilted and unnatural.

Videos featuring the presenter were preferred over a journalistic interview style, as these were seen by the project team to be more ‘authentic’, and reduced the overall video length. The target length for most videos was under three minutes, as shorter videos tend to have higher retention rates (as demonstrated in Figure 7 of the results section). YouTube’s advanced search includes a duration filter, with ‘short’ videos up to 4 minutes, and ‘long’ videos over 20 minutes.

This project’s outputs have also included four fully scripted video parodies (the Lone Stranger series), on farm hygiene and biosecurity topics. These required additional preparation time for concept development, script editing, costume and props acquisition, and location scouting.

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 multiple presenters were filmed in a single day.

Video equipment used included a Panasonic shoulder-mount AVCCAM camcorder, a smaller hand-held Panasonic camcorder, various tripods and hand-held gimbals, a Sennheiser lavalier microphone, Brinno time lapse cameras, Dinolite pro digital microscopes, and DJI Phantom, Inspire or Mavic UAV models with integrated camera units.



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

The majority of video camera and UAV footage was taken by Paul Grundy, and microscope and time lapse footage was mostly generated by Tonia Grundy. The project has also incorporated video and photos taken by others, which have been acknowledged in individual video credits, either within the video (e.g. as text on single photographs) or on the closing credits screen.

Sound quality was enhanced with the use of a lapel microphone to provide even audio levels and minimise background noise, particularly wind. The background music used for the majority of the videos was adapted from a track provided with 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 still be utilised in future videos, either as cover footage, in combination with other presenters, or with journalistic-style narrative voiceovers.

Video editing

The majority of video editing has been done with Sony Movie Studio software. Adobe Premiere, Adobe Media Encoder, and GoPro Studio have also been utilised for specific scenes, re-coding files to ensure compatibility, or fish-eye lens removal. Manipulation of graphics and generation of diagrams has been primarily done using Adobe Photoshop and Adobe Illustrator.

Raw footage was trimmed and re-ordered to provide smooth spoken audio narrative, and visual layers added to enhance or reinforce the audio and/or patch 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 was required, and music and branding applied.

Approvals

Videos at advanced draft stage were provided to the presenter for comment to ensure they included all key points and that the presenter was not taken out of context. Presenters were asked to complete a multimedia consent form at this point. Video drafts were then sent to both a technical specialist within CottonInfo and CRDC communications for content checking and any additional comments or suggestions.

Final versions

Once approved, the videos were rendered to high definition (up to 1920x1080), rechecked for visual/audio consistency and correct acknowledgements and spelling, and the audio manually transcribed. The final file was uploaded to YouTube, where metadata (title, description, keywords and thumbnail identifier) was added. The transcript file was uploaded and manually matched to the video to create closed captions (YouTube's auto-generated captions are often inaccurate and unintentionally amusing).

Uploaded 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, either by 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).

Results

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

Industry support for both video projects has been excellent, with 70 individuals from 25 different organisations, as well as growers participating as presenters or content contributors. There have also been many conference delegates or field day attendees who have provided short comments that were utilised in some of the videos.

Between July 2016 and June 2018, this project had produced 43 videos for public viewing on the YouTube Channel, plus several more for promotional purposes relating to cotton conferences. The project team 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 for this period is available in section 9.

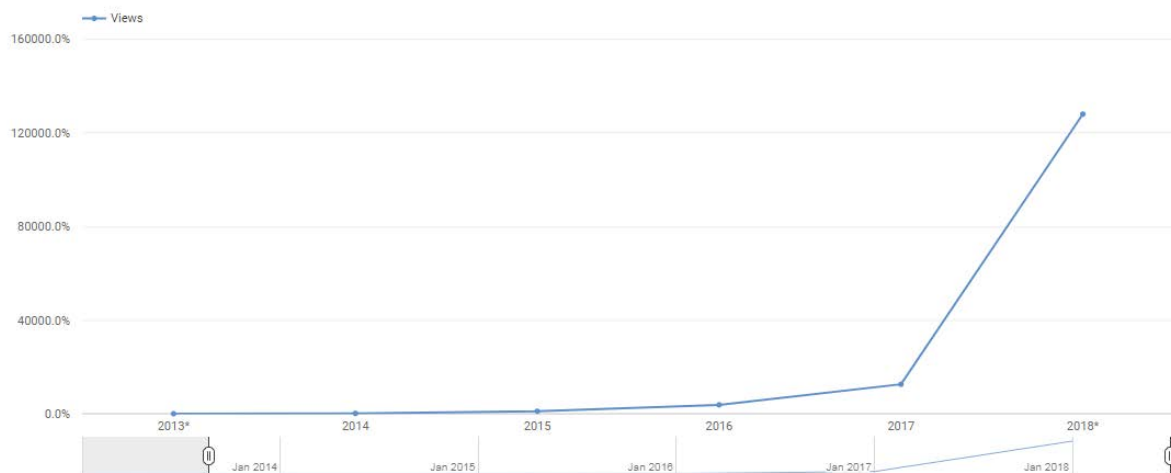
While the videos on the CottonInfo channel have been produced with a focus on informing the cotton industry, some have full or part relevance within other agricultural industries (for example many of the irrigation videos), and some (such as a video on recognising inversion conditions and the potential for spray drift) have been specifically produced for a wider audience.

The following information on channel views has been extracted from YouTube's internal analytics software, and focusses on the period between 1 July 2016 and 30 June 2018, but also includes comparative analysis from the lifetime of the channel.

Views and watch time

As at 30 June 2018, the channel had received a total of 760,623 views, with a total estimated watch time of 769,647 minutes (equivalent to 76.35 weeks).

Average daily views had been slowly increasing over time (Figure 1 and Table 2), until a video on how to start a siphon went viral in late January 2018, and daily view tallies increased dramatically (Figure 2 and Table 2).



* Selected date range includes an incomplete year.

Figure 1. Growth in daily views by year

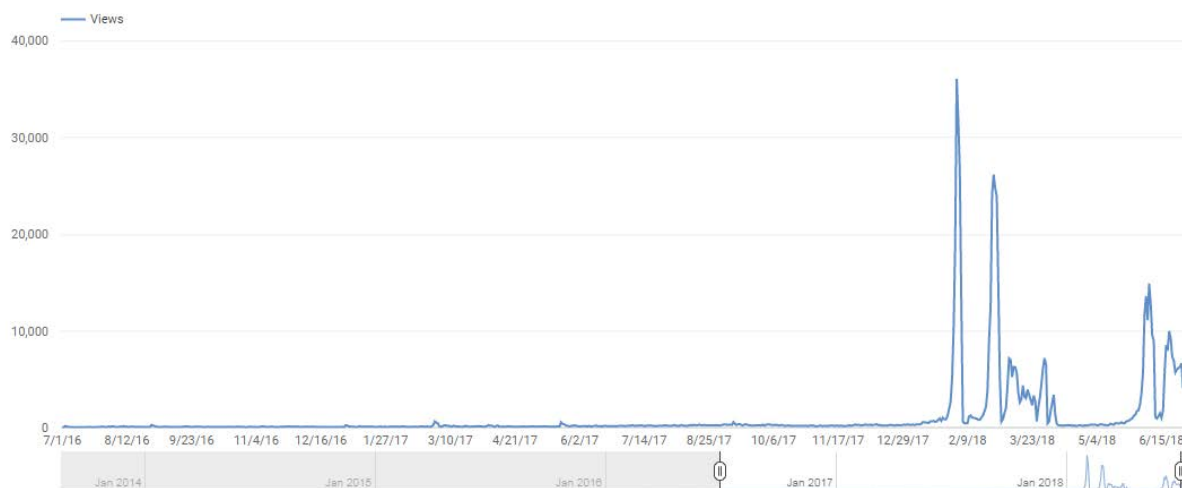


Figure 2. Channel views increased dramatically as a video went viral

During the second quarter of 2016, the channel was averaging over 40 views per day, up from about 15 views/day in the same period during 2015. During the same period in 2017, views had more than tripled to over 140/day (Table 2), and were still rising steadily until early 2018, when total numbers jumped dramatically due to the irrigation video viewings.

Table 2. Average daily views

Year	Jan-Mar (90-91 days)	Apr-Jun (91 days)	July-Sep (92 days)	Oct-Dec (92 days)
2014	0.8	0.4	5.4	7.6
2015	7.6	15.3	25.2	18.8
2016	28.4	42.8	77.5	73.3
2017	123.8	141.4	232.2	224.0
2018	4782.8	2592.0		

About 4% overall and 6% of Australian viewers are utilising the subtitle (closed caption) option available for videos.

CASE STUDY: A video goes viral

The video *Irrigating with siphons* was uploaded on 25 July 2014. Initially, views were less than 10 per day. By mid-2016, views were more than 20 per day, and mid-late 2017 were reaching 100 per day (Figure 3). The initial popularity of this video is thought to be due to some farm managers in Australia (and possibly the USA) adding it to their induction material for new farm hands.



Viewing numbers within YouTube are to a large extent self-perpetuating, in that videos with high viewing numbers are more likely to be promoted as 'suggested videos' by YouTube.

In late January 2018, a spike in video views occurred, predominantly in India (peaking at nearly 36,000 views/day), and several more viewing spikes have occurred between January and June 2018 (Figure 4). Australian views of this video over this period have remained relatively steady (Figure 5). *Irrigating with siphons* currently accounts for nearly 90% of the channel's total views, and 47% of total views on the channel have now been from India.

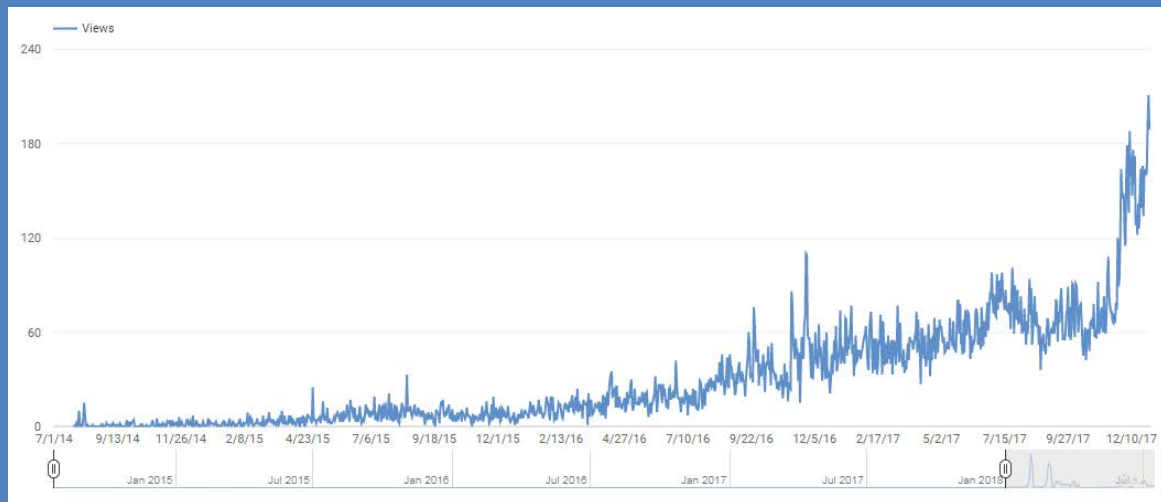


Figure 3. Views for *Irrigating with siphons* from 1 July 2014 to 31 December 2017

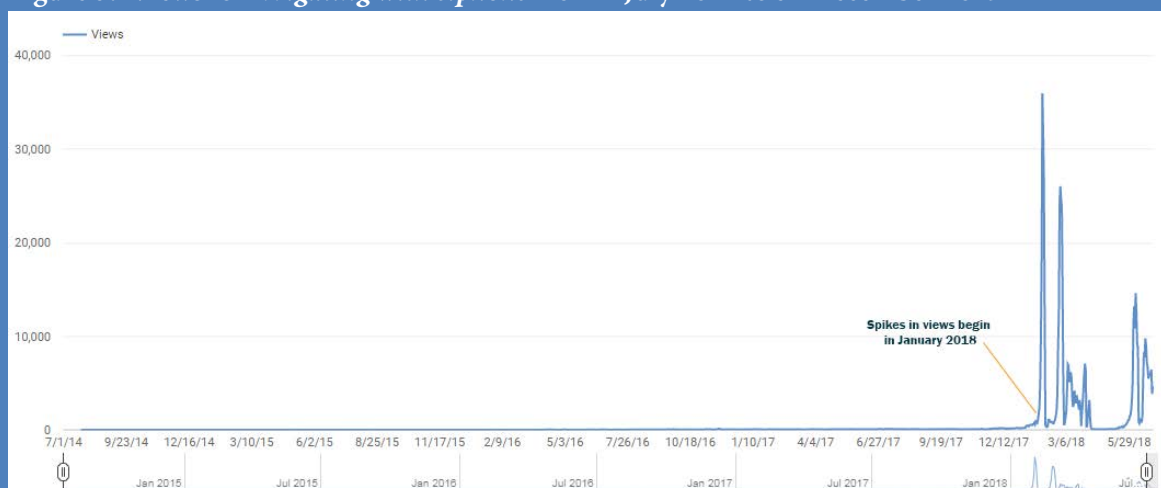


Figure 4. Views for *Irrigating with siphons* from 1 July 2014 to 30 June 2018

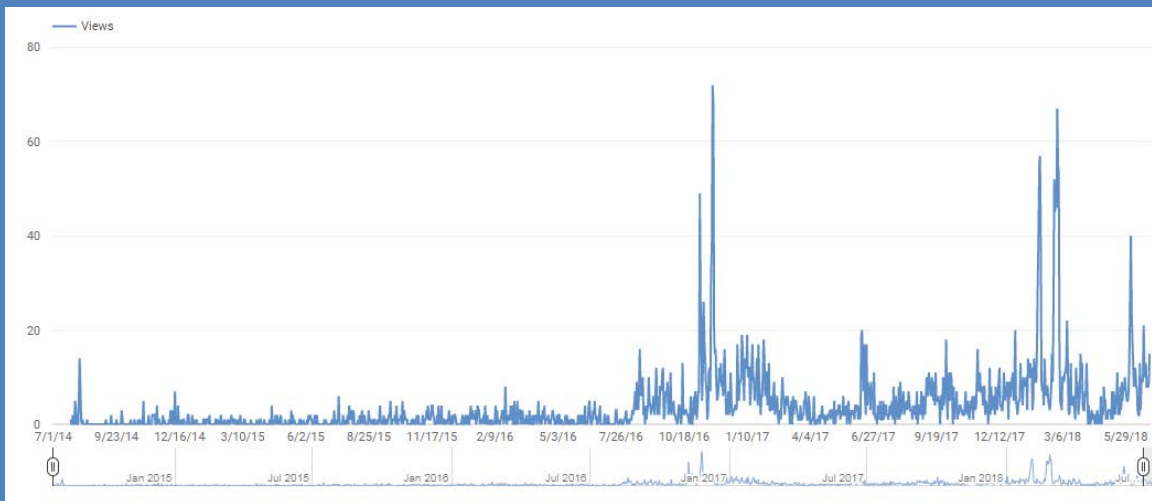


Figure 5. Australian views for *Irrigating with siphons* from 1 July 2014 to 30 June 2018

Addition of this video to audience favourites or playlists follows a similar pattern to overall views in Figure 4, with the spikes in popularity beginning in early February 2018 (Figure 6). More than 90% of the overall audience utilised a mobile phone, compared to only half the Australian audience (Figure 7).

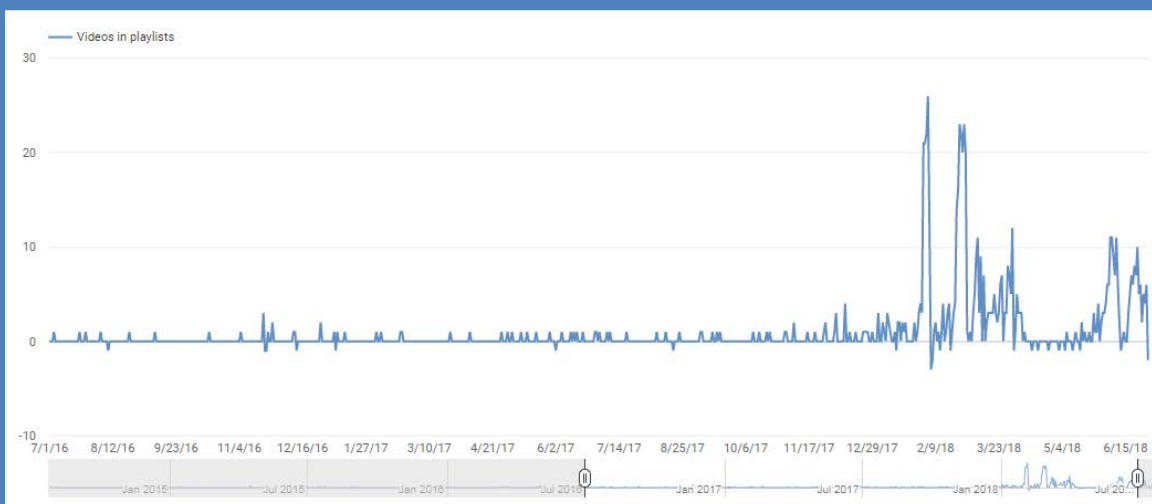


Figure 6. Number of times *Irrigating with siphons* was added to (or removed from) playlists/favourites from 1 July 2014 to 30 June 2018

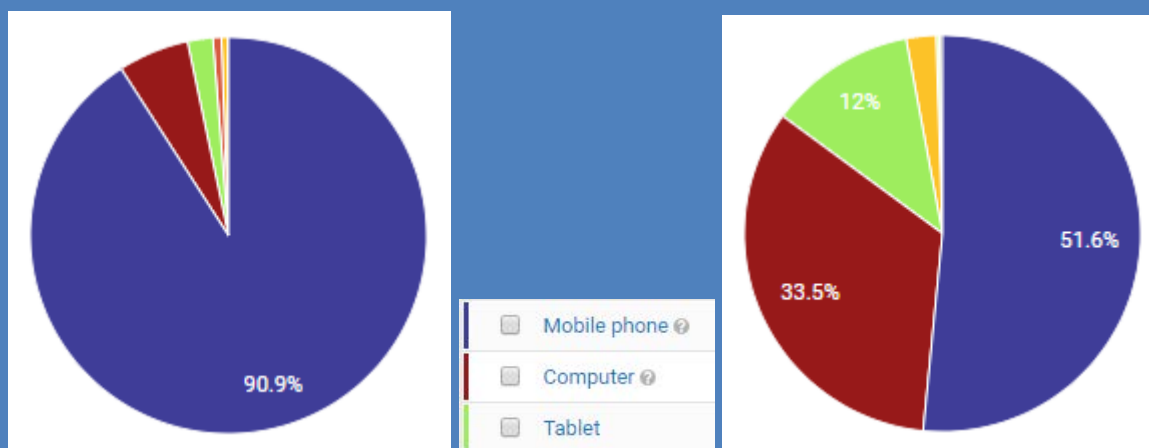


Figure 7. Preferred device used while watching *Irrigating with siphons* from 1 July 2014 to 30 June 2018 (left: worldwide, right: Australia)

Daily watch time averages have been similar to daily views, as most of the videos are of similar length (apart from webinars). Individual webinar recordings often run for close to an hour (compared to several minutes for the documentaries), potentially influencing watch time totals and averages, however the high numbers of views for the irrigation video has overwhelmed this influence when looking at total view counts.

CottonInfo videos have been watched in a total of 218 countries (Figure 8). A combination of higher populations and smaller farm sizes in countries such as India has contributed to the relatively high proportion of overseas views compared with Australia. Australian views currently account for 3.8% of the channel's views, but because Australians are more likely to watch the webinars provided on the channel, Australia accounts for 7.6% of the watch time (the second-highest after India).

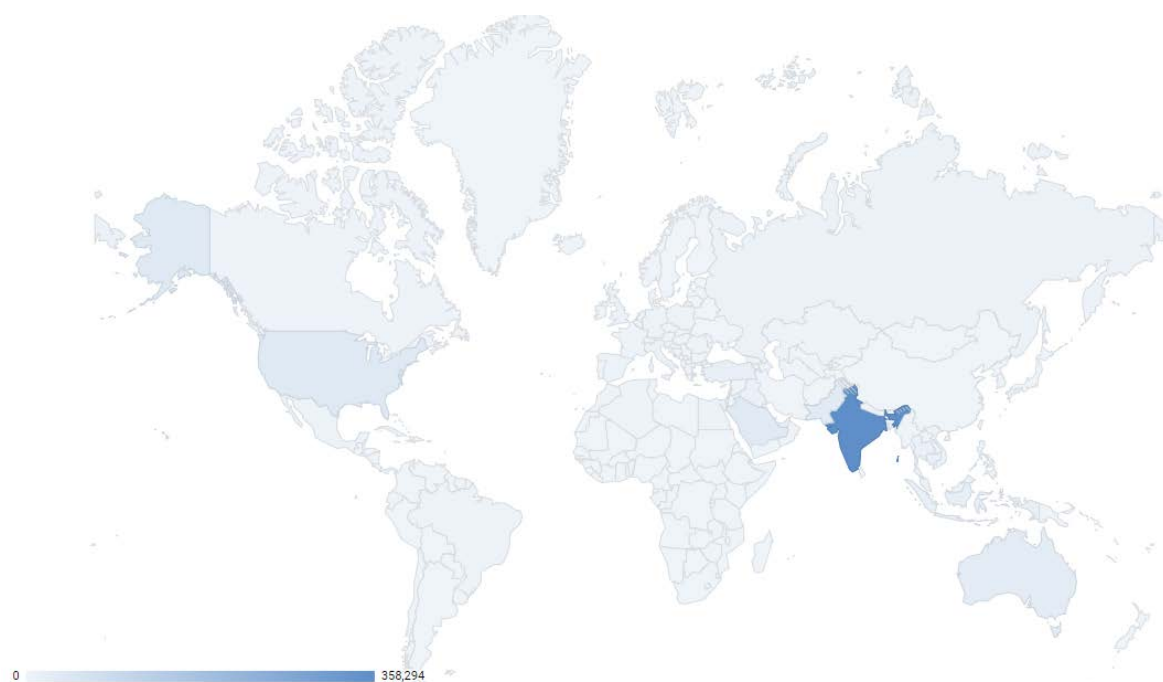


Figure 8. Geographical representation of views since the CottonInfo channel was created

Statistics provided within this report will therefore focus on the Australian audience.

CottonInfo's Australian audience views and watch time

Within Australia, from creation to 30 June 2018, the channel had received a total of 28,527 views with 58,512 minutes watched (>40 days). Views and watch time over the two years of this project are shown in Figure 9. Spikes in viewing numbers can often be correlated with specific communication efforts (e.g. CottonInfo's eNews and CRDC or presenter-initiated tweets); spikes in watch time that do not correlate to a spike in views are usually webinar-related (Figure 9b).

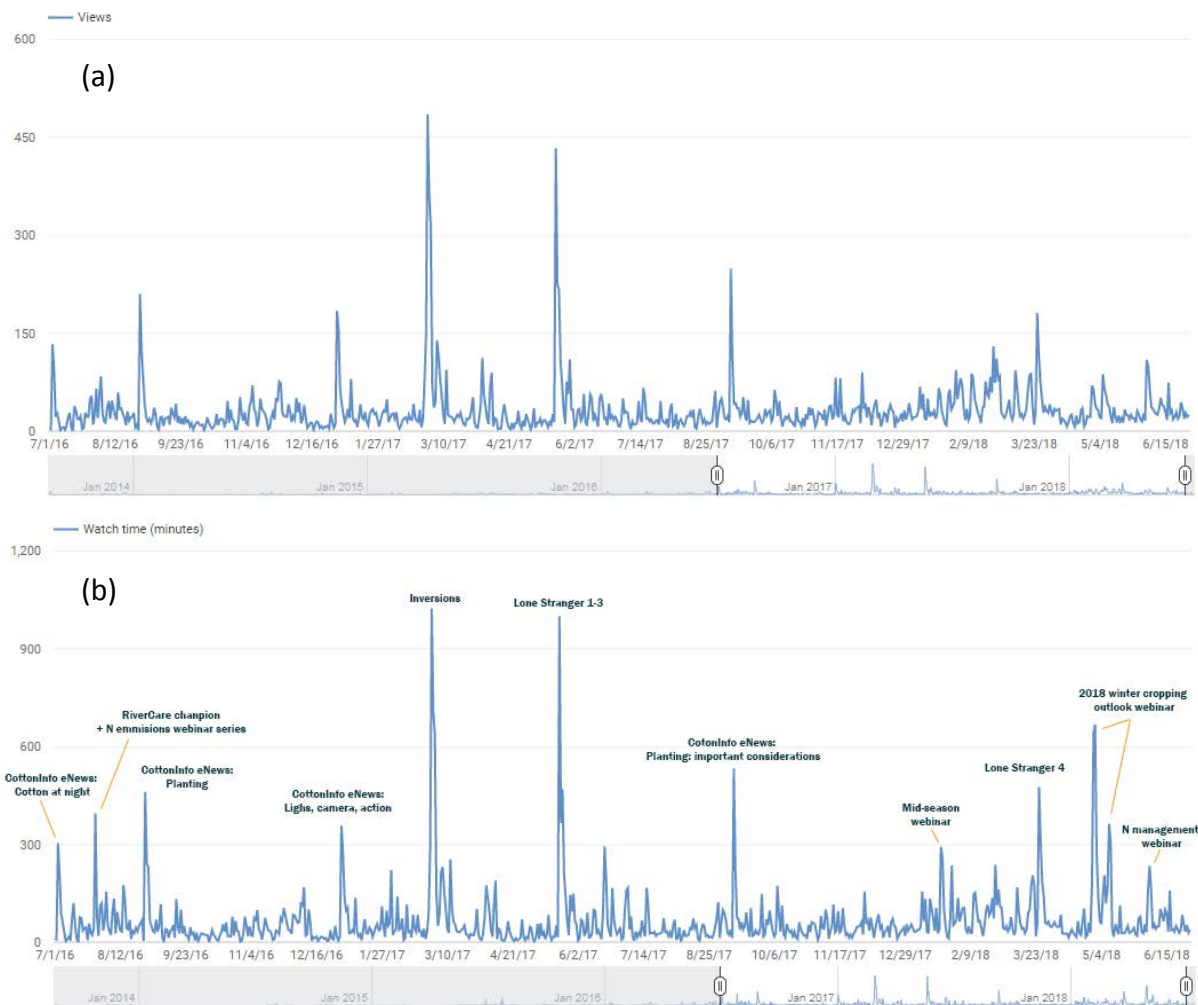


Figure 9. Australian audience (a) views and (b) minutes watched, including notation of videos or newsletters corresponding to increased watch times, July 2016-June 2018

Videos popular with Australian audiences have reflected a combination of influences from both content and promotion (Table 3). *Irrigating with siphons* remains the most popular video within Australia as well as worldwide. The top 25 videos contain both videos of an inversion series by Mary O’Brien (@spraydriftgirl) that she promoted extensively through her own networks. A range of irrigation videos appear, and planting videos have also been popular, with planting-focussed CottonInfo eNews editions issued in both years of this project that had links to these videos. Practical machinery videos such as *How to check that your picker is clean* and *Pre-season planter maintenance* also feature in this list.

Off-beat content has been popular with Australian audiences, including all four Lone Stranger parodies, and the James Bond parody to promote the channel at the 2016 Australian cotton conference. *What does cotton do at night?*, a serious look at the influence of night temperatures on plant respiration by Warren Conaty, but with a quirky title and cute cartoons, has also been well watched.

Table 3. The 25 most popular videos (by views) within Australia since the channel was created

Video	Watch time (minutes) 📊	Views 📊 ↓	Average view duration 📊	Average percentage viewed 📊
Irrigating with siphons	6,242 (1.1%)	5,345 (1.9%)	1:10	72%
Early morning inversion: what happens to fine ...	4,612 (7.9%)	2,479 (8.7%)	1:51	75%
Lone Stranger adventures. Part 1: Come Clean...	1,762 (3.0%)	833 (2.9%)	2:06	72%
Daytime conditions (for spraying): A demonstr...	901 (1.5%)	686 (2.4%)	1:18	74%
Automated small pipe irrigation system	1,509 (2.6%)	667 (2.3%)	2:15	63%
Using IrrisAT for irrigation scheduling	1,212 (2.1%)	554 (1.9%)	2:11	69%
The expansion of cotton in southern NSW	1,229 (2.1%)	542 (1.9%)	2:16	57%
Planting tips for cotton	812 (1.4%)	502 (1.8%)	1:37	69%
Moving to an autonomous irrigation system	951 (1.6%)	420 (1.5%)	2:15	59%
Important considerations when making plantin...	890 (1.5%)	406 (1.4%)	2:11	65%
CottonInfo nitrogen trial time lapse – Macquari...	223 (0.4%)	395 (1.4%)	0:33	113%
What does cotton do at night?	680 (1.2%)	391 (1.4%)	1:44	80%
Lone Stranger adventures. Part 2: Farm biosec...	689 (1.2%)	369 (1.3%)	1:51	69%
Lone Stranger adventures. Part 3: Cotton volun...	759 (1.3%)	361 (1.3%)	2:06	67%
How to check that your picker is clean	807 (1.4%)	349 (1.2%)	2:18	63%
Lone Stranger adventures. Part 4: Cleaning up	1,135 (1.9%)	348 (1.2%)	3:15	52%
The Cotton RiverCare champion	999 (1.7%)	348 (1.2%)	2:52	65%
Soil moisture monitoring with the EM38	551 (0.9%)	322 (1.1%)	1:42	63%
Pre-season planter maintenance	623 (1.1%)	311 (1.1%)	2:00	74%
CottonInfo Irrigation Automation Tour: Norther...	741 (1.3%)	290 (1.0%)	2:33	62%
Planter components	394 (0.7%)	282 (1.0%)	1:23	75%
CottonInfo James Bond parody	530 (0.9%)	278 (1.0%)	1:54	68%
Cotton growth stages: first square	295 (0.5%)	269 (0.9%)	1:05	71%
Cotton growth stages: cut-out	423 (0.7%)	267 (0.9%)	1:35	73%
Seed placement	480 (0.8%)	265 (0.9%)	1:48	80%

Audience retention

Average audience retention (percentage viewed) across all videos from 1 July 2016 to 30 June 2018 is 54% worldwide and 43% for Australia. Dips in percentage viewed were often correlated with webinars. Australian audiences initiated views of more webinars than audiences worldwide, resulting in both the lower retention figures and higher average view duration (e.g. watching 10% of a 60 minute webinar results in twice as many minutes viewed as 100% of a 3 minute video) (Figure 10).

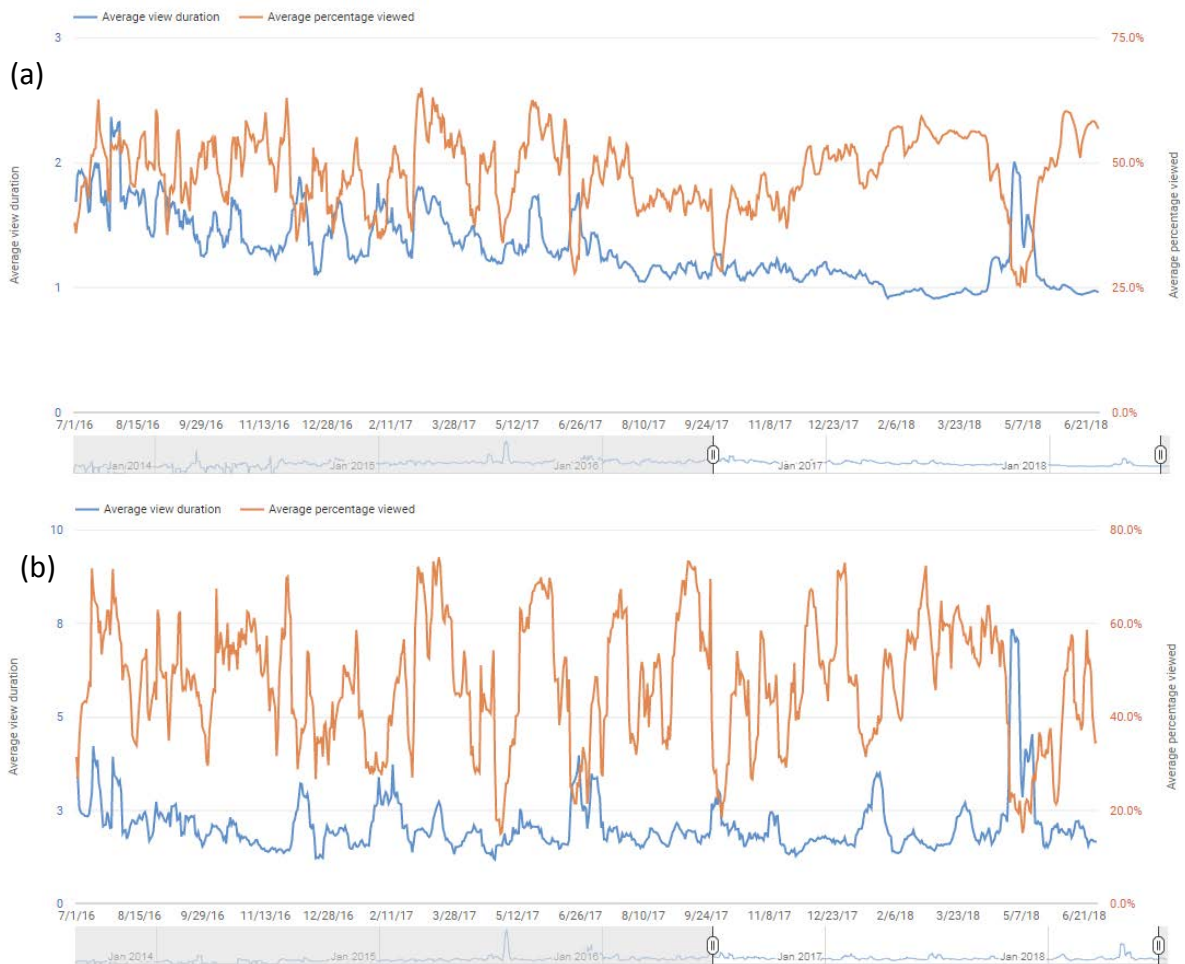


Figure 10. Audience retention (rolling 7 day average) for both view duration and percentage viewed: (a) Channel average, and (b) Australian viewer's average

The short documentary videos retain their audience on average for about two thirds of the video, with only one video falling below one third, while webinar recordings average closer to 20%, with none averaging above one third (Figure 11). Individual video watch time can exceed 100% if viewers re-watch some or all of the material in a single viewing session.

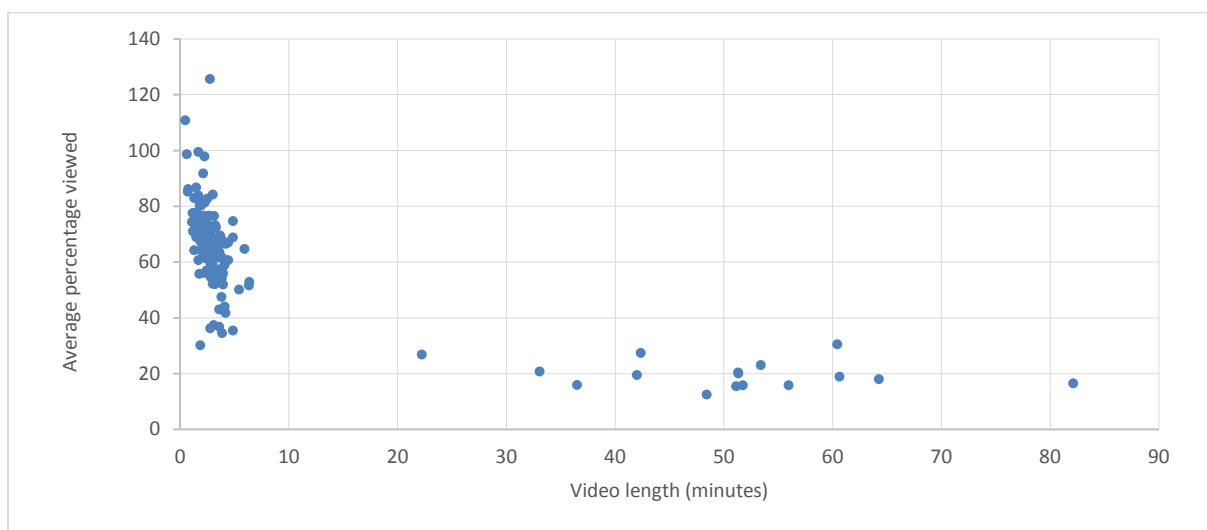


Figure 11. Audience retention as a feature of video length

Audience engagement

Between July 2016 and June 2018, the channel gained an additional 2454 subscribers (76 from Australia). Subscribers must already be YouTube members. Australian subscribers have joined at a reasonably steady pace since mid-2016 (Figure 12), with only 3 unsubscribes to date.

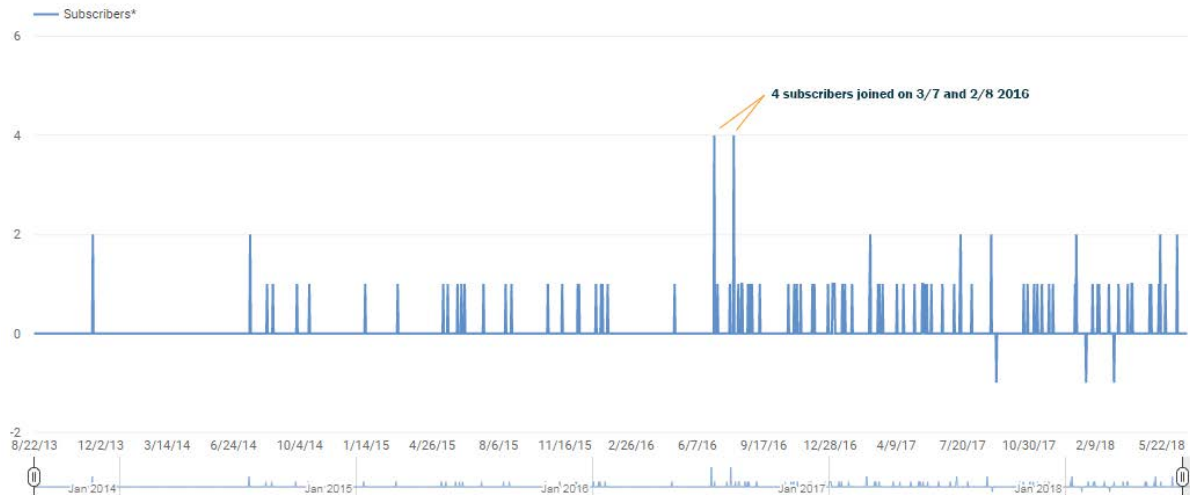


Figure 12. Australian subscriptions since the channel was created

Between July 2016 and June 2018, the channel received 2639 likes and 265 dislikes (76 and 2 from Australia). YouTube users must be logged in to like or dislike videos.

Over the two years, 1434 videos were shared (262 from Australia). Overall, WhatsApp was the most popular method for sharing (24%), probably due to its increasing popularity in India. Within Australia, WhatsApp only accounted for less than 5% of shares, whereas Facebook and Facebook messenger accounted for nearly 15%. The grey 15.3% in Figure 13 includes WhatsApp, Twitter and email.

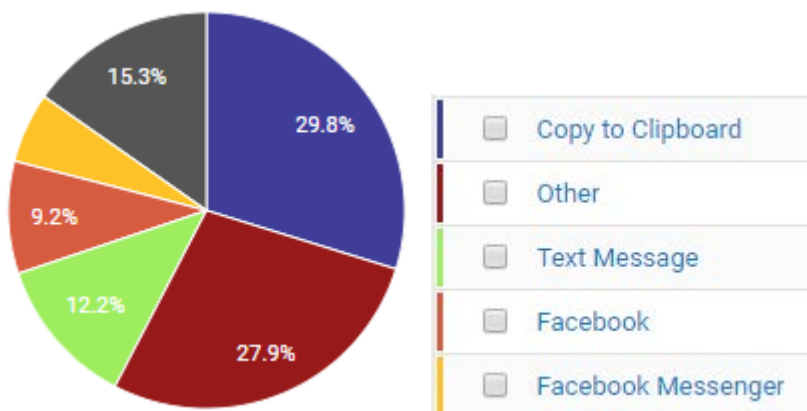


Figure 13. Methods Australians used to share videos, July 2016-June 2018

Audience demographics

Viewers from 216 countries have watched CottonInfo videos between July 2016 and June 2018. India is the leading source of views, but the USA, Saudi Arabia, and Pakistan all have substantial viewer numbers. Other major cotton producing countries (e.g. Brazil, Turkey, and Mexico) are represented in the top 25 countries (Table 4). Australia ranks second in terms of watch time, but fifth in terms of views.

Table 4. Top 25 countries by minutes watched (July 2016-June 2018)

Geography	Watch time (minutes) ↓	Views	Average view duration	Average percentage viewed
India	320,260 (43%)	357,268 (48%)	0:53	52%
Australia	48,174 (6.4%)	23,280 (3.1%)	2:04	43%
United States	44,490 (6.0%)	34,560 (4.6%)	1:17	61%
Saudi Arabia	34,953 (4.7%)	34,498 (4.6%)	1:00	61%
Pakistan	34,001 (4.6%)	33,286 (4.5%)	1:01	55%
Indonesia	16,657 (2.2%)	17,276 (2.3%)	0:57	58%
Turkey	15,757 (2.1%)	16,019 (2.1%)	0:59	55%
United Arab Emirates	13,175 (1.8%)	13,819 (1.9%)	0:57	58%
Cambodia	10,569 (1.4%)	10,180 (1.4%)	1:02	62%
Thailand	10,206 (1.4%)	10,671 (1.4%)	0:57	56%
Iraq	10,118 (1.4%)	10,555 (1.4%)	0:57	58%
Malaysia	8,794 (1.2%)	8,695 (1.2%)	1:00	61%
Greece	8,695 (1.2%)	7,810 (1.0%)	1:06	50%
Kuwait	8,518 (1.1%)	8,340 (1.1%)	1:01	62%
Italy	7,823 (1.0%)	8,069 (1.1%)	0:58	58%
Bangladesh	7,623 (1.0%)	8,386 (1.1%)	0:54	55%
Egypt	7,356 (1.0%)	6,908 (0.9%)	1:03	62%
Russia	6,695 (0.9%)	6,551 (0.9%)	1:01	61%
United Kingdom	6,303 (0.8%)	5,595 (0.7%)	1:07	61%
Vietnam	5,531 (0.7%)	6,267 (0.8%)	0:52	53%
Philippines	5,385 (0.7%)	4,837 (0.6%)	1:06	65%
Mexico	4,814 (0.6%)	4,478 (0.6%)	1:04	59%
Brazil	4,717 (0.6%)	4,783 (0.6%)	0:59	53%
Germany	4,587 (0.6%)	4,672 (0.6%)	0:58	55%
Canada	4,546 (0.6%)	3,519 (0.5%)	1:17	64%

1-25 of 216

Videos are primarily being accessed via their individual watch pages, directed there by a combination of search and suggested videos within YouTube. Browse features and suggested videos contribute to more than 90% of the views on the channel. External and direct links (from newsletters, websites and Twitter) are an important source of Australian visitors, (Figure 14).

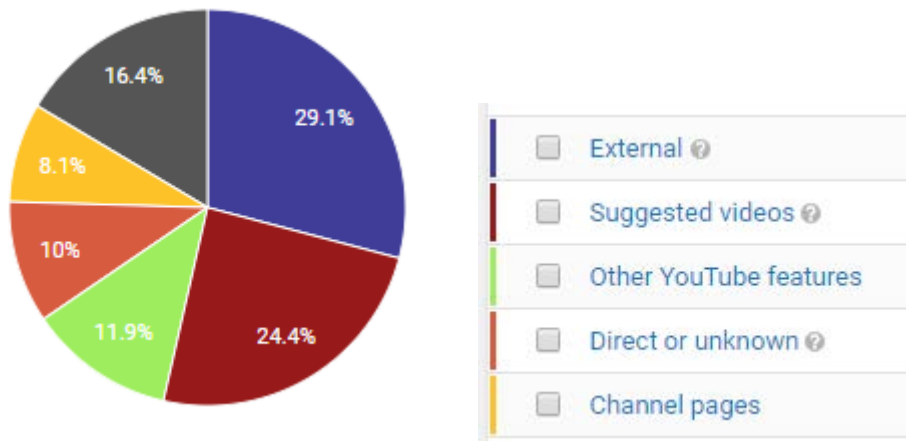


Figure 14. Source of Australian traffic

Access by Australians is now almost evenly split between traditional computers and mobile devices (Figure 15).

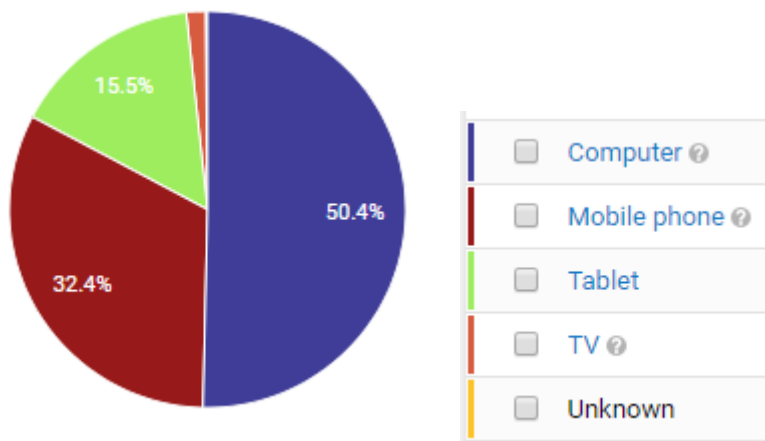


Figure 15. Device type videos are displayed on (Australian audience)

Over the life of the channel, Australian viewers have been predominantly males between 25 and 44 years of age.

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 2018, it hosted 155 videos; 104 of these were cotton documentaries produced by projects DAQ1302 and DAQ1702. 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.

The planned outcome for this project was "Cotton growers have access to at least 40 additional informative short videos that outline key information, research outcomes and best management practices for cotton production". Between 1 July 2016 and 30 June 2018, 43 new short videos that fell within the project's aims were added to the CottonInfo YouTube channel. For a full list of videos produced in this period, see section 9.

Links to relevant videos are being included in industry newsletters (CottonInfo's eNews and Moisture Manager) and in Tweets, and the value of this direct promotion can be seen in view numbers spiking with newsletter releases. As the video repository continues to expand, the breadth of topics available will ensure that the CottonInfo YouTube channel remains a relevant and useful source of industry information that can supplement traditional 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.**

N/A

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?**

From its creation to June 2018, the CottonInfo YouTube channel has been watched over 760,000 times, with views increasing exponentially as awareness of this resource improves. Views within Australia are also increasing at a satisfactory rate, considering the relative size of the target audience.

Videos that contain hands-on 'how-to'-style information or industry hints and tips, particularly those related to specific plant growth stages, have on the whole been more popular than more generic topics or research areas, however, dedicated promotion of a particular video or series has also contributed significantly to views.

The CottonInfo channel has also been shown to be a useful platform to host extension material not generated specifically by the project. Recorded webinars have been popular during this project period, with the *2018 winter crop outlook* in April 2018 receiving 228 views.

This project continues to demonstrate that video can be utilised as an extension tool to enhance audience engagement and provide additional value to existing information and extension networks. To fully realise the potential of this medium to add value to information extension, the public need to be aware that videos on topics of interest are available, and therefore continued promotion of this resource through a range of other communication channels is essential.

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 suggested that the promotion individual videos to add relevance and impact to extension messaging, and generally raising the profile of the CottonInfo YouTube channel within the Australian cotton industry, should continue to 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 including a mention of individual videos correlating to articles within issues, or pro-bono advertising of the channel to ensure continuing awareness of this resource.

It is anticipated that if the YouTube channel continues to be successful as a communications tool that CRDC might consider adding a question to project reports and/or project proposals asking researchers and extension staff whether they have a topic of interest that may be communicated in video format.

- 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 majority-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.

Copies of HD (1280x720) and full HD (1920x1080) versions in MP4 video format, along with transcripts of project-produced videos are provided to CRDC on a portable hard disk drive at the conclusion of the project.

Table 5. Videos majority filmed and produced by the project (July 2016-June 2018)

Video title	Direct url youtu.be/...	Presenter(s)	Length (min)	© year
CRDC: delivering RD&E to the Australian cotton industry	oHYRHY7TOxM	-	0:42	16
CottonInfo: connecting growers with research	WFQuA4qmLRA	V: John Welsh	3:09	16
Cotton Conference 2016 – 3 minute thesis	YvtEyowndTE	Paul Grundy	2:47	16
1 Thrips in cotton: identification and damage	e8B0wpimUvA	Lewis Wilson	2:35	16
2 Thrips in cotton: sampling and management	FKkwWID4iQA	Lewis Wilson	3:09	16
3 Thrips in cotton: friend or foe?	UsWxHB94NN4	Lewis Wilson	2:11	16
4 Consider controlled traffic farming to minimise soil compaction	mPfh9Qv5I-M	John Bennett	2:27	16
5 Measuring compaction	NW3K1Gbd6U	John Bennett	3:52	16
6 Managing soil phosphorus	YsEQ55io-sY	Brendan Griffiths	2:28	16
7 The science of nitrogen losses	7HQGKUGOFeY	Ben Macdonald	3:26	16
8 Optimising leaf performance	IJTkyeuC76g	Paul Grundy	2:59	17
9 What to do if you find a mealybug hotspot	pR7U_1ng71E	Paul Grundy	2:44	17
10 Early morning inversion: what happens to fine spray droplets	FPUstarVuls	Mary O'Brien	2:27	17
11 How to check that your picker is clean	pgddGNSsy3s	Peter Blokman	3:38	17
12 Daytime conditions (for spraying): A demonstration of air movement after an inversion breaks	BO-ODL6eO1g	Mary O'Brien	1:45	17
13 Lone Stranger adventures. Part 1: Come Clean. Go Clean.	-a0N8sm0dwU	Oliver / Sharna	2:56	17
14 Lone Stranger adventures. Part 2: Farm biosecurity	ZgWEWR_VSgY	Oliver / Sharna	2:42	17
15 Lone Stranger adventures. Part 3: Cotton volunteers	625yP3mvYps	Oliver / Sharna	3:06	17
16 Silverleaf whitefly (SLW) in cotton: 1. Why is SLW such an issue?	yBFkhgFxtgE	Paul Grundy	2:06	17
17 Silverleaf whitefly (SLW) in cotton: 2. Sampling and the SLW threshold matrix	9Y_XOiDCjtg	Paul Grundy	3:11	17
18 Silverleaf whitefly (SLW) in cotton: 3. When population increases don't match the matrix	H0yYCx3gBk	Paul Grundy	3:18	17
19 Silverleaf whitefly (SLW) in cotton: 4. IPM and reducing the risk of resistance	2gRCz-xcpcf	Paul Grundy	3:14	17
20 Silverleaf whitefly (SLW) in cotton: 5. How key pesticides work and minimising resistance	UABalUkioYI	PG & Jamie H	4:25	17
21 Timing your last irrigation	uBOXSivwdXY	Mike Bange	2:50	17
22 Using harvest aids in cotton	8st4yggcCNY	Mike Bange	2:53	17
23 Timing cotton defoliation	ubta5vnOLA8	Mike Bange	2:19	17
24 Identifying parasitism in silverleaf whitefly	SO0cedrGIQI	Jamie Hopkinson	2:05	17
25 What's on my beat sheet?	3r4uqD5hp-w	-	2:42	17
26 Long-term rotation research trial (ACRI)	1BPYr9DfVvw	Tim Weaver	3:07	17
27 The 1-5-8 shortcut (selecting leaves for SLW sampling)	vveOlmMEpg8	Richard Sequeira	1:52	18
28 Remembering the silverleaf whitefly outbreak in Central Queensland	XJ-JG8tvoRM	various	5:25	17
29 Mirids in cotton: 1. identification and damage	FdCtVONjh_Y	Paul Grundy	3:48	17
30 Mirids in cotton: 2. Sampling and management	iK63neuw7rU	Paul Grundy	3:41	17
31 Managing fusarium wilt	Cygy6XiRDcw	Linda Smith	1:36	14
32 Soil your undies! 1. About the campaign	Fvc2iXoKxLk	Sally Dickinon	2:07	18
33 Understanding agrochemical labels	29eaCNajQhA	Mary O'Brien	3:45	17
34 Lone Stranger adventures. Part 4: Cleaning up	09Yye7jfpvc	Oliver / Sharna	6:19	17
35 Key points from the optimising irrigation & nitrogen research tour (2018)	UcmdGC6WXf8	various	2:57	18
36 Verticillium wilt in cotton	hgiatA52nNw	Linda Smith	2:45	18
37 Using Day Degrees in cotton production	KalpLTP-Evc	Mike Bange	2:25	18
38 Soil your undies! 2. On-farm example	1voWaWnYRwo	Nigel Corish	2:53	18
39 Soil your undies! 3. The science	wtk1aORqPYc	Oliver Knox	5:54	18
40 Reniform nematode in cotton	QgBn4vfkOzl	Linda Smith	2:44	18
41 An overview of ginning cotton	QQQGkmX-ul8	Steve MacNellie	4:51	17
42 Minimising glyphosate resistance	cke-mamGe2o	Eric Koetz	2:15	18
43 Sources of weed seed	TLSpFIZzaQU	Eric Koetz	1:40	18

Other videos that have received project support:

A. Support to videos produced by others (editing/branding/etc):

- On-farm storages: surveying to determine accurate volumes (BrayLee)
- On-farm storages: minimising evaporation and seepage losses (BrayLee)
- On-farm storages: benefits of a maintenance program (BrayLee)
- The day it nearly rained (Amanda Thomas)
- Research trials: 40" and 60" cotton (Amanda Thomas)

B. Minor support to videos produced by others (upload / closed captions only):

- CRDC resilience assessment of the Australian cotton industry: What is resilience? (Naturally Resourceful)
- CRDC resilience assessment of the Australian cotton industry: How resilient is the cotton industry? (Naturally Resourceful)
- Safety Induction (Tony Lower)
- Irrigation Pump Safety (Tony Lower)
- Storing Fuel Safely (Tony Lower)
- PTO Tractor Safety (Tony Lower)
- Farm workshop safety (Tony Lower)

C. Webinar recordings with project assistance (upload with editing/branding if required):

- Climate risk management in the agricultural sector
- What does it take to yield well with limited water?
- Timing first irrigation
- Late season irrigation management
- Mealybugs in cotton (what where and why)
- Pest management in the 2016/17 season
- IrriSAT use and applications for irrigation management in cotton
- mid-season climate update, January 2018
- 2018 Winter Cropping Outlook
- Nitrogen management in cotton - your 3 key questions, answered!

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 varied crop production, protection & best practice topics that have been added to the CottonInfo YouTube channel ([youtube.com/CottonInfoAust](https://www.youtube.com/CottonInfoAust)) where they can be readily accessed, adding value to existing extension material 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 are not necessarily oriented towards short term issues.

Between 1 July 2016 and 30 June 2018, this project has produced 43 videos, and provided assistance to and managed uploading of 22 others, including 10 webinar recordings. Within this period, the CottonInfo channel received nearly a quarter of a million views, with a total estimated watch time of more than 74 weeks.

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 additional videos will add value to the collection, informing new growers, consultants, and established growers who want to know more about cotton production, protection and best practices. They may 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.