



Annual Operational Plan

2018-2019





1. Introduction

CottonInfo is the Australian cotton industry's extension program: designed to deliver research and development (R&D) outcomes to cotton growers and consultants. CottonInfo is an unincorporated joint venture between three cotton industry organisations: Cotton Seed Distributors (CSD), the Cotton Research and Development Corporation (CRDC) and Cotton Australia (CA).

CottonInfo connects growers and consultants with the latest R&D outcomes to help achieve best practice. The team comprises Regional Extension Officers, Technical Leads and myBMP experts, who work across a broad portfolio, covering biosecurity, climate, crop nutrition, disease management, energy use efficiency, fibre quality, insect and mite management, natural resource management, pesticide input efficiency, soil health, stewardship, water management and weed control.

2018-19 marks the first year for CottonInfo under its new 2018-23 Strategic Plan, and as such, the 2018-19 Annual Operational Plan (AOP) is the first under this new Strategic Plan.

The development of the AOP has three key drivers:



DELIVERING

on the goals and targets of the CottonInfo Strategic Plan 2018-23



PROGRESSING

any outstanding actions, and considering any opportunities or issues arising from the 2017-18 AOP



ASSESSING

new CRDC-supported research projects for their suitability to engage with growers and consultants, and integrating these into the AOP

2. Alignment with the Strategic Plan

The CottonInfo 2018-19 Strategic Plan contains three strategic goals with supporting key focus areas:



STRATEGIC GOAL ONE: SUCCESSFUL ADAPTATION AND ADOPTION OF RESEARCH AND DEVELOPMENT

- a. R&D outcomes adopted to increase productivity and profitability.
- b. New technologies and management practices adapted and integrated into best practice in myBMP.
- c. Sustainable cotton farms with a social licence.
- d. Collaboration within cotton and across sectors to share knowledge and deliver extension efficiently.

The outcomes of research are only effective when they result in informed decision-making and practice change in the farming system. The role of extension is to increase the rate of practice change, the reach to more growers and the effectiveness of the change implemented. This year CottonInfo will continue to work with the Rural R&D for Profit program's projects on Smarter Irrigation and Nitrogen for Profit to increase the rate and reach of change in resource use efficiency. Productivity will also be pursued through working with growers on alternative energy options. Pest management will be addressed through area wide management groups, on farm demonstrations of resistant weed control tactics and continued participation in disease surveys, black root rot testing and continuing verticillium rotation trials.



STRATEGIC GOAL TWO: ENABLE SUCCESSFUL COTTON INDUSTRY EXPANSION

- a. A whole of business and systems approach.
- b. Support the information needs of new growers and new regions.

Cotton is grown as a component of a farming system, with crop rotations and adjacent land use impacting on productivity. Aspects of soil health, compaction and pest management are influenced by the wider production system. New cotton growers need to successfully fit cotton production into their farming system as well as grow a profitable cotton crop. CottonInfo will support new growers by connecting them with industry communication channels and existing resources. Peer-to-peer learning will be offered through activities that allow growers and consultants to share their experience.

2. Alignment with the Strategic Plan



STRATEGIC GOAL THREE: PREPARED TO RESPOND TO BIOSECURITY THREATS AND ASSIST IN THE EVENT OF NATURAL DISASTERS

- a. Capacity to support the industry in the event of a biosecurity incursion.

The cotton industry has a long history of preparedness for unforeseen crises such as biosecurity incursions. The CottonInfo team provide a foundational asset to industry responsiveness through their established communication systems, both regional and expertise networks, and an understanding of farming systems. This year CottonInfo will continue to build the team's capacity to respond, develop networks with other biosecurity stakeholders and emphasis the importance of biosecurity plans through *myBMP*. An emerging challenge for the industry is the current dry conditions. Both irrigation storage reserves and stored soil moisture are at low levels, with a halving of planted area predicted if significant rain is not forthcoming. In response, CottonInfo will provide information to support growers and consultants as they plan planting area and management systems.



OUR ENABLING STRATEGIES: AN EFFECTIVE EXTENSION TEAM, AND A TRUSTED INFORMATION SOURCE

- a. *myBMP* supports and resources industry best practice.
- b. Works collaboratively with other industry service providers.
- c. Supports innovation and adoption of new technology.
- d. Utilises innovative communication practices and responsive two-way communication.
- e. Is organisationally effective and efficient.



3. The Plan

3.1 Stakeholder Engagement

At a regional level, coordination between the regional representatives of the partner organisations is essential. This will be achieved through regular interaction between the CottonInfo REOs, the Cotton Australia Regional Managers (RMs) and the CSD Extension and Development team (E&D team). Each organisation should have an understanding of the work plan priorities of the other, as well as identified areas where they can work collaboratively to effectively deliver outcomes. In practice, this will comprise of a twice-yearly regional meeting between REOs, RMs and the local Cotton Grower Association (CGA) chair to share work plans and identify opportunities to coordinate.

CottonInfo Technical Leads will have a role in engaging with researchers in their technical area and to be the point of contact between relevant research organisations and the CottonInfo team. In conjunction with CRDC R&D Managers, research forums will be supported with the aim of bringing together researchers, industry stakeholders and representative growers and consultants to receive updates of current research and discuss research and extension gaps and prioritise for the future. In the next year, that will include forums on soil health, disease, weeds, Integrated Pest Management (IPM) and resistance management.





3. The Plan

3.2 Communications

Led by the CottonInfo Communications Manager, the 2018-23 Communications Strategy is designed to support the CottonInfo Strategic Plan, the AOP, and the CottonInfo team. The primary objectives of the CottonInfo Communications Strategy are to communicate R&D outcomes and extension information to growers and consultants and encourage adoption, utilising innovative communication practices and responsive, two-way communication; and to communicate CottonInfo's role as a trusted information source to growers and consultants.

Importantly, communications is a whole of team effort – Technical Leads have a key role in working with researchers to package findings into resources and myBMP, while the REOs provide direction for regional specific information needs and communicate directly with local growers.



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**COMMUNICATIONS IS
A WHOLE OF TEAM EFFORT**
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3.3 Building upon the 2017-18 AOP

The 2017-18 AOP had a focus on:



MANAGING

irrigation to improve nitrogen use efficiency (NUE)



TACKLING

the increased threat of pests, diseases and resistant weeds in cotton growing regions



ADDRESSING

the impact of declining soil health and heavy reliance on inputs within farming systems

Activities in the 2018-19 plan that build on the 2017-18 AOP include:

- **A focus on soil testing practice and timing of nitrogen application** based on the findings of the REO irrigation and nitrogen trials and feedback from the researchers tour;
- **Managing early season IPM and retention.** Building on the mirid tent trials and the revival of the Beneficial Disruption Index, management to optimise yield while preserving beneficial insects for SLW and mealy bug control later in the season will continue;
- **The continuation of IPM short courses**, with a focus on Queensland;
- **Practical demonstrations of pre-emergent herbicide** options and patch management, in response to feedback from the ICAN weed management workshops;
- **The continuation of the Soil Your Undies campaign**, to provide a focus on managing soil health, with links to ongoing cover cropping and root depth projects.

3.4 Integration of H.A.R.D. Research Projects

Each year, new projects are assessed for their suitability to engage with growers and consultants. CottonInfo uses a four point H.A.R.D. assessment of projects to see if they require **help** from the team, should be part of an **awareness** campaign for end users, are a **resource** providing expertise or key knowledge, or if there is a specific regional **demonstration** associated with the project. These projects meet the Strategic Plan target of 30 H.A.R.D. projects integrated into the AOP.



3.4.1 Goal 1: Successful adaptation and adoption of research and development

Resource Use Efficiency

H: DAN1505 Benchmarking WUE and crop productivity (*McCarthy*)

D: RRD4P More profit from nitrogen (*Schwenke, Baird, Antille*)

R: UNE1403 Professor of soil biology (*Knox*)

H: DAN1503 Resilient farming systems in irrigated vertisols (*Nachimuthu*)

H: RRDP1603 Smarter irrigation for profit (*Foley*)

D: RRDP1602 Smarter irrigation for profit (*Jamali*)

New projects

A: Improving NUE of cotton crops through better understanding of dissolved organic nitrogen and the contribution of mineralised nitrogen to meet plant requirements (*MacDonald*)

R: Objective measurement for improved water productivity in fully and partially irrigated cotton – further support the commercialisation of the stress time threshold (*Jamali*)

Increased Reliability of Cotton Production

H: Biological control of noogoora burr (*Johnston*)

R: Supporting integration of existing weed tactics (*Koetz*)

R: UQ1501 Staying ahead of weed evolution (*Werth*)

A: DAN1601 Developing weed control thresholds (*Charles*)

R: CSP1401 Enhancing IPM in cotton systems (*Homona*)

A: Cover crops in cotton farming systems (*Lawrence*)

A: Kaylix dryland cover cropping trials

New projects

D: Ready to use soil test for BRR

R: Cotton Disease Technical Lead in the South

R: IPM for high yielding cotton (*Grundy*)

A: Improved Management of SLW (*Sequeira*)

R: Regional approach to weed management

R: Insect Resistance Technical Lead (*Ceeney*)

A: Improved natural capital on Australian cotton farms (*Smith*)

3. The Plan

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3.4.2 Goal 2: Successful Cotton Businesses and Expansion

- A:** Science leadership for Northern Australia – supporting the development of cotton in the farming system in Northern Australia. Has a Post Doc built into the project and will facilitate linkages between the northern CRC (Yeates)
- A:** Thresholds for resilience in regional communities – exploring the co-dependence of cotton farming and agribusiness, what are the tipping points for regional communities
- A:** Development of a spray drift hazard prediction system
- A:** Understanding Motivational factors for improved spray application on cotton farms (Hine)

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3.4.3 Goal 3: Prepared to respond to unplanned threats

- R:** Large scale biosecurity preparedness scenario
- H:** Cotton industry disease survey (Smith)
- R:** DAQ1501 Managing Solenopsis mealy bug (Sequeira)

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3.4.4 Additional new projects

- 1:** Range of projects incorporated into RRD4P round two proposal: Smarter Irrigation for Profit 2 (Foley, Hornbuckle)
- 2:** Use of Smart Sprayable Polymers (Bristow)
- 3:** Alternative Energy Technologies and policy solutions. (PhD, UTS)
- 4:** Evaporation mitigation solutions for Australian cotton farm water storages (Qiao)
- 5:** Range of projects incorporated into RRD4P round two proposal: Precision to Decision Agriculture 2:
 - a. Data management framework
 - b. Development of a digital strategy for whole of agriculture sector
 - c. Big data reference architecture – applicability to different business models
 - d. Digital literacy including training for extension officers
- 6:** Data analytics capacity and solutions developed for digitising the Australian cotton industry
- 7:** Communicating cotton best practice with videos (Grundy)
- 8:** Cotton comparative analysis (Boyce)

3. The Plan

3.5 Summary matrix of key activities

In some cases, technical areas will contribute to outcomes and targets across different strategic goals. Strategic Plan targets will be colour coded to identify alignment with Strategic Plan goals with:

**IMPROVING RATE AND REACH OF ADOPTION AND ADAPTATION
OF RESEARCH AND DEVELOPMENT**

ENABLING SUCCESSFUL COTTON BUSINESSES AND INDUSTRY EXPANSION

PREPARED TO RESPOND TO UNPLANNED THREATS

For each Technical Area, a Technical Lead and partner REO will be responsible for developing a more detailed activity plan and overseeing the delivery of priority activities. REOs will also develop individual action plans that include their contribution to the AOP and regionally specific activities.

TECHNICAL AREAS	STRATEGIC PLAN TARGETS	AOP TARGETS	RESEARCH ALIGNMENT AND COLLABORATION	PRIORITY ACTIVITIES
Irrigation/Water Use Efficiency (WUE)	<p>Improved yield 11.6bales/ha.</p> <p>Improved input efficiency 1.3bales/ML GPWI.</p> <p>Increasing reliability of production 3.9M bales/year.</p> <p>5 new products supported through testing and validation.</p> <p>Improve environmental footprint 325 kg CO₂e per bale.</p>	<p>30% growers aware of WUE benchmark findings.</p> <p>30 growers with changed knowledge of bankless systems management.</p>	<p>Benchmarking WUE.</p> <p>Smarter Irrigation 2 RRD4P.</p>	<p>WUE basics on farm. The Smarter Irrigation project has identified the importance of in field irrigation operations on water use efficiency. A refresher program targeted at irrigation staff at the beginning of the season is planned.</p> <p>Bankless system forum in NW NSW. In conjunction with the NW Irrigation Association, a forum will be held to highlight the installation, management economic analysis and grower experiences of bankless irrigation systems.</p> <p>Promote the finding of the Benchmarking WUE and Crop Productivity project.</p>

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TECHNICAL AREAS	STRATEGIC PLAN TARGETS	AOP TARGETS	RESEARCH ALIGNMENT AND COLLABORATION	PRIORITY ACTIVITIES
Soil health	<p>Involvement in three cross industry projects.</p> <p>Improved yield 11.6bales/ha.</p> <p>Two farming systems incorporated field days per year per region.</p>	<p>Soil health forum developed and delivered by Dec 2018.</p> <p>Six soil health workshops delivered to 100 growers and consultants to increase awareness of soil health management options.</p>	<p>Support from Oliver Knox.</p> <p>Resilient farming systems.</p> <p>GRDC Cover cropping.</p> <p>Kaylix cover cropping.</p>	<p>In conjunction with CRDC a soil health forum will be held to review current soil health research, identify prioritise from growers and consultants and to identify future research and extension needs.</p> <p>Deliver a series of soil health workshops that build on the rooting depth project.</p> <p>Continued partnership with the Cover Cropping project with engagement around regional trial sites.</p> <p>Progress the <i>Soil Your Undies</i> campaign to explore the drivers behind differences in soil biological activity.</p>
Disease/BRR	<p>Improved yield 11.6bales/ha.</p> <p>3.9M bales 5 year average production.</p>	<p>Early and late season disease surveys completed and result extended regionally.</p>	<p>Disease survey.</p> <p>BRR soil test.</p> <p>Innovative solutions to fungal diseases.</p>	<p>Participate in the early and late season disease surveys, raising awareness of regional outcomes.</p> <p>Organise Fuscom to provide a platform for sharing current research and identifying priorities for disease research and extension.</p> <p>Continue the verticillium rotation and management trials in partnership with the Lower Namoi CGA and Macintyre.</p> <p>Engage with the new BRR testing project to support the adoption pathway for testing.</p>
IPM/AWM	<p>Improved yield 11.6bales/ha.</p> <p>3.9M bales 5 year average production.</p>	<p>AWM groups supported to meet two times per season.</p> <p>Two IPM short courses delivered in QLD.</p>	<p>IPM for high yielding cotton.</p> <p>Improved SLW management.</p> <p>Enhancing IPM.</p> <p>Managing mealy bug.</p>	<p>Area wide management groups promoted and supported as required. Groups will continue in the Macintyre, Gwydir and Macquarie regions.</p> <p>Support SLW projects and raise awareness of threshold sampling developments.</p> <p>Encouraging softer earlier, demonstrate BDI tool impact.</p> <p>Two IPM short courses delivered in Queensland.</p>

3. The Plan

TECHNICAL AREAS	STRATEGIC PLAN TARGETS	AOP TARGETS	RESEARCH ALIGNMENT AND COLLABORATION	PRIORITY ACTIVITIES
Weeds		<p>Three demonstrations of pre-em and residual use.</p> <p>70 growers using patch management as a tactic for managing resistant weeds.</p>	<p>Supporting extension of weeds tactics.</p> <p>Staying ahead of weed evolution.</p> <p>Weed control thresholds.</p> <p>Regional approach to weed management.</p>	<p>Pre-emergent, residual and patch management demonstrations, resistant weed fact sheets.</p>
Nutrition	<p>Improved yield 11.6bales/ha.</p> <p>Improve input efficiencies 11.5kg lint/kgN.</p> <p>Improve environmental footprint 325 kg CO₂e per bale.</p>	<p>Conduct soil sampling trial in each region to.</p> <p>Three focus groups on nutrition support tool use and needs to provide direction for future resource development.</p> <p>Five workshops targeting 60 farms on managing declining phosphorus.</p>	<p>More profit from N.</p> <p>Improving NUE of cotton crops.</p> <p>Long term P decline project.</p>	<p>Nutrition messaging, decision tools and PKS.</p> <p>Soil testing best practice.</p> <p>Demonstrate soil sampling practice: sample based on yield map, comparing 1 to 10 samples for accuracy.</p> <p>N rate effect on trash and ginning survey.</p> <p>Problem identification of nutrition decision making tools using focus groups.</p>
NRM	<p>Increased capacity to manage natural capital 6.6% native veg managed for conservation.</p>	<p>Increase 20% growers awareness of groundwater ecosystems and native vegetation management options.</p>	<p>MQ1501 - Groundwater ecosystems function and impacts.</p> <p>GU1701 - Managing natural landscapes on Australian cotton farms to increase the provision of ecosystem services.</p> <p>UNE1602 - Managing riparian corridors on cotton farms for multiple benefits.</p> <p>CSE1501 - Keeping pest populations lower for longer: connecting farms and natural systems.</p> <p>FRP031 New - Improved Natural Capital on Australian cotton farms.</p>	<p>Groundwater health tool development and extended.</p> <p>Assessment of the Carbon Tool as an extension tool for the future.</p> <p>Continued partnerships and collaboration with LLS's.</p> <p>Identification and extension of management options for Native vegetation conservation.</p> <p>Send weekly tweets on river care, looking for team support on stories.</p>

3. The Plan

TECHNICAL AREAS	STRATEGIC PLAN TARGETS	AOP TARGETS	RESEARCH ALIGNMENT AND COLLABORATION	PRIORITY ACTIVITIES
myBMP	100% modules updated with CRDC research. 50% growers completed level 1.	100 new grower registrations (industry wide).	CottonInfo team in collaboration with RMs.	Encourage myBMP participation through all extension activities and CottonInfo website registrations. All modules reviewed in the 12 months to prioritise updates with Technical Leads. myBMP biosecurity webinar aimed at building the capacity of REOs and RMs to enable them to work with growers on managing biosecurity risks.
Industry expansion	Economic partial analysis of energy, nutrition, irrigation and pest management completed. 90% of new growers actively supported in their first season.	90% of new growers supported.	Establishing southern cotton. Supporting cotton in Northern Australia. BRR soil test. Understanding motivation of spray application.	Supporting new growers with resources, farm walks and peer to peer learning. Expansion into northern Australia. BRR test for the South. Coordinate activities with CSD E&D and Monsanto RBMS.
Stewardship		85% growers and consultants use the IRMS when making spray decisions. All regions contribute to insect resistance monitoring. Stewardship of Bt technology is of high importance to 90% growers.	Insecticide resistance Technical Lead. Heli monitoring project. Insect monitoring (SLW, Mirids Mites Aphids). Improved management of SLW.	Promotion of stewardship in Bt and insecticides. Plan developed to involve REOs in insect resistance monitoring programs. Communication of resistance issues as required.



3. The Plan

TECHNICAL AREAS	STRATEGIC PLAN TARGETS	AOP TARGETS	RESEARCH ALIGNMENT AND COLLABORATION	PRIORITY ACTIVITIES
Biosecurity	<p>Participate in 2 industry training exercises.</p> <p>30% farms with a documented biosecurity plan.</p>	<p>2% of growers with biosecurity plans completed.</p> <p>20% of registered <i>myBMP</i> have the biosecurity module completed to level 2.</p>	Biosecurity scenario training.	<p>Biosecurity plan development capacity building webinar for REOs and RMs.</p> <p>50 growers supported to develop biosecurity plans.</p>
Spray drift		Spray drift awareness support for the Spray Drift Working Group.	<p>Understanding motivational factors of spray application.</p> <p>Inversion towers.</p>	<p>Work with spray drift working group.</p> <p>Distribution through CSD reseller network.</p> <p>Defoliation impacting native vegetation.</p>
Energy	<p>Improve environmental footprint 325 kg CO₂e per bale.</p> <p>Economic partial analysis of energy, nutrition, irrigation and pest management completed.</p>	Economic analysis of on farm energy use completed.		<p>Economic evaluation of energy technologies.</p> <p>5% irrigators install energy innovation, for example solar, battery or hydrogen.</p>

3.6 General Targets

In addition to the specific targets outlined above, there are a number of general targets in the CottonInfo Strategic Plan that need to be addressed in the 2018-19 AOP, as follows:



TARGET: 10 NEW PROJECTS WITH ADOPTION PATHWAYS THAT INCLUDE COTTONINFO ANNUALLY.

2018-19 Activity: Eleven projects identified for development of adoption pathways, including:

- A:** Improving NUE of cotton crops through better understanding of dissolved organic nitrogen and the contribution of mineralised nitrogen to meet plant requirements (*MacDonald*)
- R:** Objective measurement for improved water productivity in fully and partially irrigated cotton – further support the commercialisation of the stress time threshold (*Jamali*)
- A:** Improved natural capital on Australian cotton farms (*Smith*)
- D:** Ready to use soil test for BRR
- R:** Cotton Disease Tech Lead in the South
- R:** IPM for high yielding cotton (*Grundy*)

- A:** Improved Management of SLW (*Sequeira*)
- R:** Regional approach to weed management
- R:** Large Scale biosecurity preparedness scenario
- A:** Development of a spray drift hazard prediction system
- A:** Understanding Motivational factors for improved spray application on cotton farms (*Hine*)



TARGET: 200 EXTENSION ACTIVITIES DELIVERED. 85% OF PARTICIPANTS REPORT AN INTENTION TO CHANGE.

2018-19 Activity: Under this AOP, the CottonInfo team will aim to deliver over 50 extension activities impacting more than 1000 participants. The team will also assess the use of Focus Farms as an extension tool for the following season.



TARGET: 85% GROWERS WITH DEVICES LINKED TO THE OFFICE.

2018-19 Activity: While digital agriculture will be extended through projects such as the Smarter Irrigation work on system automation, a specific program for digital agriculture adoption will be developed once the Precision to Decision 2 project is finalised.

3.7 Team Skills Development

The CottonInfo team has identified three focus areas for training in the next year:



DIGITAL LITERACY

This is required for the full CottonInfo team to enable interaction with research projects working on digital agriculture solutions and to inform the development of digital literacy training for growers and consultants.



ADVANCED GROUP FACILITATION

Effectively working with small groups is a core skill required of the full CottonInfo team. Research projects are increasingly engaging with groups to understand end user issues; there has been an increase in the use of research forums to get feedback on research and extension progress.



WRITING SKILLS

A skill gap particularly within the REO team, required to enhance regional newsletters, report writing and case study presentation.



3. The Plan

3.8 Evaluation

CottonInfo's impact is measured through monitoring and evaluation (M&E), guided by the CRDC M&E Strategy. The purpose of the strategy is to demonstrate the extent to which CottonInfo has contributed towards the specified targets within the Strategic Plan. It also helps guide future strategic priorities, activities and provides timely feedback to understand barriers and any unintended consequences of extension adoption.

The main M&E tools utilised by CottonInfo are YourDATA, the CRDC Cotton Grower Survey and the CRDC-supported Crop Consultants Australia survey. The CottonInfo team use these tools to record outputs, such as activities and participation. In 2018-19, the focus will be on improving the M&E of outcomes and impacts (such as practice change) and understanding the 'where to from here' issues from the growers' perspective. This year, YourDATA will be reconfigured to align with the new Strategic Plan to allow seamless reporting on progress against goals and targets.





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