



Annual Operational Plan

2020-2021







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 and increase the adoption of best practice. 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.

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

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 2019-20 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 2018-23 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.

This strategic goal recognises that 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.



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.

This strategic goal recognises that cotton is grown as a component of a farming system, with crop rotations and adjacent land use affecting 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. While the number of new growers in established cotton growing regions have been limited due to the reduced area of cotton grown, Northern Australia has continued to progress towards the establishment of a northern cotton industry.



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.

This strategic goal recognises that the cotton industry needs to continuously plan and prepare 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 emphasise the importance of biosecurity plans through *myBMP*.

CottonInfo has demonstrated its responsiveness to Fall Army Worm (FAW), providing leadership in the development of resources and communication. The movement and impact of FAW will continued to be monitored, as well as the preparation of resources for other likely incursions.



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 Priorities for the 2020-21 Season

While the team will deliver across all technical areas of the CottonInfo program, there will be areas of particular focus for this season. We are assuming that while the planted area of cotton will continue to be below average, it will be an improvement on the 2019-20 season, resulting in more active cotton growers to engage with. Initiatives for the 2020-21 season include:

- A training program on evidenced-based agriculture, encouraging growers and consultants to explore opportunities to improve their management practices through well designed and analysed on farm trials.
- Supporting the continued development of the water use efficiency benchmarking project to add more value to the growers contributing information.
- Particular messaging around early season pest management, given the likelihood of higher pest pressure due to the forecast wetter winter and resulting green bridge. This will be combined with increased data collection of early season retention to better understand the resilience of newer varieties to early season boll losses.
- Rethinking nutrition extension. The recent Cotton Sustainability Report has identified nitrogen management as a practice that is trending counter to industry targets, with implications for carbon emissions as well as productivity impacts. In keeping with conceptualising nitrogen management as a complex system, we are looking to testing the concept of utilising existing CSD sensor networks to develop an early season nitrogen loss warning system. At the end of the season, we will be promoting the costs of excessive nitrogen in the system on defoliation and fibre quality impacts.
- An NRM initiative to establish long term biodiversity monitoring sites, conducted by REOs utilising a rapid assessment protocol.
- With a number of CRDC-supported research projects concluding at the end of the 2021 season, CottonInfo will be actively supporting Cotton Australia and CRDC in organising technical forums to contribute to the identification of research gaps and priorities for nutrition and irrigation.
- A team focus for the (now postponed) Cotton Conference was a series of 'game changer' videos, showcasing stories of significant changes on farm. This will continue in an online format.

3.2 Stakeholder Engagement

At a regional level, ongoing coordination between the regional representatives of the partner organisations remains essential. This will continue to 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, CSD E&D Agronomist, regional Crop Consultant Australia (CCA) representatives and the local Cotton Grower Association (CGA) chair to share work plans and identify opportunities to coordinate.

CottonInfo Technical Leads will engage with researchers in their technical area and 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 to prioritise for the future.



3.3 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.



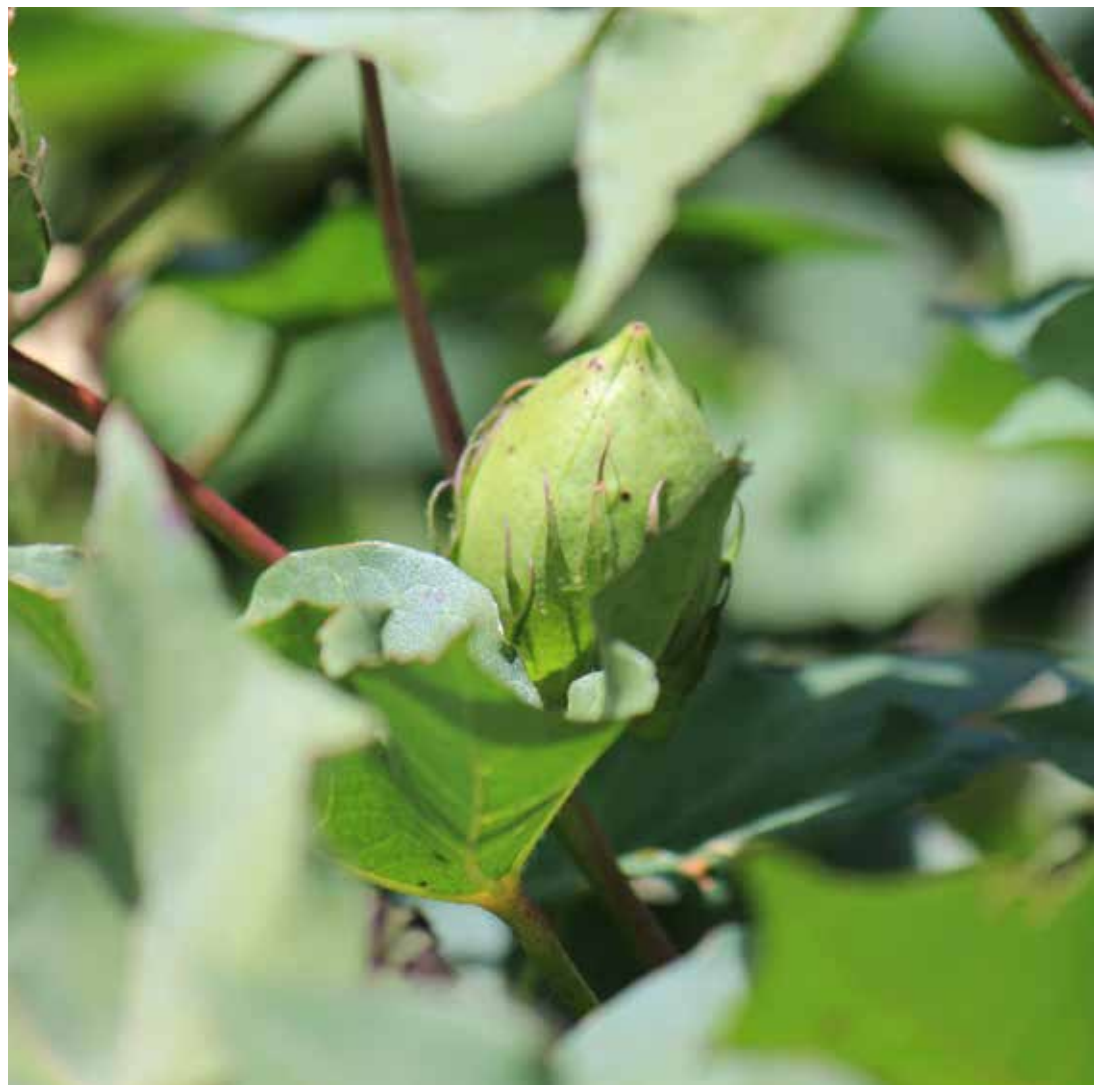
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**COMMUNICATIONS IS
 A WHOLE OF TEAM EFFORT**



3.4 Building upon the 2019-20 AOP

Activities in the 2020-21 AOP that build on the 2019-20 activities include:

- **WUE benchmarking project.**
- **Continued development of the Area Wide Management (AWM) group** concept, with the introduction of cotton catch-up meetings.
- **Digital microscopes** used by REOs to promote monitoring of Silver Leaf Whitefly (SLW) parasitism.
- **Continued publication of an industry wide crop check** to monitor crop development, pests, disease and weeds.
- **Herbicide resistance demonstration sites expanded** to promote alternative control tactics.
- **Soil health workshops** continue in a further two regions (Macintyre & Upper Namoi).





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

Each year, new CRDC R&D 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.



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

Resource Use Efficiency

- 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)
- D:** RRD1602 Smarter Irrigation for Profit Phase 2 (Jamali)
- A:** CSP1904 Improving nitrogen use efficiency (McDondald)
- A:** USQ1903 Managing soil constraints (Bennett)
- R:** 1902FRP006 Benchmarking WUE (Perovic, Crawley)
- D:** Plant based sensing for irrigation (Jamali)
- R:** Real time automation for irrigation (Foley)

New Projects

Increased Reliability of Cotton Production

- R:** CSP1401 Enhancing integrated pest management (IPM) in cotton systems (Homona)
- R:** DAN1703 Innovative solutions for disease (Le)
- R:** DAN1903 Cotton disease technical lead in the south (Green)
- R:** DAQ1902 IPM for high yielding cotton (Grundy)
- H:** UWS1901 Biological based products for production (Singh)
- A:** RRDP2007 Evaporation mitigation solutions (Qiao)
- A:** RRDP2004 Gwydir Valley digital technologies for irrigation (Gall)
- A:** NEC1901 Sensors for IPM (McCarthy)
- R:** DAN1901 Integrated weed management (Koetz)
- R:** DAN2004 Improved management of weeds in cotton and grains farming systems. DPI and QDAF (Charles)
- A:** 1920FRP010 Disease suppressive soils (Smith)



3.5.2 Goal 2: Successful Cotton Businesses and Expansion

- A:** CSP903 Science leadership for Northern Australia – supporting the development of cotton in the farming system in Northern Australia. (Has a postdoc built into the project and will facilitate linkages between the northern CRC). (Yeates)
- A:** MRES1701 Development of a spray drift hazard prediction system (Tepper)
- H:** CRDC1944 Supporting the sustainability strategy (Cosgrove)



3.5.3 Goal 3: Prepared to respond to unplanned threats

- H:** RRDP1724 Cotton industry disease survey (Smith)



3.6 Summary matrix of key activities

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

**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 oversee 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 11.6 bales/ha.</p> <p>Improved input efficiency 1.3 bales/ML GPWUI.</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>10 growers per region receiving feedback on opportunities to improve WUE based on benchmarking results.</p> <p>Benchmarking to identify key messaging to improve the average farm GPWUI by 0.15 bales per ML.</p> <p>30% of farms utilising resources for training of irrigation staff at the start of the season.</p> <p>150 farms increased awareness of research findings of SIP2.</p>	<p>Benchmarking WUE.</p> <p>Smarter Irrigation for Profit Phase 2 (Rural R&D for Profit program).</p>	<p>At least 10 irrigators in each region to participate in 2020-21 irrigation trends and drivers project.</p> <p>Training of REOs to understand the benchmarking process to better promote participation and discuss findings.</p> <p>Resources provided to farm managers to run irrigation application efficiency training.</p> <p>Extension of Southern late season irrigation trials, incorporating fibre quality impacts, including a Southern farm walk and trial results communicated nationally.</p> <p>Collaborate and support Smarter Irrigation for Profit phase 2 extension activities. Needs analysis survey completed and program under development.</p>

Soil health	<p>Involvement in 3 cross industry projects.</p> <p>Improved yield 11.6 bales/ha.</p> <p>Two farming systems incorporated field days per year per region.</p>	Two health workshops targeting 20 participants.	<p>Support from Oliver Knox.</p> <p>Resilient farming systems.</p> <p>GRDC & CRDC cover cropping.</p>	<p>Two soil health workshops delivered with focus on soil constraints for root growth.</p> <p>Support local trials where possible cover cropping, compaction, soil additives and ameliorants.</p>
Disease/BRR	<p>Improved yield 11.6 bales/ha.</p> <p>3.9M bales 5 year average production.</p>	<p>Early and late season disease surveys completed and result extended regionally to all growers.</p> <p>Fuscom seminar delivered to 30 participants.</p> <p>Southern Valley crop protection trials with a minimum of one trial in each area.</p> <p>Verticillium management trials, looking at soil inoculum levels (pre and post crop) on two farms.</p>	<p>Disease survey.</p> <p>Innovative solutions to fungal diseases.</p> <p>Southern valley crop protection.</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>Several disease and insect trials on relevant issues to southern growers and area relevant research figures published to industry.</p> <p>Continue the verticillium rotation and management trials at CSD and in partnership with the Lower Namoi CGA and QLD DAF in the Macintyre.</p>

IPM/AWM	<p>Improved yield 11.6bales/ha.</p> <p>3.9M bales 5 year average production.</p>	<p>Minimum of three Cotton Catch-up meetings in each valley targeting 20 growers and consultants per meeting.</p> <p>Regional targets to be set for consultant use and feedback on SLW app.</p> <p>Insect resistance monitoring projects supported in three regions not usually covered.</p>	<p>IPM for high yielding cotton.</p> <p>Improved SLW management.</p> <p>Enhancing IPM.</p> <p>Managing mealy bug.</p>	<p>Team to create a scope for the meetings that has information on how to run the meetings, feedback protocols, resourcing guide lines, tips and techniques to facilitate the meetings.</p> <p>Early season cotton catch-up farm walks in all regions to focus on expected increased pest pressure due to green bridging over winter.</p> <p>Crop checks published fortnightly during the season in all regions and distributed to consultants and researchers.</p> <p>On farm trials demonstrating recovery potential from early retention loss in six regions.</p> <p>All REOs to monitor SLW paracitism every two weeks from Jan to March.</p>
Weeds		<p>Establish three experimental sites with a combination of best practice weed management strategies based on HRMS and modelling.</p> <p>Increase % growers using three or more weed control tactics from 30% to 40%.</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, focus on sowthistle and annual ryegrass.</p>	<p>Regional surveys of the top five resistance weeds in 50 fields to keep awareness of changes in resistance.</p> <p>Three on farm herbicide options demonstrations with a field day and additional farm walk at each during the season targeting 75 participants.</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>Targetting the equivalent of 180kgCO₂e reduction from nitrogen fertiliser, equating to a 30kg N/ha reduction of fertiliser applied.</p>	<p>More profit from Nitrogen.</p> <p>Improving NUE of cotton crops.</p> <p>Long-term P decline project.</p>	<p>Development of a nitrogen loss warning system utilising the existing CSD weather network.</p> <p>End of season messaging in all regions to highlight the cost of excessive nitrogen, including defoliation and fibre quality impacts.</p> <p>Promote nutrient budgeting, targeting increased reliance on mineralised N (given longer fallows) and shifting to a greater proportion on in-crop N application to avoid pre-season losses.</p>

NRM	Increased capacity to manage natural capital 6.6% native veg managed for conservation.	Increase 500 growers and consultants' awareness of BMP guidelines for conserving biodiversity on cotton farms.	New and improved technologies for managing biodiversity on cotton farms. Managing natural landscapes on Australian cotton farms to improve natural capital and increase the provision of ecosystem services. Managing riparian corridors on cotton farms for multiple benefits.	Six long term biodiversity monitoring sites established. Sites will be used as case studies for biodiversity communication. Bi-monthly natural resource management blogs to continue in all regional newsletters. Two field days targeting 50 participants focused on revegetation demonstration sites.
myBMP	100% modules updated with CRDC research. 50% growers completed level 1.	100 new grower registrations (industry wide). Increase accredited farms from 230 to 360.	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 CA Regional Managers 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. Understanding motivation of spray application.	Supporting new growers with resources, farm walks and peer-to-peer learning. Review of myBMP for northern Australia. Continue disease trial work to inform management in southern valleys. Coordinate activities with CSD E&D and Bayer Territory Business Managers 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.

Biosecurity	<p>Participate in two industry training exercises.</p> <p>30% farms with a documented biosecurity plan.</p>	30% of growers having a current written biosecurity plan.		<p>Participation in cross sectoral Plant Biosecurity Research Initiative to pilot a community of practice for biosecurity and extension.</p> <p>Two biosecurity Top Tips videos and three fact sheets to promote the development of farm biosecurity plans and preparedness.</p> <p>Monthly blogs to complement the IYPH calendar.</p>
Fibre Quality		<p>Quantify the impact of limited irrigation on fibre quality, results communicated to 80% growers.</p> <p>Assess the impact of nitrogen fertiliser rates on fibre quality and lint turn out.</p>	CRDC project 'Managing cotton quality to maintain our premium status' and follow up project.	<p>Reporting on comparison of spindle vs stripper harvesting on semi irrigated cotton.</p> <p>Contributing key messages on N impact on fibre quality from analysis of CSIRO N trials.</p> <p>Establish the impact of harvesting and ginning on seed damage and the creation of SCF levels.</p>
Spray drift		<p>Spray drift awareness support for the Spray Drift Working Group.</p> <p>All CSD agencies distributing provided information.</p>	<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>Awareness campaign of defoliation impacting native vegetation.</p> <p>Support SOS (Stop Off-Target Spraying) Group activities.</p>
Energy and Business	<p>Improve environmental footprint 325 kg CO₂e per bale.</p> <p>Economic partial analysis of energy, nutrition, irrigation and pest management completed.</p>	<p>To lower energy costs in the cotton system and simultaneously lower emissions per bale to 360 kg CO₂e.</p> <p>One partial budget to support extension delivery.</p>	<p>Understanding environmental impacts with changing demand for cotton.</p> <p>Climate and energy for cotton farm businesses.</p>	<p>Identify areas where technology may fit. Investigate suitable case study growers and investigate adoption of chosen technology.</p> <p>A technical area will be selected to develop partial budgets.</p>

3.7 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 2020-21 AOP, as follows:



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

2020-21 Activity: The target projects for adoption pathway development will be finalised when contracting timing is completed with CRDC. While CottonInfo has a process in place for developing adoption pathways for individual projects, we are looking at transitioning to program level adoption pathways to better align with CRDC research management.



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

2020-21 Activity: Under this AOP, the CottonInfo team will aim to deliver over 50 extension activities impacting more than 1000 participants.



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

2020-21 Activity: CottonInfo will work with digital agriculture providers to build team capacity in using digital tools to support individual grower on-farm trials. Digital tools provide a significant opportunity for growers and consultants to test management options, providing new opportunities for extension to support informed practice change.

3.8 Team Skills Development

In 2019-20, the CSD extension team instigated a program of technical training for all extension staff, including the CottonInfo REOs. This year, the CottonInfo team will build on this platform through monthly team meetings alternating with the existing team teleconferences. The objectives of these online meetings will be:

A significant opportunity to increase the impact of extension is to better utilise digital technology to enable action learning on-farm. The ability to use sensors to automatically collect data and improved data analysis options are opening the door for growers and consultants to run on farm trials with less time and effort. CottonInfo has started to process of engaging with digital agriculture providers (such as PCT, Goanna Ag and John Deere) to work with them to build out teams capacity to exploit this technology.



BUILD ON THE PROGRAM

Cotton crop production training from CSD to look at a technical update each month. This will serve as a mechanism for providing an informal interaction between researchers in this technical area to cover the progress of research as well. It is planned that the meetings will include up to an hour of presentation and discussion on the scheduled technical topic.



AUSTRALASIA-PACIFIC EXTENSION NETWORK (APEN) MENTORING SCHEME

Four REOs have taken the opportunity to participate in the Australasia-Pacific Extension Network (APEN) mentoring scheme in 2020.



EXTENSION SKILLS AND KNOWLEDGE REVIEW

An overview of a particular extension topic will be covered, where possible relating to upcoming activities in the AOP. There is also the possibility of utilising recordings of APEN webinars on extension capacity building.



TEAM DISCUSSION

Team discussion on planning and delivery of the AOP, as is covered in the normal team teleconferences.

3.9 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 CottonInfo Strategic Plan. It also helps guide future strategic priorities, activities and provides timely feedback to understand barriers and any unintended consequences of extension adoption.

It is a continuing challenge to measure and report on the impact of extension activities. Strategies include asking for feedback on intention to change at the time of the activity, following up with growers at a later date to record actual changes and utilising industry surveys to follow general trends in practice. We are working with the CRDC M&E Manager to improve the mechanisms of monitoring and reporting evaluation. This includes set templates for data gathering and use of PowerBI for reporting.





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