



Annual Operational Plan

2019-2020







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.

This is our second AOP under the 2018-23 Strategic Plan and builds on last year's AOP.

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 2018-19 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.



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 teams capacity to respond, develop networks with other biosecurity stakeholders and emphasise the importance of biosecurity plans through *myBMP*.

In addition, a continuing challenge for the industry is the prolonged dry conditions. Both irrigation storage reserves and stored soil moisture are at low levels, with a halving of planted area predicted for 2019-20 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, 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 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.



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. The Plan

3.3 Building upon the 2018-19 AOP

Activities in the 2019-20 AOP that build on the 2018-19 activities include:

- **Water Use Efficiency (WUE) benchmarking project.**
- **Continued development of the Area Wide Management (AWM) group concept**, with the introduction of Cotton Communication Network meetings. Purchase of the digital microscopes to promote monitoring of Silver Leaf Whitefly (SLW) parasitism.
- **Focus on soil health** to continue in partnership with the Crop Consultants Australia (CCA) regional workshop series.
- **Herbicide resistance demonstration sites** expanded to promote alternative control tactics.



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



3.4 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.



3.4.1 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:** RRDP1602 Smarter irrigation for profit (Jamali)
- A:** CSP1904 Improving NUE (McDondald)

New Projects

- A:** RRDP1901 More profit from nitrogen (Antille)
- 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)

Increased Reliability of Cotton Production

- H:** Biological control of noogoora burr (Johnston)
- R:** CSP1401 Enhancing IPM in cotton systems (Homona)
- R:** DAN1703 Innovative solutions for disease (Le)
- A:** GRDC1801 Cover crops in cotton farming systems (Lawrence)
- A:** Kaylix dryland cover cropping trials
- R:** DAN1903 Cotton Disease Technical Lead in the South (Green)
- R:** DAQ1902 IPM for high yielding cotton (Grundy)
- A:** DAQ1802 Improved Management of SLW (Sequeira)
- H:** UWS1901 Biological based products for production (Singh)

New Projects

- A:** Evaporation mitigation solutions (Qiao)
- A:** Gwydir Valley digital technologies for irrigation (Gall)
- A:** NEC1901 Sensors for IPM (McCarthy)
- R:** DAN1901 Integrated weed management (Koetz)
- A:** 1920FRP010 Disease suppressive soils (Smith)

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3.4.2 Goal 2: Successful Cotton Businesses and Expansion

- A:** CSP 903 Science leadership for Northern Australia – supporting the development of cotton in the farming system in NA. Has a Post Doc built into the project and will facilitate linkages between the northern CRC. (Steve Yeates)
- A:** Thresholds for resilience in regional communities – exploring the co dependence of cotton farming and agri-business, what are the tipping points for regional communities.
- A:** MRES1701 Development of a spray drift hazard prediction system (Tepper)
- A:** Understanding motivational factors for improved spray application on cotton farms (Hine)
- H:** CRDC1944 Supporting the sustainability strategy (Cosgrove)

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3.4.3 Goal 3: Prepared to respond to unplanned threats

- R:** PHA1902 Large Scale biosecurity preparedness scenario (Dibley)
- H:** RRDP1724 Cotton industry disease survey (Smith)
- R:** DAQ1501 Managing Solenopsis mealy bug (Sequeira)

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 11.6 bales/ha. Improved input efficiency</p> <p>1.3 bales/ML GPWI. 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>Promote industry WUE benchmarks</p> <p>Webinar delivered to 30 irrigators/consultants to increase their understanding of strategies to employ when facing a limited water year.</p>	<p>Benchmarking WUE.</p> <p>Smarter Irrigation for Profit Phase 2 (Rural R&D for Profit program)</p>	<p>500 growers aware of current GPWUI (benchmarks). (workshops, media articles, conferences)</p> <p>Individual reports provided at face-to-face meeting in eight regions to 60 growers - include background to benchmarking, why, how, promoting new survey and encouraging participation to increase grower understanding of irrigation benchmarking for continuous improvement.</p> <p>At least 10 irrigators in each region to participate in 2019-20 irrigation benchmarking project.</p>



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TECHNICAL AREAS	STRATEGIC PLAN TARGETS	AOP TARGETS	RESEARCH ALIGNMENT AND COLLABORATION	PRIORITY ACTIVITIES
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>	<p>Three field days/walks to 60 growers and consultants showcasing current research and findings in use of cover crops.</p> <p>Four soil health workshops delivered to 100 growers and consultants (three in conjunction with the CCA).</p>	<p>Support from Oliver Knox.</p> <p>Resilient farming systems.</p> <p>GRDC & CRDC cover cropping.</p> <p>Kaylix cover cropping.</p>	<p>Program of work started</p> <ol style="list-style-type: none"> 1. Gather details on this work. 2. Produce summary report of projects in play. 3. Distribute report to REOs. 4. Monitor site progress. 5. Organise field walks to demonstration/trial sites. <p>Conduct Soil Health Workshops</p> <ol style="list-style-type: none"> 1. CRDC funding application. 2. Organise locations and itineraries. 3. Develop and print handbooks. 4. Deliver Workshops. 5. Evaluation and reporting.
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 Macintyre.</p>

TECHNICAL AREAS	STRATEGIC PLAN TARGETS	AOP TARGETS	RESEARCH ALIGNMENT AND COLLABORATION	PRIORITY ACTIVITIES
IPM/AWM	Improved yield 11.6bales/ha. 3.9M bales 5 year average production.	Minimum of three Cotton Communication Network meetings in each valley targeting 20 growers and consultants. Complete the review of CPMG and implement revised content and format for 2020-21 edition	IPM for high yielding cotton. Improved SLW management. Enhancing IPM. Managing mealy bug.	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. Conduct and end user (growers and consultants, CCA) and stakeholder (CRDC, CCA, researchers, CottonInfo) engagement process to better understand how the CPMG is utilised by people and explore options for how it might be future proofed in regard to content, format, accessibility.
Weeds		Establish three experimental sites with a combination of best practice weed management strategies based on HRMS and modelling. Three field days reaching 60 growers. Establish connection with cover crop sites	Supporting extension of weeds tactics. Staying ahead of weed evolution. Weed control thresholds. Regional approach to weed management.	Site selection build toolbar for shroud sprayer and inter row tillage. Liaise with CCA on sites and experimental design and expectations around weed measurements.



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TECHNICAL AREAS	STRATEGIC PLAN TARGETS	AOP TARGETS	RESEARCH ALIGNMENT AND COLLABORATION	PRIORITY ACTIVITIES
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>Increase grower awareness of recent results - especially results from local based trials, and improve researchers understanding of growers needs/questions.</p> <p>Three workshops with 90 growers. 80% indicate intention to change practice.</p> <p>Better understanding of growers attitudes in regards to nutrition application rates and how might be best to improve their management.</p>	<p>More profit from N.</p> <p>Improving NUE of cotton crops.</p> <p>Long term P decline project.</p>	<p>Regional grower meetings between nutrition researchers and growers – focusing on northern NSW and southern QLD.</p> <p>General survey of nutrition decision tools used. In depth interview with five consultants in each region to map the decision process.</p>
NRM	<p>Increased capacity to manage natural capital</p> <p>6.6% native veg managed for conservation.</p>	<p>Increase 500 growers and consultants' awareness of BMP guidelines for conserving biodiversity on cotton farms.</p> <p>Deliver two drone workshops in two locations targeting 20 participants with 50% women in attendance. Participants gain knowledge and skills in basic drone operation, legal considerations and application to agriculture.</p>	<p>Groundwater ecosystems function and impacts.</p> <p>Managing natural landscapes on Australian cotton farms to increase the provision of ecosystem services.</p> <p>Managing riparian corridors on cotton farms for multiple benefits.</p> <p>Keeping pest populations lower for longer: connecting farms and natural systems.</p> <p>New – Improved Natural Capital on Australian cotton farms.</p>	<p>Develop content for six monthly blogs based on Calendar monthly NRM tips. Forward blog content to REOs for inclusion in regional e-newsletters.</p> <p>Identify workshop partner and training provider for drone workshops. Develop, implement and collate M&E.</p>

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.
Biosecurity	Participate in two industry training exercises. 30% farms with a documented biosecurity plan.	Develop 2020 calendar focusing on plant health and appropriate communication strategy in line with following the aims and objectives of Year of Plant Health Biosecurity simulation exercise completed and feedback obtained.	Biosecurity scenario training.	Communication strategy consulted and implemented (to be confirmed closer to end of year regarding actual strategy and goals) Feedback from the exercise is obtained to identify future opportunities to address gaps in extension and training for growers and CottonInfo team respectively.



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TECHNICAL AREAS	STRATEGIC PLAN TARGETS	AOP TARGETS	RESEARCH ALIGNMENT AND COLLABORATION	PRIORITY ACTIVITIES
Fibre Quality		<p>Quantify the impact of limited irrigation on fibre quality, results communicated to 80% growers.</p> <p>Assess the impact of high nitrogen fertiliser (above 300 kgN/ha) on fibre quality.</p> <p>Assess the impact of high nitrogen fertiliser (above 300 kgN/ha) on fibre quality.</p>	Managing cotton quality to maintain our premium status.	<p>Working with Steve Buster (Summit Ag) with four sites in 2019 season to be analysed for quality and yield and written up as a case study in 2019-20.</p> <p>Work with REOs to identify three sites, collect data for yield at picking. Case study to be produced by Aug 2020.</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>Defoliation impacting native vegetation.</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 perform application of chosen technology.</p> <p>A technical area will be selected to develop partial budgets, with irrigation row spacing a priority in a low water year.</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.

2019-20 Activity: The target projects for adoption pathway development will be finalised when contracting timing is completed with CRDC. The EY Agricultural Innovation report has identified the importance of considering adoption and commercialisation at the start of research projects. While CottonInfo has a process in place, we would like to continue develop the effectiveness of this process by engaging with other industries to gain insights into their approaches and allow them to critique our approach.



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

2019-20 Activity: 2019-20 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.

2019-20 Activity: CottonInfo will work with digital agriculture providers to build team capacity in using digital tool 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. The Plan

3.7 Team Skills Development

In 2018-19, 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:



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.



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.



TEAM DISCUSSION

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

Representatives of the team will participate in the Cotton Collective in July, the APEN Conference in September and the Association of Australian Cotton Scientists' Cotton Research Conference in October. Building on the science communications training, the CottonInfo and CSD Communications Managers are planning further communications skills training for the CottonInfo and E&D teams. One area of interest is the development of podcasts. This is a logical progression from the recorded webinars we have available on our website.

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.

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.

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. Previously we have conducted follow-up interviews about resistant weed management and IPM (through the AWM groups). This year we will target three practices to follow up that will be determined by the specificity of the practice change recommended.

In the coming year, CottonInfo will utilise the capacity of the Teams application to transition YourData from a stand-alone, online evaluation tool to a shared evaluation data collection spreadsheet. It will contain the same input fields as historically used in YourData to allow for long-term trend analysis. At an operational level, we will continue to utilise Asana as our project flow software, allowing the entry of activities that can be viewed by the whole team and progress against plans monitored.





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