



AUSTRALIAN COTTON SUSTAINABILITY REPORT 2019

[SUSTAINABLE AUSTRALIAN COTTON
PLANET. PEOPLE. Paddock.]

AUSTRALIAN COTTON GROWERS HAVE BEEN QUIETLY IMPROVING THEIR SUSTAINABILITY FOR DECADES



PERSEVERANCE

In agricultural systems where everything is interconnected, sustainability doesn't happen overnight. Social, economic and environmental sustainability takes dedication and a genuine whole-of-industry commitment to continuously improve over many years.



RESEARCH, EXTENSION & BEST PRACTICE

For decades the Australian cotton industry has invested millions of dollars each year in research, development and extension, in the industry between growers and government. The industry has created the world-leading myBMP cotton certification standard to establish best practice and developed the CottonInfo program to drive grower adoption of research.



CHANGE

This coordinated industry effort is producing premium Australian cotton fibre that is sustainably grown. The industry has a track record of long-term improvements in areas it focuses on, and its journey is ongoing. Sustainability targets, and plans to achieve them, are now being developed, with priority given to the areas this Report shows the industry can do better in.

THEY'RE WORKING TO IMPROVE EVEN MORE

Australia's cotton growers are working to make Australia a global leader in sustainable cotton production.

This is not a new goal. Since becoming the first Australian agricultural industry to benchmark its environmental impacts in the early 1990s, it has a long-term record of continual improvement.

We know, though, being a global sustainability leader doesn't just mean doing more with less. It also means being accountable for the actions and impacts of our industry.

This Australian Cotton Sustainability Report is one way of doing that. Following the industry's first five-year Sustainability Report in 2014, this Report meets the industry's commitment to inform stakeholders of its actions and performance over the five years to June 2019.

The report shows there is much the industry can be proud of. Its long-term trend of reducing water use per bale by 2.5 per cent per year has continued. It has significantly reduced the hazard of pesticides used to grow cotton. It has a well-educated workforce, resilient and innovative growers who run efficient farm businesses, and, like other Australian farmers, cotton growers have a generosity of spirit that sees them invest heavily in the fabric of their communities.

Tracking progress over the past five years also shines a light on areas the industry can improve. Like much of society, the industry needs to do more to reduce its carbon emissions. It also needs to be more efficient with its use of nitrogen fertiliser, enhance on-farm biodiversity and improve the safety of farm workplaces.

To give greater focus to its efforts to continually improve, the Australian cotton industry is now setting sustainability targets and plans to achieve them. Some targets will require the industry to continue its long-term rate of improvement, and targets for other areas will stretch the industry to go beyond business as usual.

The Australian cotton industry will rise to this challenge, because these things are as important to growers as they are to the wider community. Both want natural assets to be protected for future generations. Both want farmers to make a fair living from producing food and fibre sustainably. And both understand the need to take care of people and make positive contributions to society.

At the time of writing, most Australian cotton growers were ending their second season of severe drought, with latest estimates showing a 2019-20 crop one seventh the size of two years ago. This has had a significant impact and will limit sustainability progress in some areas: many growers have not been able to plant a crop, and with no crop there can be no progress.

The industry's long-term track record shows that despite inevitable poor seasons, Australia's cotton growers have continuously improved over time. The current drought is particularly harsh, and serves as a stark reminder of the critical importance of this sustainability work. The Australian cotton industry is committed to continue its journey towards being a global leader in sustainable cotton production.

CONTENTS

- 3 Chairs' letter
- 4 About the Australian cotton industry
- 6 Sustainability management
- 7 Sustainability performance
- 8 About this report

PLANET

- 10 Water
- 13 Carbon
- 16 Biodiversity
- 18 Pesticides

Paddock

- 20 Efficiency
- 21 Profitability

PEOPLE

- 23 Quality of work life
- 26 Wellbeing and social capital
- 30 Global sustainable cotton leadership
- 31 Governance



Hamish McIntyre
Chair,
Cotton Australia



Richard Haire
Chair,
Cotton Research and Development Corporation



ABOUT THE AUSTRALIAN COTTON INDUSTRY

Cotton is a renewable resource that is biodegradable and 100 per cent natural.

Australia is the third largest exporter of cotton in the world and produces very high quality cotton sought after by customers.

Cotton is grown mainly on family farms in inland eastern Australia. Areas for cotton production are being explored in northern Australia.

Cotton is an integral and dynamic part of the Australian economy. The industry includes growers, cotton gins to separate seed from the cotton lint, and a range of associated support industries including crop consultants, input suppliers, farming contractors, transport and warehousing facilities, cotton classers, merchants and cotton researchers.

Growing cotton is a complex process where natural capital, human capital and other inputs are carefully transformed into cotton lint and seed.

AUSTRALIAN GROWN COTTON INPUTS



Natural capital

- Up to 1,500 farms grow cotton annually in rotation with other crops
- Soil provides nutrients for plant growth
- Water comes from rainfall and irrigation
- Native vegetation stores carbon, prevents erosion, and provides habitat and other benefits.

Human & relationship capital

- Grown in more than 40 rural Local Government Areas
- Collectively, farms employ an average 10,740 people per year, not including contractors, who live locally and contribute to their communities
- Partnerships with government, industries and communities to create private and public good.

Manufactured capital

- Crop protection products, fertilisers and machinery are used to grow the crop.

Financial & intellectual capital

- Strategic planning guides research investments
- Best practices extended to growers
- Research and technology adopted by growers
- Innovation and commercialisation of R&D helps to create new companies, jobs and growth.

2014-19 OUTPUTS

\$1.8 BILLION

average annual gross value of cotton lint and seed production.

3 MILLION BALES

or 680,400 tonnes, of cotton lint produced per year on average.

Enough cotton to clothe

375 MILLION PEOPLE

annually.

930,000 TONNES

of cotton seed produced each year on average. Each tonne of seed yields about 200kg of cholesterol-free cotton seed oil, and about 800kg of meal and hulls used for stock feed.

A COLLABORATIVE INDUSTRY

Creating a sophisticated industry with a long-term track record of improvement has been the result of a sustained and coordinated effort by the entire industry. Millions of dollars and thousands of hours every year have been invested in incremental improvements by growers and industry organisations.

Five key organisations coordinate this work, in partnership with governments, cotton growers and related businesses.



Research ways to improve

The Cotton Research and Development Corporation (CRDC) is a partnership between cotton growers and the Australian Government, investing in world-leading cotton research, development and extension outcomes for cotton and its communities.



Grower input into decision-making

Cotton Australia provides a united voice for cotton growers across R&D priorities, government policy, stewardship, and cotton production issues.



Encourage best practice

myBMP is the Australian cotton industry's voluntary certification standard, demonstrating cotton growers' achievement of best management practice at the farm level.



Partnering in research and extension

Cotton Seed Distributors Ltd. are Australia's supplier of cotton planting seed; investing in plant breeding (in partnership with CSIRO), variety and agronomic research, development and extension.



Extend research to growers

CottonInfo is the Australian cotton industry's joint extension program, delivered by joint venture partners Cotton Australia, Cotton Seed Distributors and CRDC. CottonInfo delivers research outcomes to cotton growers and consultants helping them to take up new innovations and technologies and achieve best practice.

In addition to the sustainability highlights recorded in this Sustainability Report, the industry undertakes a very significant body of work across these and other areas. More information on the industry's extensive activities can be found on the websites of Cotton Australia and CRDC.

myBMP

The Australian cotton industry's sustainability standard



myBMP (Best Management Practices) is a voluntary farm and environmental management system which provides self-assessment mechanisms, practical tools and auditing processes to ensure Australian cotton is produced according to best practice.

The original BMP program began in 1997 and has been regularly reviewed and refined since. Over 400 checklist items are categorised into 10 key modules, or subject areas; 300 of these are audited, and about 100 are aspirational.

In 2019:

- 630 cotton growing businesses (some operating more than one farm) representing 66 per cent of the Australian industry were registered for myBMP
- 234 farms, or 18 per cent of the industry, had completed a third-party assurance program to be myBMP accredited
- The number of myBMP accredited farms increased from 43 in 2014.

myBMP is part of the industry's extension program, CottonInfo, ensuring that growers are provided with the latest information resulting from research, and encouraging the continuous adoption of best practice.

SUSTAINABILITY MANAGEMENT

Sustainability for the Australian cotton industry means running profitable and efficient businesses while creating environmental, economic and social value. It also means being accountable to stakeholders for the industry's actions and impacts.

The Australian cotton industry has been actively working to do this for over 30 years.

Now, the industry is seeking to improve even more as it works to its vision of being a global leader in sustainable cotton production.

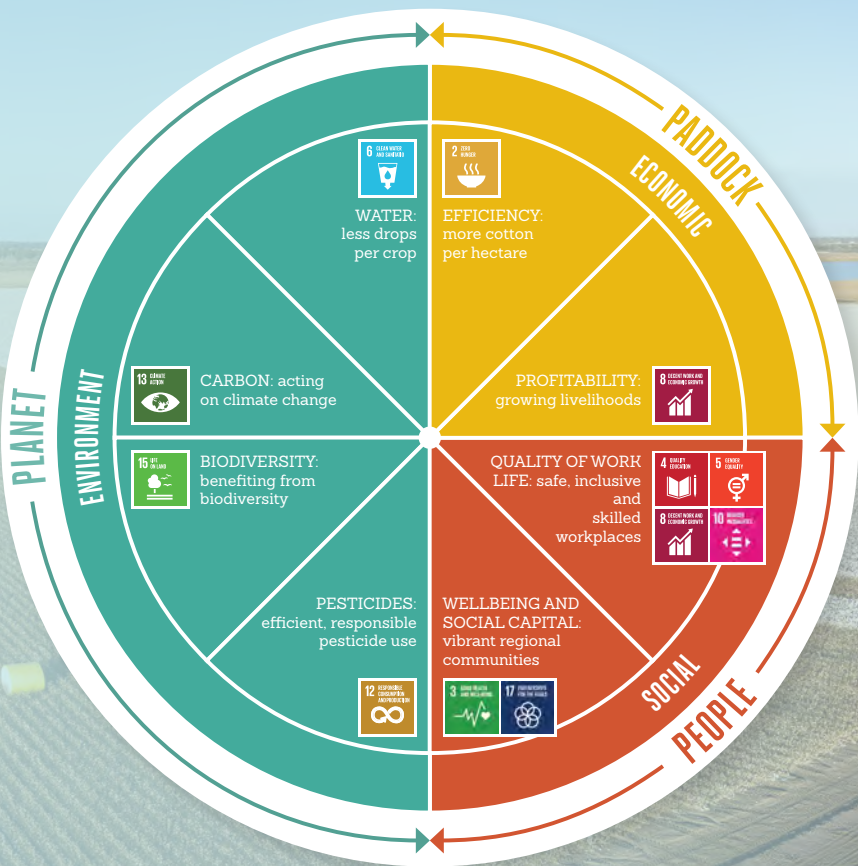
An Australian cotton sustainability framework called PLANET. PEOPLE. PADDOCK. has been created to guide work to:

- Set sustainability targets in the areas most important to industry and stakeholders
- Coordinate a whole-of-industry strategy to achieve these targets
- Engage effectively with stakeholders on actions and progress.

PLANET. PEOPLE. PADDOCK. is not a compulsory standard or a brand. It is a framework that recognises sustainability is an integral part of doing business, and provides a path for the entire industry to benefit from continually improving sustainability performance.

Through a process of consultation and review, eight environmental, economic and social topics have been assessed as being most important to customers, cotton growers, industry organisations, regional communities and other stakeholders.

Each topic aligns with relevant United Nations Sustainable Development Goals (SDGs). The SDGs are widely recognised as providing a global pathway to achieve a better and more sustainable future for all. Click on the SDG logo here to learn more about how the industry contributes to these goals.



SUSTAINABILITY PERFORMANCE

This report provides sustainability performance for the five years to June 2019. It shows the industry is doing some things well, and some things need to improve. The industry is now working to set five-year targets and plans to achieve them.

A long-term track record of continual improvement in areas the industry has focused on in the past, gives confidence it can achieve the targets to be set for these areas in the future.

2014 TO 2019 SUSTAINABILITY RESULTS

Water: A long-term decrease in the volume of water used to grow a bale of cotton has continued.

Carbon: Carbon emissions have increased, mainly from increased nitrogen fertiliser use. The amount of carbon stored on farms is not currently measured.

Biodiversity: The area of land managed for conservation has declined slightly or remained steady.

Pesticides: The amount of toxic pressure on human health and the environment from pesticides has continued to decrease. Work to reduce the hazard and volume of pesticides is ongoing.

Efficiency: The amount of cotton grown per hectare continued its long-term increase.

Profitability: Increased yields and historically high cotton prices increased profitability.

Quality of work life - safety: Injuries have decreased, but fatalities have increased.

Quality of work life - diversity and training: Most diversity indicators increased; the proportion of young people decreased.

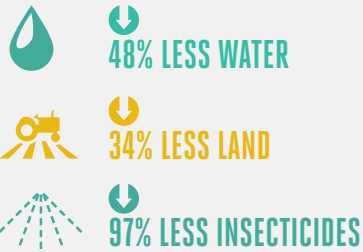
Wellbeing and social capital: The wellbeing and social capital of growers and their communities was measured for the first time.

LONG-TERM SUSTAINABILITY TRENDS

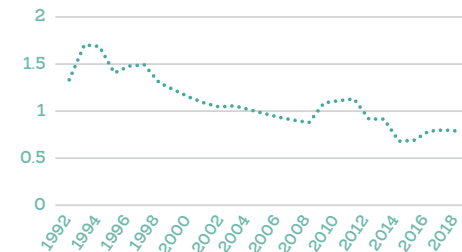
In agriculture and sustainability, a longer view is often needed to see real change. Years of drought or one bumper season can distort the true picture, even over a five-year period.

In 1991, cotton became the first Australian agricultural industry to benchmark its environmental performance by undertaking a whole of industry independent environmental audit. The results provided a catalyst for transformation.

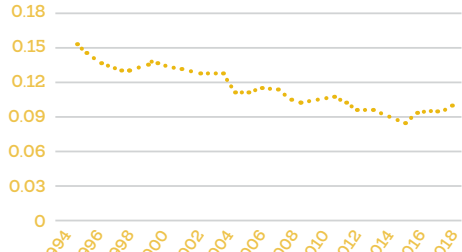
Since 1992, industry research data shows a trend of improvement in many areas. Producing a bale of irrigated cotton now requires:



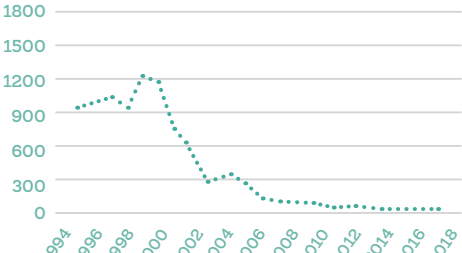
Water use*: ML/bale



Land use: hectare/bale



Total insecticide use: grams a.i.**/bale



Graph data: two-year moving average, irrigated cotton.

* Partial Gross Production Water Use Index (irrigation water plus effective rain per bale).

**a.i. = active ingredient.

ABOUT THIS REPORT

This is the Australian cotton industry’s second five-year sustainability report, following a first report published in 2014. It provides data and commentary for the Australian cotton industry’s most important, or material, sustainability topics for the five years to 30 June 2019. Where possible, data from earlier years is provided to show longer trends. The most recent industry data for some topics is not always available for the full five years to June 2019; this is clearly stated where relevant.

The report is focused on the sustainability topics most important to the industry and its stakeholders. Through a process involving a technical review, industry input and external stakeholder consultations – including a stakeholder forum, followup with key stakeholders, and feedback from a range of internal and external stakeholders – eight material topics have been identified.

This report is written primarily for an external audience: people outside the Australian cotton industry who are interested in its sustainability performance. It aims to provide a succinct and balanced summary of our sustainability work. Links to online pages with more detail are available throughout the report for readers wanting more information.

The industry undertakes many more activities across a range of other areas. More information on the industry’s extensive body of work can be found on the websites of Cotton Australia and CRDC.

Unless stated otherwise, all data relates to on-farm activities.

Data used to report against indicators is sourced from Census data, or research by third party researchers funded by industry and government. Data in this report has not been independently verified, but for transparency, indicator data is linked to the online source where possible.

Stakeholders who have provided their time to inform the material sustainability topics reported on include:

Cotton industry organisations and service organisations

- Association of Australian Cotton Scientists
- Australian Cotton Ginners Association
- Australian Cotton Shippers Association
- CottonInfo
- Cotton Australia members representing local Cotton Grower Associations, service and ginning organisations
- Cotton Innovation Network
- Cotton Research and Development Corporation
- Cotton Seed Distributors
- Raingrown Cotton Initiative
- Wincott (Women in Cotton).

External stakeholders

- Agri-Science Queensland, Department of Agriculture and Fisheries
- Australian Centre for Agricultural Health & Safety (University of Sydney)
- The Department of Agriculture, Water and the Environment
- Australian Wool Innovation
- Baptist World Aid
- Country Women’s Association of NSW
- Dairy Australia
- Kmart/Target Australia
- Local Land Services
- National Farmers’ Federation
- NSW Farmers
- NSW Natural Resources Commission
- Pacific Brands
- QLD Farmers’ Federation
- Save the Children
- Various researchers: CSIRO, QLD University of Technology.

The Australian cotton industry is grateful for the contributions from stakeholders. It will continue to engage with stakeholders in a range of ways to understand their expectations, communicate impacts and assess materiality of forward-looking topics.

CLOSING THE LOOP

Cotton is made from plants, not plastics. It is a renewable resource that is 100 per cent natural and biodegradable: it breaks down quickly in soil and water, so it does not contribute to microplastic pollution. Choosing cotton is one way to minimise the harmful impact of fashion on rivers and oceans and at the same time, support more than 100 million farming families growing cotton in 75 countries around the world.

Cotton has a natural place in the textile circular economy. The Australian cotton industry is working with the textile industry to reduce waste, with the ultimate goal of turning textiles into products that can be used back on farms. The industry invests in research and development, and is part of the Cotton Converts group that’s working to turn textile waste problems into solutions.



KMART PARTNERS WITH AUSTRALIAN COTTON FOR A MORE SUSTAINABLE FUTURE

“As a large cotton user, Kmart Australia is committed to sourcing cotton in a way that minimises impacts on the environment and has set a target to source 100 per cent of cotton as Better Cotton, organic cotton or recycled cotton for clothing, towel and bedding ranges by July 2020*. The Australian cotton industry has played an important role in Kmart’s journey toward more sustainable cotton.

Kmart started its relationship with Cotton Australia back in 2016 when the business successfully trialled Australian-grown cotton in its men’s T-shirt range. With strong interest from buying team members to expand into new categories, the business commissioned an independent social and environmental risk assessment of the Australian cotton industry, and customer insights research, to provide the business with the confidence it needed to invest.

Although there will always be challenges and areas for improvement, the assessment concluded that risks were being well-managed by the industry and through the leadership of Cotton Australia, with the myBMP program highlighted as an example of global best practice in environmental management. The customer research suggested that Australian cotton is perceived as both superior quality and a great way to support Australian jobs and industry - Australian cotton was thus seen as a win-win for our customers and the environment.

More recently, Kmart has been working with its suppliers to transition all Australian grown cotton products to Better Cotton as part of its 100 per cent more sustainable cotton commitment. With growing awareness of the Better Cotton brand in Australia and globally, the program provides Kmart with a simple way to reinforce trust among customers and other stakeholders. By July 2020, all Australian grown cotton products at Kmart will be sourced as Better Cotton.

We commend Cotton Australia for their leadership in sustainable farming practices in Australia and globally through partnerships such as the Better Cotton Initiative, and look forward to continuing our partnership into the future.”

**Commitment excludes footwear, accessories and all functional trims (e.g. zips) and decorative details (e.g. lace or ribbons).*

Kmart Australia



PLANET WATER | Less drops per crop



While dryland (rain-grown) cotton crops are successful in some Australian regions and seasons, irrigation enables high-yielding cotton to be grown in a wider range of regions more of the time. Water is thus a cotton grower's most precious natural resource. Saving water has been a focus for decades.

The Australian cotton industry experiences seasonal variation in water use, but has a long-term trend of reduced water use and increased water efficiency per bale.

Water allocations are prioritised for towns, stock, and the environment before any water is made available to irrigation licences. This is part of a governmental management plan that aims to provide sufficient river flows to support the health of rivers and the plants and animals that depend on them.

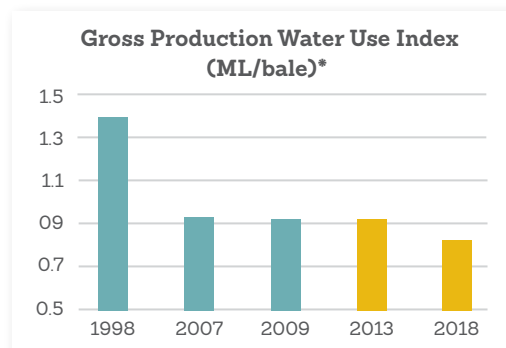
From 1992 to 2019, there has been a 97 per cent increase in the bales of cotton grown per megalitre (ML) of water (effective rain and irrigation). This equates to a 48 per cent decrease in the water required per bale of cotton. In other words, Australian cotton growers are now:

- using almost half as much water to produce a bale of cotton, compared to 1992
- producing almost twice as much cotton from a ML of water, compared to 1992.

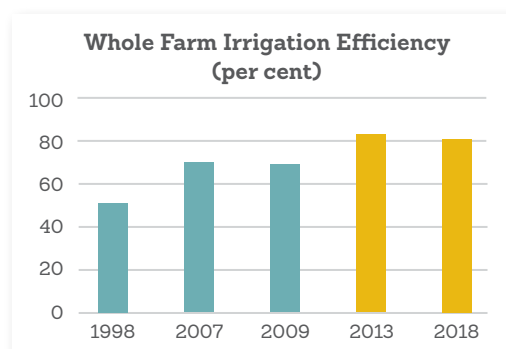


2014 – 2019 CHANGE

Australian cotton growers have continued to achieve significant gains in water productivity and irrigation efficiency in recent years.



Data source: 2017-18 Water Productivity Benchmarking study. Click [here](#) for published indicator data.



Data source: 2017-18 Water Productivity Benchmarking study. Click [here](#) for published indicator data.

Since 1992, there has been an average 2.5 per cent decline annually in the volume of water used per bale of cotton. This trend has continued in the last five years, and is the result of sustained effort to improve water use efficiency and crop productivity.

*Gross Production Water Use Index (GPWUI) measures the total irrigation, rainfall and water stored in the soil to grow a bale of cotton. It is regarded as the best measure for comparing water use between farms or seasons, and is measured as bales/ML. This Report uses the inverse of this standard measure – ML/bale – to show the decrease in water used to produce each bale of cotton.

Whole Farm Irrigation Efficiency (WFIE) has improved in recent years. This tells us more water is being used by the crop instead of being lost on-farm, mainly due to reduced evaporation from storage dams, and drainage and seepage in water delivery and across the fields.

WFIE shows the amount of irrigation water used by the plant as a percentage of total irrigation water inputs to the farm. WFIE values are influenced by rainfall and will be higher in drier years. This explains why WFIE declined slightly from 83 per cent in 2012-13, when there was 167mm of effective rain, to 81 per cent in 2017-18, when 205mm of effective rain was recorded.



RESEARCH AND EXTENSION

The industry has invested in **research** including:

- The Smarter Irrigation for Profit project, led by CRDC under the Australian Government's Rural R&D for Profit program, involves a network of 19 farmer-managed learning sites around Australia. The first stage of this project found dairy, cotton, sugar and rice farmers could achieve a 10 to 20 per cent improvement in water productivity and efficiency by adopting new and existing precision irrigation technologies
- Industry-wide water productivity is now being monitored and benchmarked annually. Regular measurement of this and other climate and crop management data allow deeper analysis into the effects of soil type, rainfall, temperatures, evapotranspiration, irrigation systems, establishment method, fertiliser rates, crop rotations and other factors in driving water productivity
- The Keytah System Comparison, a grower-run project to assess the efficiencies of four different irrigation systems since 2009 to give growers detailed data to inform irrigation investment decisions.

This has led to **practice changes** including:

- Efficient irrigation systems: in 2018, 25 per cent of growers were using overhead irrigation systems
- Good field design: 83 per cent of growers maintained field slope in 2018, up from 61 per cent in 2014
- Identifying field soil variation: 72 per cent of growers took soil characteristics into account in 2018 to help identify where water delivery improvements can be made, up from 41 per cent in 2014
- Automation: in 2018, 27 per cent of growers reported using some form of automation, and a further 47 per cent said they are considering automation solutions.



Industry insight

IRRIGATION IN AUSTRALIA

Australia is a highly water-efficient producer of cotton. However, we understand many people are concerned about scarcity of water in Australia: they appreciate cotton farmers are efficient but wonder if there is enough water to use in the first place.

The reality is water in Australia is allocated to irrigators to match the scarcity or abundance of flows in any given year. Water is a highly regulated natural resource, with rules to ensure the basic needs of the environment and humans must be met before any water can be allocated to farmers for irrigation. If water in a river system is scarce in any given year, water available for irrigation is proportionally scarce. In some years, there is no allocation of water to irrigators.

A water licence gives a share of the water that is available that year after environmental and human needs are met. Farmers with a water licence can use their allocation to grow what they choose; many choose cotton because it gives them the best financial return per unit of water.

We acknowledge compliance systems for enforcing these rules have been found inadequate in the past. Government enforcement mechanisms are being strengthened, and we strongly support reforms that make compliance robust, transparent and cost-effective. We have zero tolerance for any illegal activity and believe offenders should face the full force of the law.

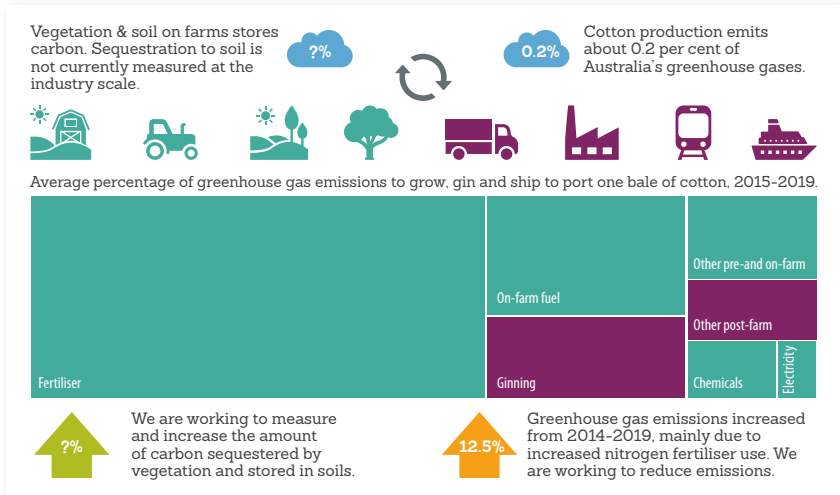
For more information on water and Australian cotton, click [here](#).





PLANET CARBON | Acting on climate change

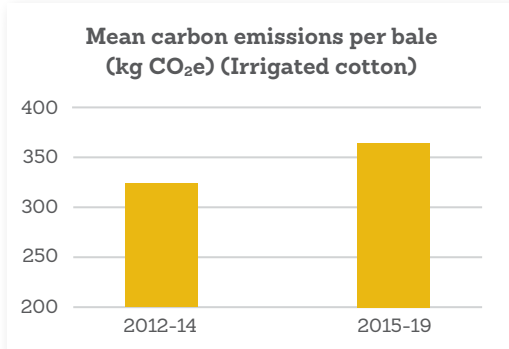
Climate change is expected to impact Australia's cotton growing regions via higher temperatures, increased evaporation and less frequent but more intense rainfall. All of these have potential negative impacts on the efficient production of cotton. Cotton growers are taking steps to adapt to the impacts of climate change by implementing new practices and adopting new varieties of cotton to make farms more resilient.



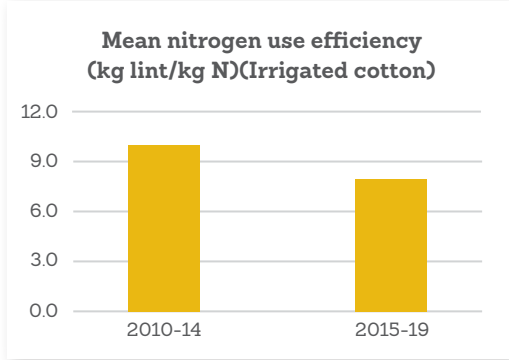
Cotton production emits about 0.2 per cent of Australia's greenhouse emissions. The main sources of emissions to grow then ship to port one bale of cotton in the five years to 2018-19 were nitrogenous fertiliser (58 per cent), on-farm fuel (15 per cent), and ginning energy (10 per cent). It's important to remember emissions are one side of the carbon cycle; on the other side, farms sequester and store atmospheric carbon in soil and vegetation. Research is now showing some farms are carbon positive: that is, more carbon is stored by the farm than is emitted by its cotton production. Due to a lack of data on the amount of carbon stored on farms at the industry scale, the industry is currently measuring only emissions, which does not provide the full picture. Measuring cotton's carbon footprint is a target area for further research.

2014 - 2019 CHANGE

The volume of greenhouse gases emitted to grow, gin and transport to port, a bale of irrigated cotton increased by 12.6 per cent over the last five years. The increase in emissions is mainly due to a decrease in nitrogen use efficiency.



Data source: 2019 carbon footprint study, five-year average. Click [here](#) for published indicator data.



Data source: rolling five-year average of CRDC Cotton Grower Survey. Click [here](#) for the most recent Cotton Grower Survey.

Adequate crop nutrition is critical to maximising crop yield. This includes maintaining stubble from the previous crop, crop rotations (such as legumes), and the addition of nutrient fertilisers, including nitrogen, phosphorus and potassium.

Being an annual crop, growers need to resupply some of the nutrients cotton plants need to thrive. However, with nitrogen fertilisers contributing more than half the carbon emissions of a bale of cotton, improving nitrogen use efficiency is an area for further work in the next five years. As well as contributing to greenhouse gas emissions, if more nitrogen is being applied than recommended it represents an additional cost to growers that doesn't necessarily result in increased production.

In addition to reducing emissions, the industry is also working to increase the amount of carbon stored in soil and vegetation on farms. In 2019, 72 per cent of growers were taking steps to specifically reduce emissions or sequester carbon, including vegetation management (40 per cent), cover cropping (35 per cent) and tree planting or using organic manure (28 per cent each).

This data is telling us an industry priority needs to be to work towards carbon neutrality by making greater efforts to reduce emissions, to increase sequestration, and to measure the industry's net carbon footprint. Part of this challenge is developing a process to efficiently and robustly measure carbon sequestration and storage at a farm and industry scale.

Independent insight



CAN WE HAVE IRRIGATED COTTON AND AN IMPROVED RIPARIAN ENVIRONMENT?

“Cotton needs plenty of water, but it might actually be one of the best crops to help cope with a rapidly changing climate. This is because cotton is an annual crop: growers plant and harvest in the same 12-month period. This means they can look to the year ahead and decide how much to plant given water availability and seasonal rainfall predictions.

With the Murray and Darling rivers being some of the most variable river systems in the world, this flexibility to plant more or less in a given year is very valuable. In a drought year with limited water, a grower may even choose to plant nothing and sell their diminished water allocation to another farmer – for example, one who grows perennial crops like vineyards or orchards. This increases the resilience of communities across the basin by supporting a diverse range of commodities and industries.

While I think we need cotton, I don't think we're distributing water well. Algal blooms and fish kills are evidence of that.

The 2012-26 Murray Darling Basin Plan is a good first step to distribute water to the environment, communities and industries, but it is poorly implemented. Industry and environmental interests in the Basin should collaborate to:

- Improve monitoring
- Relax constraints that are preventing best use of environmental water to conserve flora and fauna
- Recover agreed environmental water
- Plan for climate change.

Achieving this can deliver a healthy river system that also provides certainty to support vibrant regional communities and sustain productive agricultural industries – including cotton.”

Professor Jamie Pittock
Fenner School of Environment and Society
The Australian National University



RESEARCH AND EXTENSION

The industry has invested in research to **reduce its net carbon footprint** including:

- Optimising the management of manures in southern NSW cotton production
- Investigating the role of rotations and cover crops in cotton farming systems
- Optimising the efficiency of water pumps
- The carbon farming project to promote on-farm renewable energy, responsible use of nitrogen fertiliser, management practices to improve soil carbon levels, and environmental plantings
- Researching the use of gin trash as a biofuel to produce ethanol, to potentially reduce ginning emissions.

The industry has invested in research to **improve nitrogen use efficiency** including:

- Significant investment in research, development and extension to better understand and more efficiently manage the complexities of nitrogen use
- The More Profit from Nitrogen project, led by CRDC under the Australian Government's Rural R&D for Profit program, in cooperation with the dairy, sugar and horticulture industries, to enhance nitrogen use efficiency
- Research showing simple management practices such as how fertiliser is placed, the rate of application, and how changes in early season irrigation can reduce nitrogen losses substantially and reduce indirect nitrous oxide emissions.

This has led to **practice changes** including:

- Alternative energy sources are used: 27 per cent of growers generated solar energy in 2019
- New pump stations that are the best design and type for the farming system
- Energy use in tractors is optimised: 91 per cent of growers used autosteer and 64 per cent used traction control in 2019 to improve energy efficiency
- Nitrogen use efficiency is recorded and monitored over time.



Better monitoring improves nitrogen use efficiency

Graham Volck is always looking to improve resource use efficiency on his irrigated cotton farming business near Emerald, Queensland. Less inputs means less resources used, lower costs – and in the case of nitrogen fertiliser, lower greenhouse gas emissions and reduced run-off of nitrates.

For the 2017-18 and 2018-19 seasons, Graham offered his farm as a demonstration site to show nitrogen use efficiency can be improved by monitoring nitrogen movement and losses.

Graham increased his soil testing program from once to three times each year to get a better understanding of what was happening with soil nitrate levels before, during and after the cotton crop. This gave Graham the confidence to remove one in-crop nitrogen fertiliser application of 50 to 60 kg N/ha, which saved \$68 to \$80/ha in fertiliser costs. It also reduced soil disturbance, thereby helping maintain good soil structure and soil carbon levels.

The results of the tests are being shared widely with other growers at workshops and on YouTube. Graham is now looking at more precise nitrogen fertiliser management practices to further reduce nitrate run-off and greenhouse gas emissions, without impacting yield.

Carbon positive cotton: driven by native vegetation

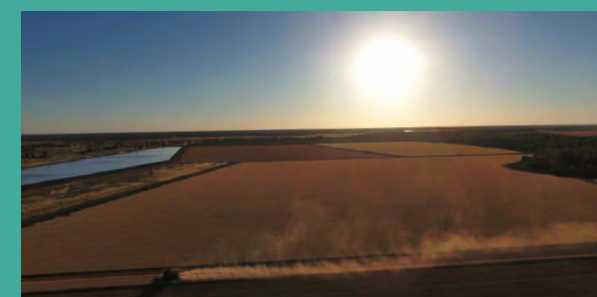
The Kahl family near Wee Waa in New South Wales are showing how a cotton farm can be carbon neutral, and even carbon positive, through careful land use management.

The Kahls have reduced farm emissions through a holistic rotation system that sees them grow cotton in a four year rotation with crops like corn, wheat and mungbeans, and graze livestock on soils not suitable for cropping.

They also maximise sequestration by maintaining healthy vegetation zones. Of the 1,200 hectares on their 'Redbank' property, 839 hectares are vegetation including 153 hectares of super-sequestering River Red Gum riparian forest.

These careful land management decisions mean their property sequesters approximately 1,185 kilograms of carbon per hectare over and above the carbon emitted.

The farm also gains other benefits including reduced erosion, pollutants and pests.



Carbon positive cotton: driven by soil carbon

The Statham family acknowledge they are temporary custodians of their land, and for decades have been working in harmony with nature to leave it in the best possible condition for future generations.

To the Stathams, this means being accountable for running a highly productive cotton farm within planetary boundaries. The family has invested in constant research, trials and innovation for many years to achieve their sustainability results. This work has seen significant improvements in water use, fertiliser efficiency, soil health and biodiversity enhancement. It has also made their farm carbon positive.

David and Danielle Statham requested a full sustainability report to be undertaken by the University of Queensland. This showed the carbon footprint per bale of irrigated cotton produced, ginned and delivered to port by the Stathams in 2018 on a high-yielding crop of 14 bales per hectare was - 412kg CO₂e per bale. This means the Statham's 20,000 hectares of black alluvial soils are a carbon sink, storing more carbon than is emitted to grow cotton. This has largely been achieved through practices such as using composted waste matter, crop rotation, and minimum or zero tillage. Together, these have seen soil carbon levels rise from 0.5 per cent in 2013 to 0.74 per cent in 2017.

The Stathams also graze cattle on carefully managed land and maintain about 10 per cent of their farm as forest and floodplain. The University of Queensland study showed the carbon footprint for the entire farm, including cattle, was -26,682 T CO₂e. That means the Stathams are running a productive food and fibre business – and storing enough extra carbon to offset the total annual emissions of about 1,800 Australians.

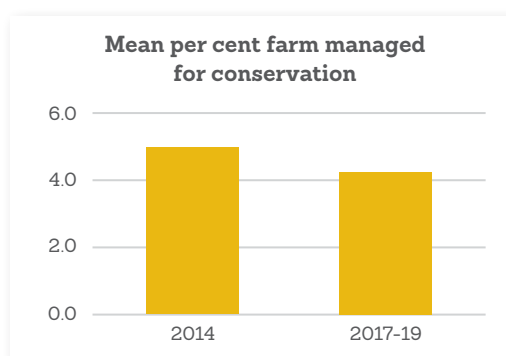


On-farm field days are an important part of extending research to growers.



PLANET BIODIVERSITY | Benefiting from biodiversity

Biodiversity is the variety of life forms found in an environment including animals, plants, bacteria, fungi and micro-organisms. It also includes the diversity within and between species and the diversity of ecosystems. Biodiversity can provide natural pest control and pollination, control erosion, store carbon and enhance water retention. The major threats to biodiversity on farms are invasive species, habitat loss and land degradation.



Data source: mean of responses to 2017-2019 CRDC Cotton Grower Survey. Click [here](#) for the most recent Cotton Grower Survey. Native vegetation refers to naturally occurring local plant species from small groundcovers such as grasses and forbs through to larger shrubs and trees.

* When assessing the land use mix on cotton farms, recent grower surveys measured 'native vegetation not grazed' and 'other' (water storages, channels etc). Older grower surveys appear to have included 'other' into 'native vegetation not grazed', thereby incorrectly estimating the proportion of land managed for conservation at 5 per cent to 6 per cent.



2014 – 2019 CHANGE

Cotton grower survey data shows the mean area of cotton growing farmland actively managed for conservation decreased in the past five years. However, older grower survey data appears to have slightly overstated the percentage of land managed for conservation*; the last two years of surveys have recorded land being managed for conservation as between 3 per cent and 4 per cent, and this proportion is likely to have been steady for some time.

In the next five years, more accurate measurement of native vegetation and increasing the mean area of farmland managed for conservation will be sought. This may not be easy as recent drought conditions restrict planting of new native vegetation. In addition, farmland is privately owned and research has shown many farms have relatively little native vegetation as a result of historical clearing. However, there is growing awareness of the benefits of farm biodiversity. The challenge is to turn this awareness into more actions.

Measuring the area of land managed for biodiversity is important, but measuring the richness and extent of biodiversity on that land provides a fuller picture. This is difficult due to the time, cost and technical expertise needed, but the challenge is being met by investing in research to assess the proportion of bird and/or insectivorous bat guilds on farms to monitor the impact of farm conservation activities. The new Cotton Landcare Tech-Innovations 2021 project to enhance natural resources and biodiversity is expected to report on this in future.



RESEARCH AND EXTENSION

The industry has invested in **research** including:

- Research showing growers who maintain healthy trees, good groundcover, diversity of native plant species, complex habitat structure and connectivity will benefit from riparian ecosystem services. These include reduced sediment runoff, natural pest control and increased carbon sequestration; old growth River Red Gums can store almost 400 tonnes of carbon over the life of the tree, and sequester on average 2.5 tonnes per hectare per year
- Benchmarking biodiversity assets across cotton landscapes and identifying priority management actions for the restoration of threatened and iconic species within cotton landscapes
- Innovative extension methods for cotton growers such as family canoe trips to spot wildlife and understand the importance of riparian - both land and water - environments.

This has led to **practice changes** including:

- Whole farm plans which consider the management of natural resources on-farm and in the surrounding landscape as part of the overall management of the farm: in 2019, 38 per cent of growers excluded grazing from areas previously grazed, and 31 per cent managed stock access through addition of fencing or offsite watering points
- Maintaining or creating new native vegetation using revegetation or natural regeneration that connect existing patches of vegetation: in 2019, 50 per cent of growers had actively encouraged natural regeneration in the past year, and 70 per cent undertook weed control of natural areas
- Maintaining or restoring natural wetlands and billabongs and enhancing artificial ones: in 2017, 70 per cent of growers reported using riparian area best management practices in the past decade.

21ST CENTURY REVEGETATION

So here's a problem. You want to enhance biodiversity by revegetating more of your farm, but being in a semi-arid environment you can't plant when it's dry, and being on heavy clay soil you can't get onto your land after drenching rains without getting stuck in mud.

What do you do? How about after heavy rain you bring in a drone fitted with a modified air rifle using technology built at Oxford University to shoot seeds into saturated soil?

With the capacity to plant a hectare of native trees in less than 20 minutes at the optimal time of year for germination, this method mimics natural conditions where floodplain species naturally flower and seed after a flood event.

Under the Cotton Landcare Tech-Innovations 2021 project, supported by the National Landcare Program's Smart Farming Partnership initiative, this is just one of the new revegetation methods researchers from Australia and the UK are investigating to help us increase revegetation.



Industry insight



SOIL HEALTH

Soil carbon and organic matter supply nutrients for plant growth, and soil micro-organisms stabilise soil structure and improve soil water storage and infiltration. Soil organic matter levels in many cropping fields, including cotton, have declined since the fields were developed for agriculture many years ago.

Common practices used by Australia's cotton growers such as minimising tillage, controlled traffic farming, using rotational crops and optimising fertiliser application including the use of manures and biosolids, are being used to address this decline in soil carbon.

The fundamental importance of soil is reflected in the six standards and 32 checklist items devoted to soil health in the industry's myBMP program. myBMP encourages growers to prevent erosion; minimise soil structural problems like compaction, salinity and sodicity, and; monitor and efficiently manage nutrient requirements.

Soil health is of material importance to our industry, but we have not measured it for this report because it is very difficult to accurately and meaningfully measure something as complex as soil health across the industry with one or two indicators.

The Food and Agriculture Organization of the United Nations has developed a Visual Soil Assessment guide to assess soil health. Australian growers have been conducting visual soil assessments for many years, and we are currently assessing the feasibility of using this as an indicator for soil health across Australian cotton farms.

You can read more about the work we do to improve soil health [here](#).



PLANET PESTICIDES

Efficient, responsible
pesticide use



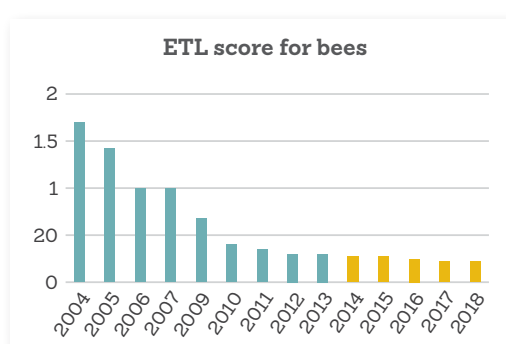
Pesticides (including insecticides and herbicides) are widely used in agriculture to control crop losses from pests. Over-use of pesticides can lead to resistance, secondary pest outbreaks, destruction of natural predators and an increased risk of off-farm movement and environmental contamination.

Australian cotton growers have reduced the amount of insecticides used in cotton by 95 per cent per hectare since 1993, or 97 per cent per bale. This coincides with the introduction of Bt transgenic cotton and strong uptake by growers of Integrated Pest Management (IPM). IPM is a strategy to manage pests with a range of practices to promote natural control from beneficial insects while suppressing pests. Tactics include crop rotations, weed control, and native vegetation and refuge crops to house 'beneficial' insects, birds, bats and other predators.

Weeds are controlled by herbicides and tillage.

Moving towards reduced tillage systems has increased soil carbon and moisture and reduced fuel use, but it has also increased herbicide use by 20 per cent since 1994. In this period there has been an increase in the use of glyphosate, and a decrease in the use of other types of herbicides. Consequently, industry has invested heavily in recommended spraying practices to avoid the emergence of weeds with resistance to glyphosate. The volumes of herbicides may reduce in future with the adoption of robotic tractors and sprayers that selectively target individual weeds using physical control and more precise application of herbicide.

Reducing the quantity of pesticides is important, but the toxicity of each pesticide also needs to be considered. This is emphasised by the choice of toxicity of pesticide use as an indicator.



Data source: CRDC commissioned research.
Click [here](#) for published indicator data.



2014 – 2019 CHANGE

The Australian cotton industry's Environmental Toxic Load (ETL) for bees decreased by 18.2 per cent from 11 to 9 in the four years to 2018. This continues a long-term, but slowing, decline: the lower the ETL score, the lower the toxic pressure.

ETL is an indicator to assess the average amount of toxic pressure on human health and the environment from pesticides applied on one hectare. ETL for bees has been chosen as the target indicator for pesticides applied in the cotton industry, as bees are a critical provider of pollination services and a key indicator for terrestrial ecosystem health.

The ETL approach also allows us to monitor the hazard to three other indicator species. For example, ETL for algae, an indicator of herbicide toxicity, decreased by 20 per cent in the four years to 2018, and by 75 per cent since 2004. This information can be used to further improve management of pesticide use to avoid resistance and minimise potential environmental impacts.



RESEARCH AND EXTENSION

The industry has invested in **research** including:

- Annually updating the industry's IPM and weed management strategies
- Years of research showing on-farm native vegetation fills a critical gap to support the life-cycle of many beneficial insects and birds that provide pest control services
- Workshops and communication to show IPM plays an essential role in helping growers avoid insecticide resistance and achieve high-yielding cotton.

This has led to **practice changes** including:

- IPM tactics to minimise weeds, diseases and pests
- Pest control decisions based on industry thresholds for pest population and crop damage: 90 per cent of spray recommendations are based on industry thresholds
- Beneficial insects conserved on farm: 91 per cent of farm advisors aim to conserve beneficial insects.



Research into more precise application of chemicals using robotic sprayers that can selectively spot weeds can help reduce the volume and hazard of herbicides.



Independent insight



HOW IS AUSTRALIA MANAGING PESTICIDES?

“Australia is notable for its success in delivering and maintaining significant reductions in insecticide use in cotton production. A key factor in this was the early adoption of Integrated Pest Management (IPM) by Australian farmers which has only increased as growers have seen how effective these techniques are at managing pests. The adoption of IPM has helped prevent secondary pests from becoming a major problem in Australian cotton production – unlike in other cotton growing countries.

That said, it is deeply concerning that Australian cotton farmers continue to use bee-toxic neonicotinoid insecticides. A key priority for the sector must be to ditch these harmful chemicals and adopt less damaging pest management approaches. Further, cotton production in Australia is especially reliant on glyphosate for weed control, with over 90 per cent of cotton planted each year carrying a glyphosate-resistant trait. Much more can be done to reduce herbicide use which has remained stubbornly high.

This will not be easy, and farmers – who are at the sharp end in dealing with environmental challenges from pest problems to climate change – will need help and support from government, research institutes and Cotton Australia itself to meet these challenges.

I am sure that Australian cotton farmers want to do the right thing and the progress they have made in adopting IPM shows what they can achieve when they get the right incentives and support to help them on their way.”

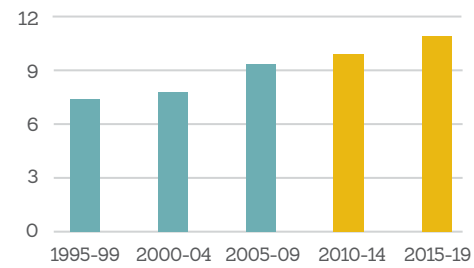
Keith Tyrell
Director,
Pesticide Action Network UK



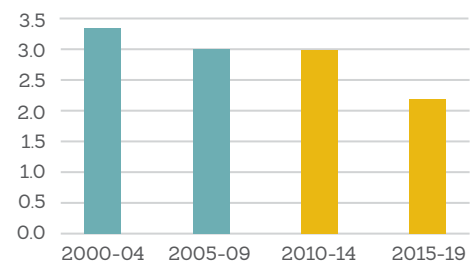
PADDOCK EFFICIENCY | More cotton per hectare

Farmers have sought to increase crop yields for thousands of years. The cotton industry takes the science of farming to a new level by investing heavily in research to increase yields, and working with innovative cotton growers to adopt research and new technologies.

Mean irrigated crop yield (bales/ha)



Mean dryland crop yield (bales/ha)



Data source: rolling five-year average of Australian Cotton Production Forecasts: Cotton Australia.



2014 – 2019 CHANGE

Irrigated cotton yield increased by 9.9 per cent in the last five years, which included a season of severe drought in 2018-19 that delivered a yield 14 per cent below the five-year average. Average dryland cotton yields decreased by 27 per cent when compared with the previous five years. This period included the three hottest and three driest years on record, both of which put stress on plants and significantly reduced both dryland production area and yields.

A long-term trend of increasing irrigated yields is the result of significant effort by the industry. Better water and nutrient management, new cotton varieties, appropriate tillage, and crop rotations are some of the factors that contribute to increasing yields over time.

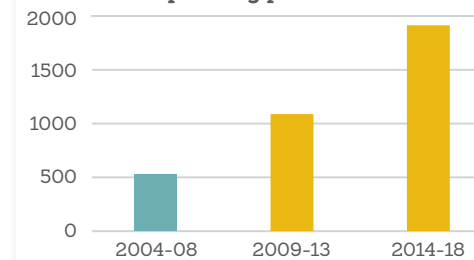


PADDOCK PROFITABILITY | Growing livelihoods

Profitability is a fundamental sustainability indicator for growers. Profitable cotton growers can re-invest in their own business, and contribute to local communities, economies and the environment.



Mean irrigated profit per ha (operating profit \$/ha)



2014 – 2019 CHANGE

In the five years to 2018*, average profitability per irrigated hectare increased 76 per cent. Average profitability per year ranged from \$986/ha to \$2,513/ha – the highest average net profit per hectare in the history of our benchmarking study. Many factors influence the profitability of cotton production. In 2018, most of the key profitability drivers – including high world cotton prices, favourable AUD-USD exchange rates, very high yields and low operating costs – were all in growers' favour. This unusual confluence of events combined to deliver record profits in that year.

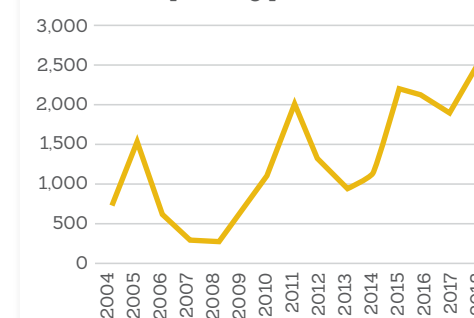
While exchange rates and cotton prices are outside the control of the industry, key drivers of profitability in the top 20 per cent of growers are higher yields and lower expenditure per hectare on costs such as water pumping and labour. Industry investments in research and innovation support higher yields, and lower expenditure per hectare.

Profits vary depending on seasonal conditions, so drier conditions in 2019 and 2020 are likely to see profitability decrease in these years.

Data source: rolling five-year average of Australian Cotton Comparative Analysis.

*Due to a one-year lag in profitability data being published, the 2019 indicator is for the five years to the 2017-18 season. Click [here](#) for published indicator data.

Irrigated profit per ha (operating profit \$/ha)





RESEARCH AND EXTENSION

The industry has invested in **research** including:

- Crop physiology research giving growers options to increase yields in low rainfall years, such as planting every second row to help plants make the most of available moisture
- Breeding programs to create new cotton varieties to increase yield, improve fibre properties and manage disease resistance.

Cotton growers invest directly in research: 35 per cent of growers hosted a research trial on their property from 2013 to 2018, contributing an average of 19 hours and \$5,500 to these trials. In addition, Cotton Seed Distributor's Ambassador Network collects extensive data throughout the season from fields on 76 farms to draw conclusions on best practices that produce the highest yields. Information is extended back to growers through regular crop progress reports.

This has led to **practice changes** covering all aspects of cotton production, including improving:

- Resource efficiency by using less water and energy per bale of cotton
- Soil health and fertility, by improving soil carbon levels and soil structure, and by managing soil nutrients, erosion risks, and soil salinity
- Fibre quality, by having appropriate variety selection and crop management practices to deliver clean white cotton to the gin.

In addition, cotton growers use a sophisticated range of risk management and price hedging strategies to manage price and currency fluctuations and maximise their profitability.



PEOPLE QUALITY OF WORK LIFE | Safe, inclusive, skilled workplaces

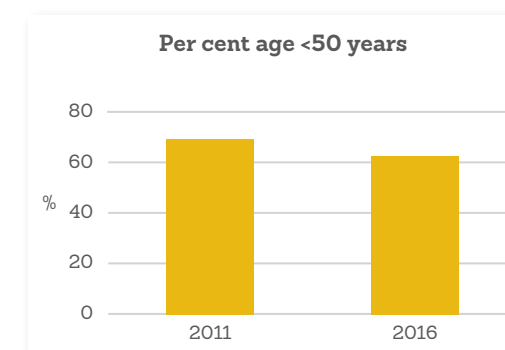
Cotton is grown on up to 1,500 farms depending on the season, mainly in New South Wales and Queensland. Some cotton is grown in northern Victoria and areas for cotton production are being explored in northern Australia. In total, these farms employ an average of 10,740 full-time, part-time and casual employees per year. This does not include extensive use of on-farm contractors. Post-farm gate, the industry directly employs a further estimated 1,700 people in marketing and export, cotton classing and in the 41 regional gins. The industry also supports jobs for agronomists, rural suppliers and other input providers.

Attracting employees is a challenge throughout regional Australia. The cotton industry is working with other sectors to improve the diversity, training and safety of its people, helping to make agriculture an employer of choice. In the cotton industry, building adaptive capacity is a research goal. The industry invests in projects in the key focus areas of science and innovation capability and new knowledge, and futures thinking.

Data for "Diversity of workforce" and "Workforce qualifications and training" is sourced from Australian Bureau of Statistics (ABS) Census data and is collected every five years. There are limitations to Census data – in particular, some people working in cotton as well as other agricultural industries aren't counted as part of the cotton industry, and the Census counts people in August when seasonal employment in cotton is low – but it is the best currently available for these demographic indicators.



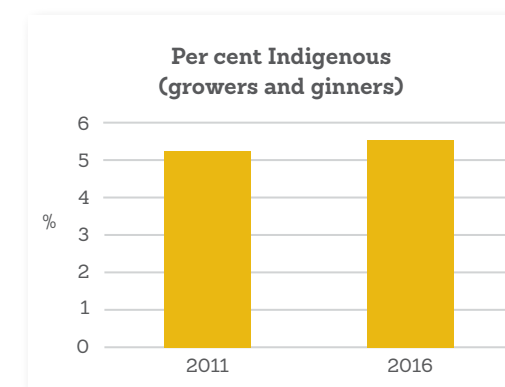
2014 – 2019 CHANGE: Diversity of workforce



Age of people in cotton growing and ginning (Census data 2011 and 2016)

Similar to Australia's workforce more broadly, the cotton workforce is ageing over time but remains younger than the national agricultural average, with 63 per cent of cotton growers and ginners under the age of 50 according to the most recent Census data. Initiatives to encourage young people to join or stay in the industry include:

- The Australian Future Cotton Leaders program, which has been run six times and has about 100 alumni
- Partnerships with start-up companies like Pollenizer, X.Lab, Startup Catalyst, and NSW DPI's The Gate
- Scholarships provided by industry organisations, including Australian Rural Leadership Program and TRAIL; Nuffield Australia; Postgraduate and Summer and Honors scholarships; and the Science and Innovation Award for Young People in Agriculture, Fisheries and Forestry
- Pathways for cotton industry disruptors and entrepreneurs through MIT boot camps.



Percentage of Aboriginal & Torres Strait Islander people in cotton growing and ginning (Census data 2011 and 2016)

The proportion of Aboriginal and Torres Strait Islander people involved in growing or ginning cotton was 5.5 per cent in 2016. This is higher than the national agricultural average of 1 per cent. This is partly due to a relatively higher proportion of Aboriginal and Torres Strait Islander people living in cotton growing regions. Programs are also supported such as:

- The Aboriginal Employment Strategy, a school-based traineeship that ran for 14 years at Wee Waa and Narrabri High Schools. This gave Year 11 and 12 Indigenous students paid work experience, a nationally recognised qualification, credit towards their Higher School Certificate, and exposure to cotton industry career opportunities
- Partnering with the Clontarf Foundation to provide financial support and pathways into employment within the cotton industry.



A SUSTAINABLE FARM IS A PROFITABLE FARM

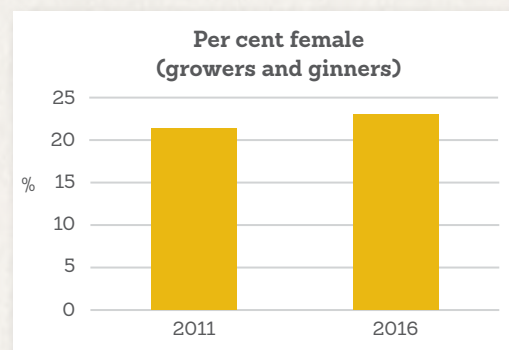
Fifth-generation farmers Andrew and Heike Watson are showing how to run a profitable and environmentally sustainable food and fibre production business. At their cotton, grain and grazing property near Boggabri in New South Wales, the Watsons have targeted reductions in key cotton production inputs to improve profitability while increasing water efficiency, biodiversity and soil carbon.

Central to this has been improving natural habitat. Creating diverse tree, shrub and grass habitat surrounding their fields has provided a breeding ground for ladybeetle, damsel bug and lynx spider populations to manage Helicoverpa and mirids in the cotton crop. It also provides habitat for bird and bat species which can consume up to 50 per cent of pest insects in a crop. The Watsons now use no, or very little, insecticides.

"As the tree belts and shrub vegetation grows and thickens throughout the farm, we have found we are no longer reaching insect pest thresholds that would in the past have indicated a need to spray," Andrew said.

The Watsons also doubled their water use efficiency in the 14 years to 2018 by installing overhead irrigation systems, using soil probes to better predict crop water needs, and taking actions to reduce evaporation and seepage. They have also incorporated chicken manure into their crop nutrition program, to reduce their application of nitrogen fertiliser to about 60 per cent of the industry average.

Together, these strategies are improving the farm's carbon footprint, insecticide use and water efficiency. All of this is being achieved without reducing yields and with an operating cost of production that was 20 per cent lower than the industry average in 2015-16.



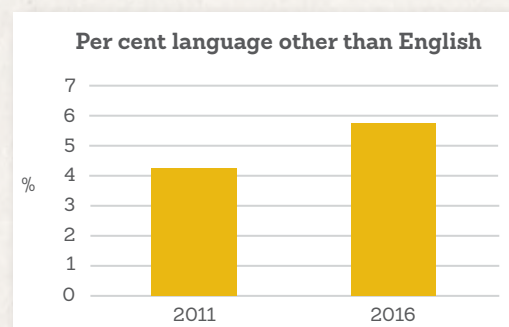
Percentage of females in cotton growing and ginning (Census data 2011 and 2016)

According to 2016 Census data, 23 per cent of cotton growers are female, compared to a national agricultural average of 32 per cent. However, this figure does not accurately represent the true engagement of women in cotton growing, as the Census only includes people who report their primary occupation as cotton growing. This leads to an underestimate of women involved in cotton growing (and in agriculture more broadly) as it excludes women who have both a role in agriculture and another job.

There are also high proportions of women in other industry roles such as research, extension, agronomy and marketing. Across the industry bodies of Cotton Australia, CRDC and CottonInfo, approximately 60 per cent of employees are women.

Research shows 88 per cent of women in an industry role and 86 per cent of women on cotton farms have a post-school qualification.

The cotton industry was a Foundation Partner of the National Farmers' Federation's Diversity in Agriculture Leadership Program in 2018, pledging to support transformational change in the representation of women in Australian agriculture leadership positions.



Percentage of cultural and linguistic diversity in cotton growing and ginning (Census data 2011 and 2016)

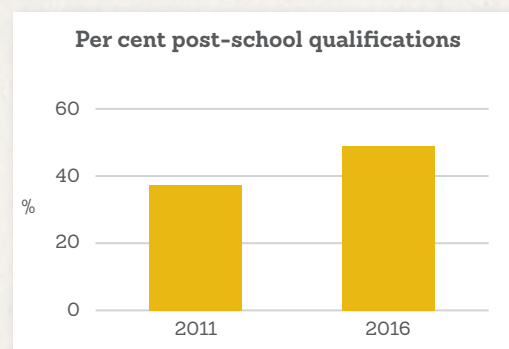
When measured by language other than English spoken at home, cotton's cultural and linguistic diversity is lower than the national average for agriculture: 5.7 per cent compared to 11 per cent. Cotton is grown in regional communities that typically have less cultural diversity than cities, and less diversity than other agriculture sectors like horticulture. A cultural diversity of 5.7 per cent is broadly consistent with the diversity of cotton growing communities.

Data source: ABS Census data (2016 and 2011) – includes growers and ginners.

NB: Census data doesn't capture the full employment picture for the cotton industry. The Census is undertaken in August which is an off-peak period for the cotton industry where seasonal or contract employment is much reduced. Also, not all farmers who grow cotton may 'identify' as a cotton grower, given they grow other commodities (eg grains, beef). This means they may be counted elsewhere in the Census.



2014 – 2019 CHANGE: Workforce qualifications and training



Data source: ABS Census data (2016 and 2011).

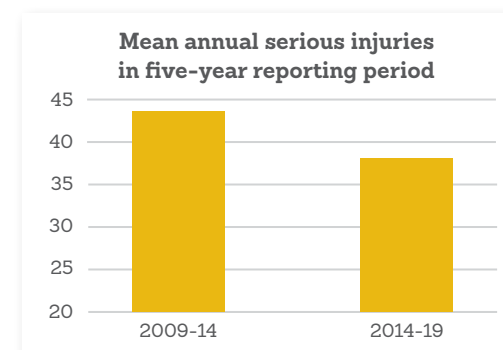
As of 2016, about 49 per cent of cotton growers and ginners had post-school qualifications, compared to the national agriculture average of 43 per cent, according to Census data. The industry supports the University of New England's Cotton Production course, one of the only commodity-specific university courses in Australia. This reflects the specialist nature of cotton production, and the need to invest in building specialist skills.

The proportion of industry workers with post-school qualifications has increased by almost a quarter in the last five years. The ways continual learning is encouraged include:

- Establishing a Cotton Industry Workforce Strategy which helped create AgSkilled, an industry-led vocational training partnership between the NSW Government, and the grains and cotton industries. To date 3,000 grains and cotton growers have participated in 110 training courses across NSW including cotton pest management, soil health, precision agronomy and workplace health and safety
- Supporting 589 cotton growers, researchers, students and industry personnel from 2013-18 through 10 leadership and development programs
- Delivering the Cotton Industry Skills Development Project which provided subsidised, tailored training to 54 cotton workers in 2014-15.



2014 – 2019 CHANGE: On-farm safety



Data source: commissioned research by AgHealth Australia (The University of Sydney). Click [here](#) for published indicator data. Serious injuries are those requiring 5+ days of lost time.

NB: Normally, safety data is reported as a rate of occurrence – for example, serious injuries per 1,000 employees. Cotton's seasonal workforce and changing number of growers makes it difficult to provide an accurate number of workers, so the indicator is total numbers per year.

*Provisional data including unintentional work-related and non work-related farm injury deaths.

Agriculture contributes disproportionately to workplace health and safety incidents across Australia. From 2014 to October 2019, the agricultural sector had one of the highest rates of fatalities and serious injury. During this period, 399 people lost their lives on an Australian farm.*

In the cotton industry, 6 people lost their lives on a cotton farm in Australia from July 2014 to June 2019. The causal factors were aeroplane, farm vehicles and farm machinery. From 2014 to 2019, the annual number of serious injuries in the cotton industry declined by 13 per cent.

Initiatives taken to keep improving farm safety include:

- 33 best management practices standards covering worker health and safety in myBMP. In 2019, 68 per cent of surveyed growers said they had improved workplace health and safety as a result of these modules
- Funding 27 myBMP workplace health and safety workshops in Queensland from 2015 to 2018
- Delivering annual AgSkilled courses in New South Wales since 2017. In the first half of 2019 alone, AgSkilled supported 45 safety courses for the cotton and grain industries across NSW, providing safety training for 299 individuals
- Delivering first aid workshops for growers every year from 2014 to 2019
- Delivering a Look up and Live campaign each season to raise awareness of safety around powerlines in the busy harvest period
- Raising workplace health and safety awareness each season via industry newsletters
- Sponsoring the Queensland Agriculture Workforce Network's series of 16 workplace health and safety workshops in 2017 and 2018 in southern Queensland
- Partnering with nine Research and Development Corporations, including CRDC, in the Rural Safety & Health Alliance to improve rural industries' health and safety record
- Free physical health checks including skin, heart, blood sugar, hearing and eyesight offered to all delegates at the Australian Cotton Conference
- Membership of Farmsafe Australia.

Despite these investments in workplace health and safety programs, the risks leading to death, serious injury and illness in agricultural are well known. More needs to be done to ensure the industry reduces these statistics.



PEOPLE WELLBEING AND SOCIAL CAPITAL | Vibrant regional communities

Cotton is grown in more than 40 rural local government areas, and is a significant economic contributor to 27 of them. Growers make an average of 80 per cent of their purchases locally.

However, the richness of a community is measured in much more than economics. That's why the industry has started to assess wellbeing and social capital in cotton growing regions. Social capital – the social connections, support and networks between people that create communities and provide support – is critical to wellbeing, and in particular to resilience during challenging times. Measuring wellbeing and social capital helps to understand the resilience of farmers and regional communities to adapt to change.

The cotton industry is an important part of cotton growing communities*, but it is only one part. The wellbeing of individuals and communities is the sum of many aspects, some of which the industry can influence to a degree, and many of which are outside its control. Measuring wellbeing and social capital can be difficult, and for this reason is often overlooked. By examining these things the industry is seeking to better understand where there are opportunities for it to contribute to the broader wellbeing of the communities its members live and work in. It is investing in understanding the diversity of human capital, skills development and futures thinking that will ensure Australian cotton is produced to high social and environmental standards.

The industry thinks it's important that it plays its part to measure and improve wellbeing and social capital in cotton growing communities. For this report, data from the University of Canberra's national Regional Wellbeing Survey gives a snapshot of key indicators as of 2018. This is the first time wellbeing in cotton communities has been measured by the industry, and is a starting point. University of Canberra researchers have provided some commentary for the tables on the next page to accompany the wellbeing scores, but it needs to be emphasised this is a first year and more work is needed to understand the context, the impact of drought, and other factors. More work is also needed to confirm if these are the right indicators to be monitoring: indicators need to help the industry understand if and how it can do more to work with government, communities, other industries and individuals to improve the wellbeing and social capital of people and communities where cotton is grown.

INDIVIDUAL WELLBEING (AS AT 2018)



	All farmers	Employed people in cotton growing communities	Cotton growers
Global life satisfaction** (0-100, mean score).	74.5	74.2	77.3
Cotton growers reported slightly higher personal wellbeing and satisfaction than others in their community, and farmers nationally, although not significantly higher. As this survey was conducted in 2018 and wellbeing scores often take two to three years to change, this may have changed due to the severe drought being experienced by most growers.			
Physical health** (per cent reporting very good or excellent health).	49.8	44.4	34.4
Cotton growers are less likely to report very good or excellent health than either other farmers or others in their communities, indicating that despite reporting positive wellbeing, they are experiencing stresses that may be affecting physical health.			
Mental health** (average score for psychological distress using the Kessler 6 psychological distress scale; measured from 6 (very low distress) to 30 (very high distress)).	11.8	12.1	12.0
Cotton growers on average report similarly low levels of psychological distress compared to other farmers and others living in cotton growing communities. However, this data is based on a relatively small sample of cotton growers, with a goal of increasing the sample in subsequent reporting years to check whether this average is representative of all cotton growers.			

COMMUNITY WELLBEING

	All farmers	Employed people in cotton growing communities	Cotton growers
Community Wellbeing Index** (1-7, mean score).	5.4	5.4	5.0
Cotton growers rate their community's wellbeing as lower than others living in cotton communities, and are more pessimistic about their community's ability to cope with change. This may be a 'lead' indicator of stress for communities experiencing effects of poor seasons, with this affecting those most directly connected to cotton growing before others experience decline in community wellbeing.			

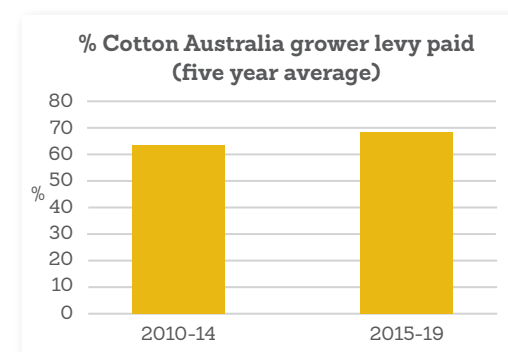
COMMUNITY CONTRIBUTION

	All farmers	Employed people in cotton growing communities	Cotton growers
Community involvement** (1-7, mean score).	3.8	3.7	4.4
Cotton growers are more likely to be involved in their community (attending community events, meetings, or taking part in sports groups) than others living in the region, and farmers nationally. This is backed by cotton grower surveys which show growers strongly contribute to their communities through supporting local events: 90 per cent of growers reported being involved in at least one community activity in 2019.			

Data source:

* A "cotton growing community" is defined as a Local Government Area where cotton contributes 10 per cent or more of its local crop value, as measured in the 2016 ABS Agricultural Census.

** CRDC-funded analysis of the University of Canberra's Regional Wellbeing Survey 2018.



Data source: rolling five-year average.
Click [here](#) for the most recent CA Annual Report.

INDUSTRY CONTRIBUTION

Australia's Rural Research and Development Corporations – which includes CRDC – collect a compulsory levy to allow Australian government and primary producers to co-invest in research, development and extension. The \$1.50 per bale levy to the industry's peak representative body, Cotton Australia, is voluntary. A high contribution rate indicates a high level of commitment to the industry's broader wellbeing.

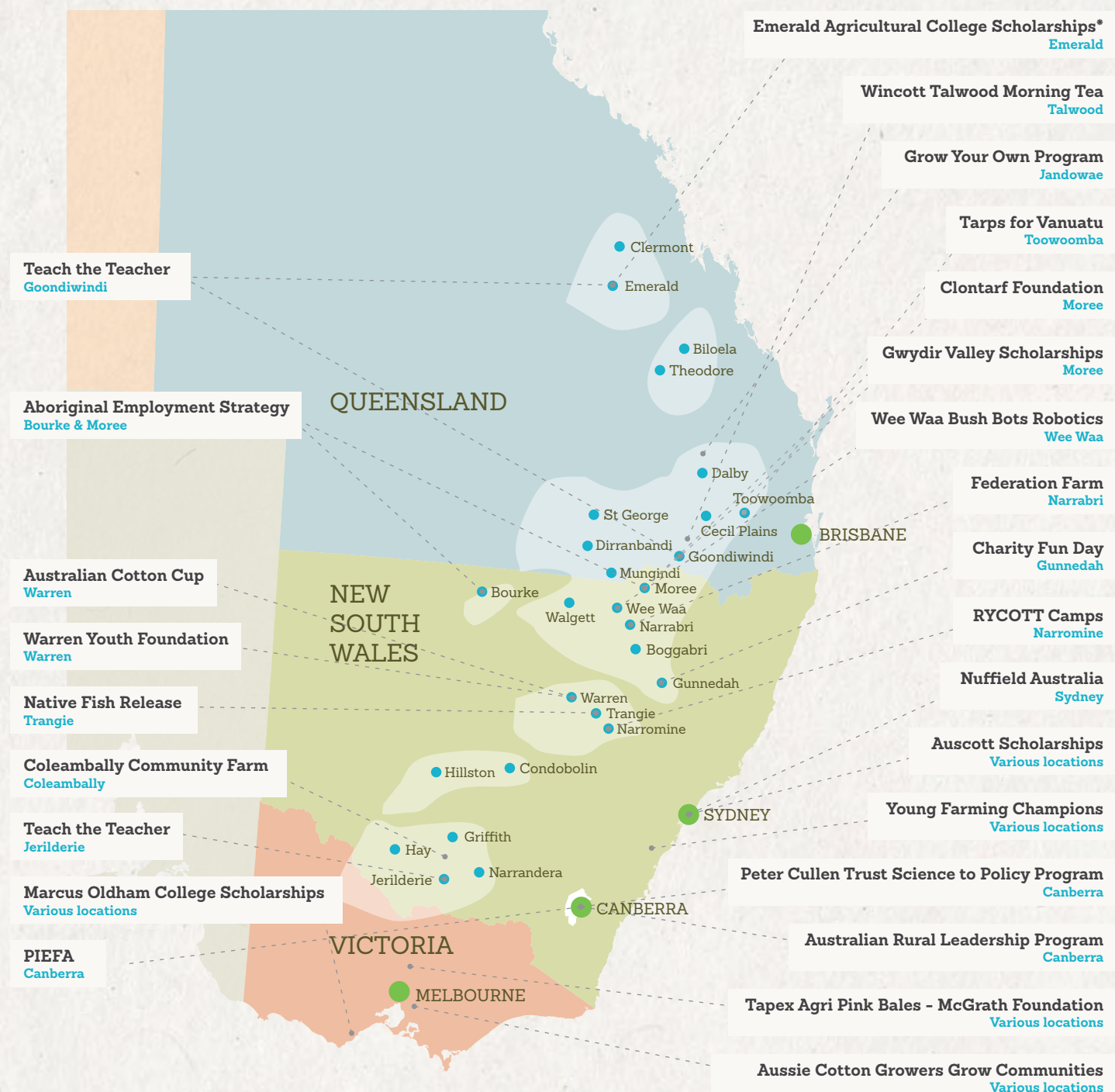
More evidence of a highly-engaged industry is participation in industry-wide events such as the biennial Cotton Conference which attracted over 2,460 delegates in 2018, including about 45 per cent of all growers. The Australian Cotton Conference is one of the largest conferences of any agricultural industry in Australia.

SOCIAL IMPACT PROJECTS

A SNAPSHOT

In common with other agriculture sectors, people in Australia's cotton industry invest heavily in the social fabric of their communities. Some projects are driven by the industry, but many are the work of local individuals, groups or companies.

These are just some of the social impact projects taking place in the Australian cotton industry.



Colleambally Community Farm

Established by locals to give community groups the opportunity to grow crops for fundraising, this community farm has returned more than \$2 million to local schools, service clubs and sporting clubs since 1997.



Native fish release

The Macquarie Cotton Growers Association, together with local councils and the state government, have released more than 200,000 native fish fingerlings over the past 20 years. This annual event is just one of the projects industry and groups take to boost native fish populations and raise awareness of the importance of river health.



Why are these cotton modules pink?

Manufacturers of round module bale plastic, Tama Australia, have partnered with McGrath Foundation to produce pink round bale wrap. In addition to raising breast cancer awareness, the partnership has donated over \$160,000 to McGrath Foundation since 2014.

GLOBAL SUSTAINABLE COTTON LEADERSHIP

The Australian cotton industry’s vision is to be a leader in global sustainable cotton production. But a rising tide lifts all boats, so the industry works to promote the production and consumption of sustainable cotton around the world.



The **Better Cotton Initiative (BCI)** is the largest cotton sustainability program in the world. Its members span the global cotton supply chain from farmer organisations through to retailers and brands. Together with partners like Cotton Australia, it provides training on more sustainable farming practices to more than two million cotton farmers in 21 countries. Cotton produced under the Australian myBMP certification can be sold into the global market as Better Cotton.



Cotton LEADSSM is Cotton Australia’s partnership with the US cotton industry. Its goal is to promote the use of responsibly produced cotton, by providing evidence of best practice cotton production and traceability in the supply chain. Cotton LEADSSM connects businesses across the global supply chain to support sustainability efforts that improve cotton around the world.



The Expert Panel on the Social Environmental and Economic Performance (**SEEP**) of Cotton Production is an advisory body of the International Cotton Advisory Committee. CRDC took a lead role in SEEP to prepare a **guidance framework** for measuring sustainability in cotton farming systems globally. This is now being expanded to develop common indicators to monitor progress towards Sustainable Development Goals for cotton and coffee globally.

Supporting Better Cotton in Pakistan

In Pakistan, a partnership between the Australian cotton industry, the Australian Government, the Better Cotton Initiative, and supporting global brands saw approximately 200,000 cotton growers receive vital training to improve sustainable practices including pesticide use, water efficiency and working conditions. Once trained and licenced, Pakistani growers can sell their fibre as Better Cotton into the world market. This is a remarkable public-private partnership to deliver good.

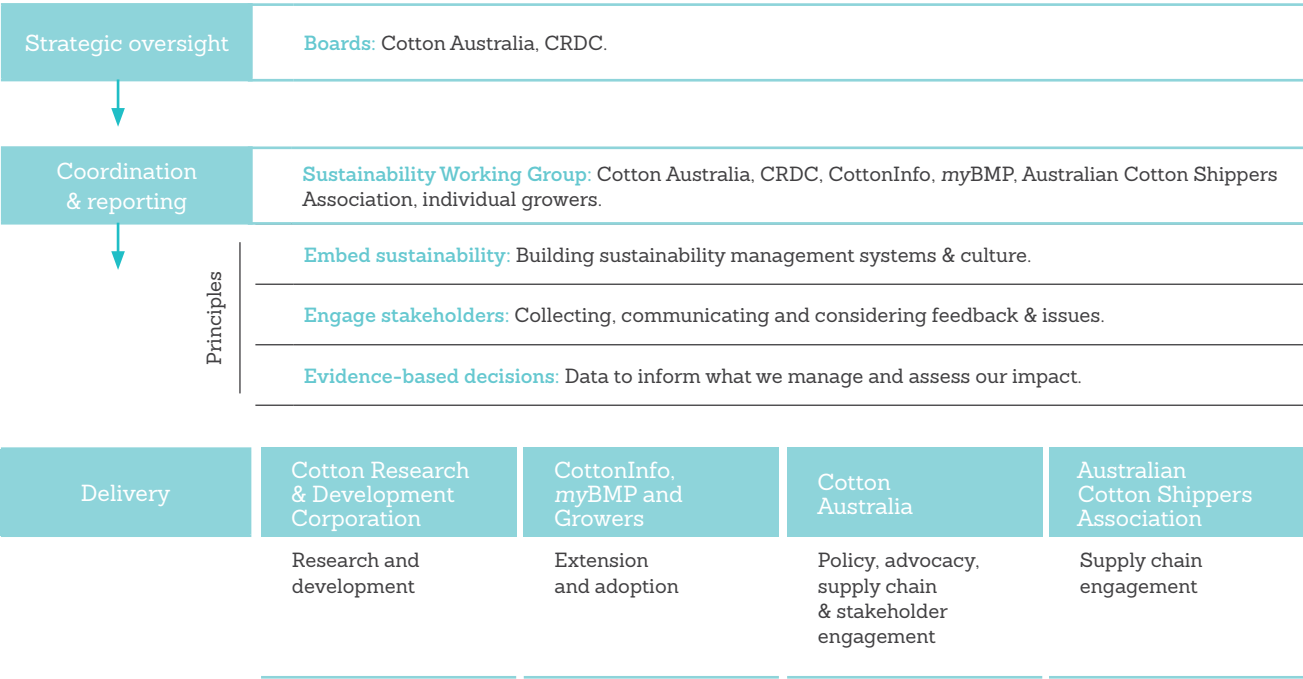
“We were able to visit Australia to learn how the Australian cotton growers can achieve some of the highest crop yields in the world, and at the same time reduce their pesticide and other input usages to a very low level. Thank you very much Australia.”



Bilal Khan (far right). Cotton grower, Pakistan, and member of the BCI Council, representing Farmers Associates Pakistan.

GOVERNANCE

The Australian cotton industry has formed a Sustainability Working Group (SWG) to coordinate its work to become a global leader in sustainable cotton production. The SWG is comprised of industry representatives and reports to the Boards of Cotton Australia and CRDC.



COMPLIANCE

Australia’s cotton industry is regulated by a strict legislative framework which is applied at federal, state and local government levels. Legislation affects all aspects of cotton farming operations, including but not limited to:



- Recruitment and conditions of employment for staff and contractors and the protection of their safety
- Minimum rates of pay
- Management of irrigation water from dams and underground supplies
- Application of pesticides
- Storage and handling of pesticides and petrochemicals on-farm
- Licencing arrangements for access and use of transgenic traits including strict planting windows and pre-emptive resistance management
- Management of trees and native vegetation.

myBMP helps Australian cotton growers keep track of their legal obligations in operating their farm businesses. Of the more than 300 ‘check’ items used as evidence of industry best practice, around 150 provide evidence of legal compliance. Practices are then audited for myBMP certified farms. myBMP is promoted and well-supported by on-ground staff. It is also recognised under a number of global sustainability standards, and has been recognised in the Australian Human Rights Commission’s 2015 report Promoting Positive Practice.

