COTTON AUSTRALIA

CRDC
COTTON RESEARCH AND DEVELOPMENT CORPORATION

AUSTRALIAN COTTON SUSTAINABILITY TARGETS

STAKEHOLDER CONSULTATION REPORT EXECUTIVE SUMMARY - DECEMBER 2020

SUSTAINABLE AUSTRALIAN COTTON
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Australian cotton sustainability targets and indicators: stakeholder consultation report.

Executive summary.

December 2020.

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Australian cotton's emerging sustainability targets

The Sustainability Working Group (SWG), on behalf of the Australian cotton industry, has used a materiality process and data from five-year sustainability reporting from 2014 to 2019 to set draft sustainability targets to 2029. Draft targets, and indicators of progress, were developed by growers, scientists and industry experts

In a stakeholder consultation process during July and August 2020, the SWG sought stakeholder feedback on these draft indicators and targets to validate the level of ambition, to test they are the 'right' ones to use, and to elicit suggestions for partnerships and solutions to achieve targets.

A total of 356 stakeholders from inside and outside the industry provided feedback.

As outlined in the consultation process, the SWG and industry experts considered this stakeholder feedback, and have revised several of the draft targets and indicators on the basis of this feedback. This report provides an update on the Australian cotton industry's emerging sustainability targets as a result of this consultation: industry response to the main feedback themes, what the revised draft targets look like, and industry's plans to achieve the draft targets.

As also described in the consultation process, other primary industries such as grains, beef and sheep are also developing or have in place their own sustainability frameworks. Because cotton growers also farm crops and often livestock as well, the cotton industry is working with other industries to have sustainability metrics and methodologies that are as consistent as possible across broadacre industries.

For some PLANET. PEOPLE. PADDOCK. sustainability topics like carbon footprint, biodiversity and soil health, these common metrics and data collection methodologies don't yet exist and need to be agreed before targets can be set for the industry. Because these are complex areas involving several industries, this work is taking time to get right. Targets will be launched when this work is finalised, which will be some time yet.

In the meantime, the industry is not waiting for targets to be launched to act: it is providing stakeholders with this update, and ongoing work to improve its sustainability performance will continue to be delivered through existing industry programs such as *my*BMP, CottonInfo and focused R&D investments.

Context

The Australian cotton industry has been actively working to run efficient cotton farms while creating environmental, economic and social value for over 30 years. Setting targets is a continuation of this process. The PLANET. PEOPLE. PADDOCK. sustainability framework has been created to coordinate a whole-of-industry strategy to achieve targets.

These targets are genuinely bold, and will stretch the industry to achieve them, especially in areas where dramatic gains have already been made over the past 30 years or where factors outside the industry's control impact targets. There's a very important balance to achieve. The industry understands growers and the industry may face criticism for falling short of difficult targets, and external stakeholders don't want easily achievable targets that require no more than business-as-usual practices.

These draft targets are a starting point to get that balance right. They are based in science, and the Australian cotton industry will seek to frequently and transparently engage with stakeholders on actions and progress towards them. Targets may be refined or new ones may emerge in the future, in consultation with stakeholders, as the Australian cotton sustainability journey evolves.

What stakeholders told us: be bold, be credible, be collaborative

Responses showed stakeholders were broadly supportive of draft targets. Typically, about 80% of stakeholders viewed each target as the right level of ambition, and a proportion of stakeholders viewed the target as too ambitious or not ambitious enough.

Attached to this support though was a strong need to provide context to give ongoing confidence to stakeholders the target is appropriate. This includes spelling out where the industry has come from in relation to its performance on each target, and just as importantly, where it needs to get to: what is the end outcome, or the best possible long-term goal for each target area.

Stating an end-goal also provides the industry with the platform to be truly bold and logical at the same time: what are the environmental boundaries the industry needs to operate within; what are the ideal social outcomes that will benefit the industry and rural communities; what does the farm and regional economy of the future need to look like?

In addition to this broad endorsement of targets, a number of other themes were evident in stakeholder responses:

- Credibility: Each target needs a clear and achievable plan to give stakeholders confidence it can be achieved, clarity on what the outcomes will be, and trust that what is being reported is accurate.
    - Industry response: Each target area has a pathway for achieving targets. Pathways are based on existing industry strategies and plans; potential new actions will be identified as needed to achieve targets.
- Collaboration: A lot of people in a lot of agriculture sectors are doing a lot of work across the sustainability topics; the cotton industry will achieve much more by working with growers, other industries, government, non-government, commercial, research and other organisations than it will ever achieve on its own.
    - Industry response: Each target pathway identifies potential organisations for collaboration, many suggested by stakeholders.
- Coordination: The amount of work being done by other people, including by other industry sustainability frameworks, makes coordination essential to avoid duplication and confusion.
    - Industry response: The SWG is working with other industry sustainability frameworks and organisations to increase alignment of indicators and work programs where feasible.
- Regional variation: Reporting industry scale data to show progress towards industry targets makes sense, but reporting on a regional basis to account for regional variations – especially the differing environmental conditions of each region – will make the targets more meaningful for growers and external stakeholders.
    - Industry response: Each target area has identified where it is feasible to report by regions, in addition to aggregating data at the industry level.
- Whole farm systems: Target areas are closely integrated – work to achieve one target may have positive and negative impacts on others. Moreover, consultation is increasingly pointing to the need to shift from thinking about cotton's sustainability in isolation, to its role in contributing to a sustainable farm business.
    - Industry response: Positive and negative impacts on other targets were considered as part of the validation process. These impacts need to be continually considered when communicating the context around targets, and when identifying on-farm practices to target for change.

Stakeholder feedback: themes and industry response

Qualitative feedback from stakeholders was grouped into themes and is summarised here in order of the number of stakeholders who raised each theme.

Frequency of themes is one way of prioritising their importance; another method taken into account when developing responses is to assess the expertise of stakeholders. For example, an environmental NGO will have more knowledge and influence on environmental targets than a health and safety expert would, and vice versa. Incorporating the relative influence of stakeholders is, however, a subjective process and often does not bring clarity to responses; two subject matter experts may have differing views on the ambition of a target or the best indicators to measure progress. This point is made to highlight:

- how difficult it is to arrive at targets and indicators all stakeholders will support, and;
- the importance of ongoing and transparent communication with stakeholders as to why decisions are made, and a genuine commitment to engagement with stakeholders to ensure their voices are heard and considered.

Summary industry responses to key stakeholder feedback themes is provided in the following table.

PLANET: WATER

Draft five-year target: **Increase cotton water use efficiency by 12.5%**
Stakeholder rating on level of target ambition: **16% too high; 79% right; 5% too low**
Measure: Gross Production Water Use Efficiency (ML/bale)
Qualitative feedback:

Feedback themes (frequency)	Industry response
Target should be lower (30)	Industry acknowledges the target is a real stretch, but considers it can be achieved by ongoing industry and commercial investment in the many factors that drive water use efficiency. It is challenging, however, and industry may fall short of this ambitious target; efforts to improve water use efficiency need to be clearly communicated to stakeholders to show how difficult it is and the intent to achieve this target.
Target should be higher, and/or consider total water use and other indicators (26)	Industry acknowledges some stakeholders would like to see a target that reduces water consumption. In sustainability frameworks, water reduction targets aim to be within planetary boundaries: the level of freshwater use that reduces the risk of large scale environmental changes. In effect, this is what already happens in Australia's cotton growing regions, with the Murray Darling Basin Authority setting sustainable diversion limits each year based on seasonal flows. Within this regulatory framework that already aims to deliver sustainable freshwater use within healthy river systems, the cotton industry's view is its role is to maximise the efficiency of every drop of water. This is what the target aims to do. The industry also supports improved government monitoring and compliance of water use.

	For further transparency, industry will report additional metrics on water efficiency, provide links to publicly available government data on: • total water use – covering environmental, human, and agricultural volumes – within cotton-growing catchments • compliance breaches within cotton-growing catchments. Additional context will also be provided in sustainability communications to show why the target is indeed ambitious and a stretch. This is primarily because of the physiological limits of the cotton plant; the 2029 water use efficiency target is very close to the maximum theoretical water use efficiency level, and achieving this level of efficiency across hundreds of farms is extremely difficult.
Target is right (10)	Noted.

PLANET: CARBON FOOTPRINT

Draft five-year target: **No target, but stakeholders were asked to provide feedback on a potential carbon neutral target**
Stakeholder rating on level of target ambition: **15% too high; 73% right; 12% too low**
Measure: tCO_2e, Nitrogen Use Efficiency (kg lint / kg N)
Qualitative feedback:

Is it achievable? (15), it is achievable (14), get the methodology right (8), consider soil and water impacts on sequestration (9), other comments (6), take a whole of agriculture approach (3)	The key to achieving carbon neutrality is accurately and credibly measuring emissions and sequestration at scale. Industry is participating in a cross-sector project to accurately and credibly measure whole-farm emissions. When the agreed national agriculture methodology is agreed, baselines will be established. This will give a clear understanding of the technical feasibility of carbon neutrality, and the pathways required to achieve it. In the meantime, industry will continue with its existing work to improve nitrogen use efficiency, encourage renewable energy, and enhance soil health and biodiversity.
Measure the full life cycle of carbon emissions (5)	As a starting point, the industry is likely to set the boundary as being the production and transport to port of a bale of cotton. The boundary may extend further in time.
Not relevant (5)	Industry's view is taking action to reduce its carbon footprint is needed.
Work to reduce fertiliser impact (3)	Industry is working to improve nitrogen use efficiency to reduce emissions and potentially reduce grower costs.
Focus on renewable energy and energy efficiency (3)	Nitrogen is the biggest focus area because it is the biggest contributor to cotton's carbon footprint, but work to encourage renewable energy and energy efficiency is important and ongoing.

PLANET: BIODIVERSITY

Draft five-year target: **No target set: pending development of an agreed methodology and metrics for biodiversity on farms**
Stakeholder rating on level of target ambition: **n/a**
Measure: n/a
Qualitative feedback:

Consider measuring soil biodiversity (11)	Soil biota is addressed within the Soil Health target.
Consider measuring fish impacts / river health (11)	Fish protections are being addressed by planned CRDC research. River health will not be a specific indicator for now, due to the difficulty of accurate measurement, the number of other factors and industries that impact river health, and the role of government in monitoring river health. The industry's focus on protecting riparian zone vegetation, improving soil health, and reducing the environmental impact of pesticides are all on-farm actions that should contribute positively to river health.
Consider measuring fauna, including insects (8)	Birds and bats are proposed to be measured via an existing CRDC project; if better ways to measure fauna can be identified, such as by using simple 'citizen science' monitoring, these will be considered.
Extend the focus beyond the riparian zone (5), including native vegetation connectivity (3) and wetlands (3)	Revised targets and indicators now have equal emphasis on riparian and non-riparian ecosystems, although it should be noted most identified priority biodiversity areas are within the riparian zone. Ideally, priorities will be identified and change reported at a regional level to account for regional variations, and aggregated to the industry level. The feasibility of doing this needs to be confirmed with other stakeholders.
Ensure change in condition is measured, not just change in area (4)	Industry is working with other stakeholders to develop consistent whole farm measures of condition. The industry hopes to plan, measure and report changes at the regional level if it is feasible to do so, and to aggregate this information at the industry scale.

Include pollinator vegetation (4) and practice changes to support biodiversity (3)	Each of these are included, to varying extent, in the *my*BMP Sustainable Natural Landscapes module.

PLANET: PESTICIDES

Draft five-year target: **Reduce the environmental impact of pesticides by 5%**
Stakeholder rating on level of target ambition: 4% too high; 76% right; 20% too low
Measure: Environmental Toxic Load (ETL) – bees and algae
Qualitative feedback:

Target should be higher (25) or more context is needed to know if the target is the right level (4)	Industry acknowledges the Pesticide target appears low compared to other Australian cotton sustainability targets, but industry expert advice is that a 5% target is a real stretch given the very significant reductions made over recent decades, and will be very difficult to achieve if there are unexpected events such as new pest incursions. Industry acknowledges this is a complex area, and will aim to provide clear and sufficiently detailed context for stakeholders to make an informed view of the ambition of the target and actions to reach it. Additional indicators on the uptake of Integrated Pest Management will be provided when reporting to give extra context.
Target is the right level (7)	Noted.
Other methodologies should be considered as indicators (5)	Initial comparisons of other methodologies suggested ETL was most appropriate for cotton. As part of the pathway, industry aims to benchmark ETL against other methodologies over the next 18 months, and assess the results then.
Target should be lower: is it achievable? (3)	The risk of not meeting this target is real and accepted by industry. Industry will be very clear in communications about this possibility, and transparent in its actions to achieve the target so that stakeholders can clearly see the reasons why if the target is missed.

PLANET: SOIL HEALTH

Draft five-year target: **No target set: pending development of an agreed methodology and metrics for soil health on farms**
Stakeholder rating on level of target ambition: **n/a**
Measure: n/a
Qualitative feedback:

Different / additional indicators are needed (16), Is it achievable / can it be measured (11), other comments (16)	Measuring soil health at the regional and industry scale is difficult, and industry acknowledges there are many views on how, or even if, this can be done. Industry will work with government, natural resource groups, growers, and other stakeholders to attempt to reach agreement on the main components of soil health that can be pragmatically measured at industry scale for greatest impact. Baselines and targets will be set at that point.
Support measuring soil carbon (5)	The ability to measure soil carbon at industry scale will be an important part of ongoing discussions.
Support using VSA (5), include other farming system impacts like compaction (3)	The ability to measure soil structure at industry scale will be an important part of ongoing discussions. This includes compaction, which was identified by several stakeholders as an important contributor to soil health.

PEOPLE: WORKPLACE

Draft five-year target: **Safety: 0 fatalities, 30% decrease in serious injuries. Diversity and training: no target set pending industry workplace strategy to be finalised in 2021**
Stakeholder rating on level of target ambition: **n/a**
Measure: Safety: fatalities; serious injuries. Diversity: Age, gender, Aboriginal and Torres Strait Islander, cultural and linguistic diversity. Training: Post-school qualifications.
Qualitative feedback:

Feedback themes (frequency)	Industry response
Indicators are appropriate (14)	Noted.
Safety target should be higher or lower (11)	The safety target of 30% reduction every five years remains as it is consistent with Australia's national workplace safety strategy, but a long-term goal of cotton farms being free of serious injuries has been added; this may not be achievable in the near term, but it signals what industry should be aiming for.
Indigenous diversity in the industry is important (8)	Plans for Aboriginal and Torres Strait Islander participation will be part of the industry's revised workplace strategy, to be finalised in 2021.

'Training' should capture additional data, especially on-farm training (7)	Training data is currently based on the Census; the limitations of this are acknowledged, but the ability to accurately capture additional training data has real challenges. Industry will continue to explore solutions to this. Targets for training will be informed by the industry's workplace strategy, to be finalised in 2021, and the National Agriculture Workforce Strategy, expected to be released in 2021.
'Age' shouldn't have a target – people of an older age have a lot to offer the industry (5)	The indicator has been changed to reflect the value of a diversity of age groups. A target will not be set for age.
'Gender' percentages don't accurately reflect the shared roles of women and men in farming (4)	This limitation of Census data is noted. Notwithstanding the challenge of sourcing accurate data on the number of women in the industry, the industry is including plans for gender participation in its workplace strategy.
A strategy is needed before targets can be set (3)	Noted. The industry's workplace strategy is being updated, and will be finalised in 2021.
'Cultural diversity' (2)	The proportion of industry workforce from non-English speaking backgrounds is currently in line with the cultural diversity of the regions in which it operates.

PEOPLE: WELLBEING

Draft five-year target: **No target; target to be consistent with Australian agriculture aspirations, when defined**
Stakeholder rating on level of target ambition: **n/a**
Measure: Global life satisfaction; Physical health; Mental health; Community wellbeing; Community involvement
Qualitative feedback:

Focus on mental health (7), set bold targets (3), many wellbeing drivers are outside cotton's influence (3), inherent uncertainty in farming impacts wellbeing (3), community involvement is important (3), other (7)	The diversity of comments reflects a general desire to see wellbeing included, and uncertainty on how the cotton industry should best address it. The industry plans to work with other stakeholders – government, other industries, community and individuals – across cotton growing communities to develop a coordinated and collaborative strategy (or region-specific strategies) to contribute to wellbeing. There are many wellbeing factors the cotton industry can't influence; this strategy needs to make clear everyone has a role to play in wellbeing, and make everyone's role clear. With a strategy in place, the cotton industry can then understand how to best contribute to improved wellbeing in cotton communities.
Good start (14).	Noted.

PADDOCK: PRODUCTIVITY

Draft five-year target: **Increase irrigated cotton yield by 15%**
Stakeholder rating on level of target ambition: 20% too high; 77% right; 3% too low
Measure: Yield (bales/ha)
Qualitative feedback:

Feedback themes (frequency)	Industry response
Too ambitious (18), right level of ambition (10), consider the impact of yield on other sustainability targets (9), not ambitious enough (2), factor in regional variation (2).	While the draft indicator and target was supported by about 75% of respondents, industry acknowledges a number of stakeholders are concerned the yield target may only be reached at the expense of unsustainable inputs, or at the expense of quality (noting that Australian cotton is recognised as a world leader in cotton). Some also suggested land use efficiency (bale/ha – the inverse of yield) is a better indicator in a sustainability framework. Others also pointed out that increasing yields of cotton does not necessarily imply 'efficiency'. Industry has considered this feedback and is: • Renaming this target area from "Efficiency" to "Productivity" to more accurately reflect the intent of this target area • Maintaining yield as an indicator, as it's the common metric that all growers understand and is an important indicator of other sustainability factors such as soil health. "Land use efficiency" also implies to some people no additional land will be used for cotton production; this is not a perception industry wants to set because individual farmers around Australia choose what to do with their land, and the area used for cotton production may increase in future. In the interests of clarity, this indicator is called what it is most commonly known as: yield. • Reducing the yield target from 15% to 12.5% increase per five years, to be consistent with the water use efficiency target and to send a clear signal to stakeholders the industry's focus is on

	encouraging farming systems that are highly productive without putting stress on environmental and grower health. • Providing context on quality when reporting to show increased yields are being achieved without impacting quality.

PADDOCK: PROFITABILITY

Draft five-year target: **Increase irrigated cotton profitability by 15%**
Stakeholder rating on level of target ambition: 20% too high; 77% right; 3% too low
Measure: Operating profit ($/ha)
Qualitative feedback:

Too high / impacted by factors outside of control (9), should not be achieved at the expense of other sustainability targets (4), use a different indicator or measure on a whole farm basis (3), too low (3)	Industry supports the view that profitability should be measured on a whole-farm basis, to provide a better indication of the financial sustainability of the whole-farm business. The indicator will also be changed to rate of return on capital, to be consistent with other sustainability frameworks like beef. An appropriate data source for this indicator is currently being identified.

What the revised targets and indicators look like

Water

Why this is a priority	Goal	Draft five-year target	Indicators	2014	2019 baseline	2024 target	2029 target
Water is finite and essential for plant growth. Growing more cotton with every drop of available water has been an industry focus for decades.	Continuous increase in efficiency of water available for cotton irrigation, within sustainable river system and plant physiology limits.	Increase irrigated cotton water use efficiency by 12.5%	ML / bale GPWUI	0.91	0.83	0.71	0.63
Water is a highly regulated natural resource in Australia, 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 also scarce. In some years, there is no allocation of water to irrigators. *While dryland (rain-grown) cotton crops are successful in some regions and seasons, irrigation enables high-yielding cotton to be grown in a wider range of regions more of the time. 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). In other words, compared to 1992, Australian cotton growers in 2019 were using almost half as much water to produce a bale of cotton, or producing almost twice as much cotton from a ML of water. The five-year target seeks to maintain this long-term trend in efficiency. With such significant gains already made, achieving this target is possible but will become increasingly difficult over time.*			Additional indicators for context: • Bale / ML GPWUI • Total Murray Darling Basin diversions per year • Link to publicly reported water compliance breaches	1.1	1.2	1.41 - -	1.59 - -
Pathway: Reduce losses in storage and transmission - Increase precision in application - Extension and adoption of practices to reduce losses and improve application							

Carbon footprint

Why this is a priority	Goal	Draft five-year target	Indicators	2014	2019	2024 target	2029 target
Climate change is likely to impact cotton production, and the production of cotton creates greenhouse gases.	A carbon neutral cotton industry, if technically feasible. Cross-sector research currently taking place aims to answer this.	2024 and 2029 targets to reduce cotton's carbon footprint will be informed by research.	Net CO_2e emissions (kg/bale) to grow, gin & ship to port	-	-	TBA	TBA
Cotton production emits about 0.2 per cent of Australia's greenhouse emissions. In the five years to 2019 the amount of emissions per bale increased by 12.5 per cent due mainly to an increase in the application rate of nitrogen fertiliser; however, because less bales were grown due to relatively drier conditions, in the same period the industry's total greenhouse emissions actually reduced by 10 per cent. This shows the importance of a per bale indicator to provide meaningful context. *Emissions are one side of the carbon footprint; on the other side, farms sequester and store atmospheric carbon in soil and vegetation. The industry aims to measure the amount of carbon stored on farms to be able to report its net carbon emissions.* *A credible, accepted methodology to measure farm emissions and sequestration at industry scale is fundamental to be able to establish accurate baselines, set targets, and develop pathways to achieve the targets. Cross-sector research to do this is ongoing. In the meantime, the cotton industry is continuing its existing work to reduce its carbon footprint.*			Additional indicators for context: • CO_2e emissions (kg/bale) • CO2e sequestration (kg/bale) • Increase nitrogen use efficiency (kg lint / kg N)	324 n/a 10.0	364 n/a 8.0	- - -	- - -
Pathway: Improve nitrogen use efficiency - Reduce energy emissions - Increase native vegetation sequestration							

Pesticides

<table>
<tr><th>Why this is a priority</th><th>Goal</th><th>Draft five-year target</th><th>Indicators</th><th>2014</th><th>2019
baseline</th><th>2024
target</th><th>2029
target</th></tr>
<tr><td rowspan="2">Pesticides (including insecticides and herbicides) are used to control crop losses from pests. Incorrect or over-use can impact human and environmental health.</td><td rowspan="2">Pesticide use that supports optimal crop production while having the smallest possible impact on human and environmental health.</td><td rowspan="2">Reduce the environmental impact of pesticides by 5%</td><td>Environmental Toxic Load score for bees</td><td>11.0</td><td>9.0</td><td>8.6</td><td>8.1</td></tr>
<tr><td>Environmental Toxic Load score for algae</td><td>148</td><td>119</td><td>113</td><td>107</td></tr>
<tr><td colspan="3" rowspan="4">Pesticides are widely used in agriculture to control crop losses from pests. Australia has a world-recognised and respected, scientifically proficient regulator that assesses all products for their safety to humans, off-target species and the environment before they are registered for use in Australia.

Through sustained research, the adoption of Bt transgenic cotton and the adoption of Integrated Pest Management, the industry has significantly reduced the impact of pesticides used in cotton over the past two decades. The downside of this success is that further reductions are much harder, particularly if new pests or other unexpected scenarios emerge. Reducing pesticides may also have negative impacts in other areas; for example, reduced herbicide use to control weeds would likely increase tillage, which would likely have negative impacts on soil carbon, soil moisture and fuel use.</td><td>Other indicators for context: % growers using IPM practices
• Recommended thresholds are used</td><td>-</td><td>97</td><td>-</td><td>-</td></tr>
<tr><td>• Beneficial insects are conserved whenever possible</td><td></td><td>96</td><td></td><td></td></tr>
<tr><td>• Insecticide Resistance Management Strategy is followed</td><td></td><td>89</td><td></td><td></td></tr>
<tr><td colspan="8">Pathway: More tools (new chemicals, targeted application, novel control methods) - R&D for Better decision-making - Extension of tools and decision-making.</td></tr>
</table>

Soil health

<table>
<tr><th>Why this is a priority</th><th>Goal</th><th>Draft five-year target</th><th>Indicators</th><th>2014</th><th>2019</th><th>2024
target</th><th>2029
target</th></tr>
<tr><td>Healthy soil is the starting point for productive agriculture.</td><td>Deliver sustained cotton production quality and productivity improvements by improving soil health.</td><td>To be determined, when nationally consistent soil health indicators are in place.</td><td>Potential indicators:
• Change in ground cover (in cropping fields) and physical, chemical or biological soil properties.</td><td>-</td><td>-</td><td>TBA</td><td>TBA</td></tr>
<tr><td colspan="3">Soil carbon and organic matter supply nutrients for plant growth, and soil microorganisms 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.

Soil health is complex, difficult to measure at industry scale, and very difficult to boil down to a small number of indicators. In addition, soil used to grow cotton is also used to grow other crops, and in many cases is used to grow pasture for livestock. For this reason, soil health targets and ultimate goals for cotton need to be consistent with those of other broadacre agriculture sectors and governments. This consistency does not yet exist. The industry aims to work with others to develop nationally consistent indicators and a methodology for measuring soil health. Targets and indicators can then be developed.</td><td>Other potential indicators for context are:
• Increase in growers monitoring soil health properties (%)
• Increase in growers using practices that promote ground cover (%)</td><td></td><td></td><td></td><td></td></tr>
</table>

Biodiversity

Why this is a priority	Goal	Draft five-year target	Indicators (potential)	2014	2019	2024 target	2029 target
Biodiversity can provide natural pest control and pollination, control erosion, store carbon and enhance water retention.	Improve biodiversity condition on farms and across the cotton landscape.	Targets will be set when a methodology to measure condition at an industry level is in place.	Potential indicators: • Extent: area of forests, grasslands and wetlands managed for environmental outcomes • Configuration: connectivity across the landscape • Composition: species richness (flora and fauna) or weediness	-	-	TBA	TBA
Biodiversity is the variety of life forms found in an environment including animals, plants, bacteria, fungi and micro-organisms. The major threats to biodiversity on farms are invasive species and habitat loss and degradation. Grower surveys show the area cotton farms being managed for conservation has been relatively stable for several years. *Measuring biodiversity is a complex and evolving space, with no nationally agreed approach. Working to improve biodiversity condition on individual cotton farms will be much more effective if it is coordinated with other industries and with natural resource managers at a regional level to take into account differing regional ecosystems and biodiversity priorities. The cotton industry is seeking to work with growers, governments, agencies, other agriculture sectors and other stakeholders to set baselines of region-specific biodiversity, prioritise regional management practices, and develop a credible, and pragmatic way to measure change in biodiversity condition at industry scale.*			Additional potential indicators for context are: • Adoption of region-specific management practices • Partnerships and formal conservation schemes	- -	- -	- -	- -
Pathway: Measure natural assets - Coordinate regional planning to scale up impact - Targeted on-farm practices to protect and restore							

Workplace

	Why this is a priority	Goal	Draft five-year target	Indicators	2014	2019 baseline	2024 target	2029 target
Safety	Agriculture contributes disproportionately to workplace health and safety incidents across Australia. Addressing the rate of farm accidents that cause injury and death remains an ongoing priority.	Injury-free cotton farms.	Zero fatalities. 30% reduction in serious injuries.	Total fatalities (in 5-year reporting period) Mean annual serious injuries in 5-year reporting period)	5 44	6 38	0 27	0 19
From 2014 to 2019, the agricultural sector had one of the highest rates of fatalities and serious injury in Australia. During this period, 399 people lost their lives on an Australian farm[1]. Much work is being done to make cotton farms safer, but clearly more needs to be done. *Safety is normally measured as a rate to provide comparability; eg, Lost Time Injury Frequency Rate. 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. This restricts the ability to directly compare injury rates, but industry's current view is the assumptions needed to estimate the workforce would make a standard injury rate indicator unreliable.*								
Skills	Cotton production requires some specialist skills unique to the cotton industry, and skills like soil science that are needed by all broadacre injuries. The industry needs to continue to support science and innovation capability, and futures thinking.	The goal is to improve the diversity and skills of the cotton industry, to make cotton and agriculture an employer of choice. The cotton industry's Workforce Strategy is being revised, and will be released in 2021. This Strategy will inform targets for diversity and skills. It will also be informed by a National Agriculture Workforce Strategy, currently being developed by the Federal Government. A pathway for achieving targets will be provided in this strategy as well.	% post-school qualifications	39	43		
Diversity	Attracting employees is a challenge throughout regional Australia. Actively seeking to increase the participation of people from all backgrounds will help the cotton industry meet this challenge.		% age <29 % age 30-49 % age 50+ % female % Aboriginal or Torres Strait Islander origin % Culturally & Linguistically Diverse background	27.6 42.0 30.2 21.4 5.2 6.7	22.1 40.6 37.3 23.0 5.5 4.3		
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.								
Pathway: to be determined by the Australian Cotton Industry Workforce Strategy, to be finalised in 2021.								

[1] Provisional data including unintentional work-related and non work-related farm injury deaths.

Wellbeing

Why this is a priority	Goal	Draft five-year target	Indicators	2014	2019 baseline	2024 target	2029 target
Improving the wellbeing of people in the industry will make the cotton industry a better place to work, and cotton communities a better place to live.	Work with other stakeholders across cotton growing communities to collaboratively and continually improve the wellbeing of people living and working in these communities.	Develop a coordinated wellbeing strategy with other stakeholders by 2024.Targets for 2029 will be set when this strategy is in place.	Global Life Satisfaction (mean 0-100)	-	77	-	-
			Physical Health (% reporting very good or excellent health)	-	34	-	-
			Mental Health (mean 6-30)	-	12	-	-
			Community wellbeing (mean 1-7)	-	5	-	-
			Community involvement (mean 1-7)	-	4	-	-
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. By examining these aspects 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. The Regional Wellbeing Study quantifies these drivers of wellbeing. Industry is working to understand more about the context of these wellbeing figures, and how best to work with other stakeholders – government, other industries, community and individuals – across cotton growing communities to develop a coordinated and collaborative strategy to contribute to wellbeing.							
Pathway: to be determined by the cotton industry wellbeing strategy, to be developed by 2024.							

Productivity

Why this is a priority	Goal	Draft five-year target	Indicators	2014	2019 baseline	2024 target	2029 target
With the world's population forecast to increase from 7.7 billion in 2018 to 9.7 billion in 2050, farmers all around the world need to sustainably produce more food and fibre with the same or fewer resources. This target tracks efforts to sustainably grow more cotton fibre, and by extension more cotton seed, per area of land – within the boundaries of sustainability targets and by continuing to improve the quality of Australian cotton.	Increase Australian cotton yield and quality within sustainable environmental boundaries.	Increase the yield of irrigated cotton by 12.5% every five years	Irrigated crop yield (bales/ha, five year average)	9.9	10.9	12.3	13.8
The five-year average irrigated yield of Australian cotton has increased from 7.4 bales per hectare in 1998/9 to 10.9 bales per hectare in 2018/19. This is the result of sustained effort by the industry across all aspects of crop production including better water, pest and nutrient management, new cotton varieties, appropriate tillage, and crop rotations are some of the factors that contribute to increasing yields over time. *A draft target of increasing yield by 3% per year was initially set, in line with the CRDC's strategic plan. Based on stakeholder feedback, this target has been revised to 12.5% to ensure it is achieved in line with environmental sustainability targets and ongoing quality improvements.* *An indicator of dryland crop yield will reported to give a more complete indication of productivity. Due to dryland yields being impacted by Australia's seasonal variations, this may be expressed as dollars of lint per millimetre of rainfall, instead of the more traditional bales per hectare. Industry is investigating the best options for this.*			Additional indicator for context: • Dryland crop yield, indicator TBA			- -	- -
Pathway: existing industry work to support productivity will continue.							

Profitability

Why this is a priority	Goal	Draft five-year target	Indicators	2014	2019 baseline	2024 target	2029 target
Profitability shows the ability of cotton growers to contribute to the economy and to invest in the future technologies and practices needed to adapt to a changing environment and market.	Growers have sufficient profitability to confidently re-invest in their business and community.	TBA	Rate of return including and excluding capital appreciation (%).	TBA	TBA	-	-
Many factors influence the profitability of cotton production. These include cotton prices, exchange rates, yields and operating costs. For these reasons, profitability can vary greatly between seasons. *The profitability indicator has been changed from operating profit of cotton ($/ha) to a whole farm measure of rate of return on capital (%). Whole farm profitability has been adopted because measuring the profitability just of a cotton crop doesn't provide an indication of the financial sustainability of the whole farm business over time (that cotton may contribute to). Rate of return is also used by other agriculture sustainability frameworks, such as beef, and industry's aim is to be as consistent as possible with other agriculture sustainability frameworks.*							
Pathway: existing industry work to support profitability will continue.							

Achieving the targets

High level pathways have been developed to achieve the targets. The starting point for each pathway is existing industry research and strategic plans. The industry will continue to review progress towards targets, and may add additional actions or collaborations to achieve targets as needed and within budgetary constraints.

These pathways provide a roadmap to achieve the targets, but having a map is not enough to arrive at the destination.

This Australian cotton industry's strategy to achieve its vision of being a global leader in sustainable cotton production underpins work to achieve the targets. It has three strategic levers:

1. ENGAGE frequently and transparently with internal and external stakeholders
2. EMBED the systems and culture needed to support continual sustainability improvement
3. EVIDENCE to demonstrate credible progress, to make informed decisions, and to assess impacts.

These strategic levers need to be deployed at two levels: by the SWG to coordinate industry-wide sustainability effort, and at the target level to drive progress along the pathway to each target.

	Engage	Embed	Evidence
SWG actions	Coordinate cross-sector collaboration, especially with other broadacre industries & governments Coordinate an annual Australian Cotton Sustainability Reference Group Forum Coordinate ongoing stakeholder engagement inside and outside the industry	Maintain systems to monitor progress and assess materiality Using behaviour change principles, leverage *my*BMP and CottonInfo platforms to motivate internal stakeholders to achieve targets Assess the effectiveness of the industry's sustainability strategy and governance	Ensure the accuracy and credibility of data collected Aggregate data at regional and industry level to provide annual snapshots and five-year detailed sustainability reports Contribute as needed to decadal independent Environmental Assessments
Target actions	Engage with key experts and influencers to leverage resources and expertise to meet the target If needed, establish advisory panels to seek feedback from	Deliver research, development, extension and adoption actions identified in the pathway. Where possible, these will be region-specific actions to account for regional variations in production Deliver targeted communication and tools to motivate change	Gather data to monitor progress toward target and identify if additional research, development, extension and adoption is needed to achieve the target

COTTON AUSTRALIA

CRDC
COTTON RESEARCH AND DEVELOPMENT CORPORATION

CottonInfo

myBMP

Australian Cotton Shippers Association

This report has been developed by the Sustainability Working Group on behalf of the Australian cotton industry. *Cover photo courtesy Renee Anderson.*

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