



# Australian Cotton Industry

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## THIRD ENVIRONMENTAL ASSESSMENT EXECUTIVE SUMMARY

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This report was prepared independently by  
Inovact Consulting Pty Ltd for the Cotton Research  
and Development Corporation

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## Executive summary and recommendations

This report presents the findings and recommendations of an assessment of the environmental management and performance of Australian cotton growing. The study period of the report is 2003-2012 as it appraises the cotton industry's implementation of the recommendations of the Second Environmental Audit that reported in 2003 and the cotton industry's progress since then.

The industry's location in the riverine areas of the Murray Darling and Fitzroy Basins means that its interactions with rivers, floodplains, wetlands and the Great Barrier Reef (in the case of the Fitzroy Basin) places it under public and government scrutiny in terms water use and environmental stewardship.



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“The third environmental assessment represents the continuation of a 21 year commitment of the cotton industry in undertaking comprehensive independent environmental assessments, a process unique in agricultural industries in Australia.”  
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## Environmental stewardship of Australian cotton growing

Through its research and development investments and effective interrelationships between industry research institutions, grower organisations, commercial service providers and growers themselves, the industry has been substantially transformed since 2003. This transformation has occurred in production practices, the cotton farming system and farm planning and management. The result of the changes has been a substantially reduced impact of cotton growing on the riverine environments in which it exists. Growers have made considerable improvements in water, chemical and natural resource management on-farm and across cotton growing landscapes. The adoption of new technology has been a significant factor in the improvements that have been made.

BMP is the industry's main vehicle for technology transfer from research and development outputs into guidelines and tools for growers to achieve best management practices and enhance their businesses and environmental performance. The current online version known as myBMP is a sophisticated information source for growers that also has processes for self-assessment and formal on-farm audits in order to attain certification. Increasing grower uptake of myBMP remains a major challenge to the industry and this Third Environmental Assessment finds that there are significant weaknesses and confusion in its purpose, objectives, marketing, implementation strategy and accounting for grower participation.

### Genetically modified cotton and Integrated Pest Management (IPM)

Cotton growers have had access to progressively improved genetically modified cotton varieties since 1996. A new generation Bollgard II® variety was introduced in 2003 to counter potential resistance from *Helicoverpa armigera*. Similarly the Roundup Ready® variety was enhanced through Roundup Ready Flex® to improve the plant's resistance to glyphosate.

A further innovation was the release of Liberty Link® cotton which has been genetically modified to tolerate



applications of the broad-spectrum herbicide glufosinate ammonium.

The introduction of transgenic cotton varieties began a major change in pesticide management and use. It enabled substantial reductions in the number of spray applications during a growing season and in the amount of pesticide applied. Bollgard II® cotton was reported to require 85 per cent less insecticide than conventional cotton varieties and was grown on 90 per cent of the 2009-10 crop area. For the same crop Roundup Ready Flex® and Liberty Link® cotton was reported to require 48 per cent less herbicide than non-herbicide tolerant cotton. Over 98 per cent of the crop contained the Roundup Ready Flex® trait.

Bollgard II® also provided growers with the opportunity to implement more effective integrated pest management (IPM) strategies into their farming systems because it had less impact on 'beneficials' (insects, spiders, micro-bats, etc, that predate on cotton pests). IPM has become a major success story in cotton growing. The practice links crop protections with biodiversity conservation measures such as protecting and growing native vegetation on-farm to provide habitat to beneficials.

## Water management

During the past ten years, a period of national water reform and severe drought, irrigated agricultural industries including cotton have focussed their research, development and extension investments on water use and management. As a result of the uptake of research and development outputs, growers have succeeded in improving their water use efficiency by three to four per cent per annum. They have also introduced more effective water management on-farm such as improving water storage to reduce evaporation, reducing leakage from channels and storages, capturing and recycling irrigation tailwater, managing stormwater and improving on-farm water quality.

## Natural resource management

Since 2003 natural resource management has increased in prominence and the industry has worked effectively through its research institutions to develop partnerships with catchment management authorities, regional natural resource management organisations and groups such as Landcare. The Third Environmental Assessment finds evidence that cotton growers have improved soil, riparian and native vegetation management which is contributing to improved biodiversity and delivering important ecosystem services. However this is an area that requires increased monitoring and reporting of the uptake of improved practices and the outcomes achieved by growers. Deriving a practical set of measures and indicators of improved natural resource management is inherently difficult, but it would assist the industry to demonstrate its environmental credentials in this area.



## Energy use, greenhouse gas emissions and adaptation to climate change

There is evidence of improvements in all of these areas, but the industry is still in an early period of development regarding improved practices and management.

Improvements in the fuel efficiency of farm machinery, controlled traffic systems, innovations such as the round baler reducing traffic, and farm system innovations such as minimum tillage have been and will continue to be key drivers for improved energy efficiency and reduced greenhouse gas emissions on cotton farms.

Climate change has longer term impacts and it is too early to assess the outcomes of the industry's initiatives in this area.

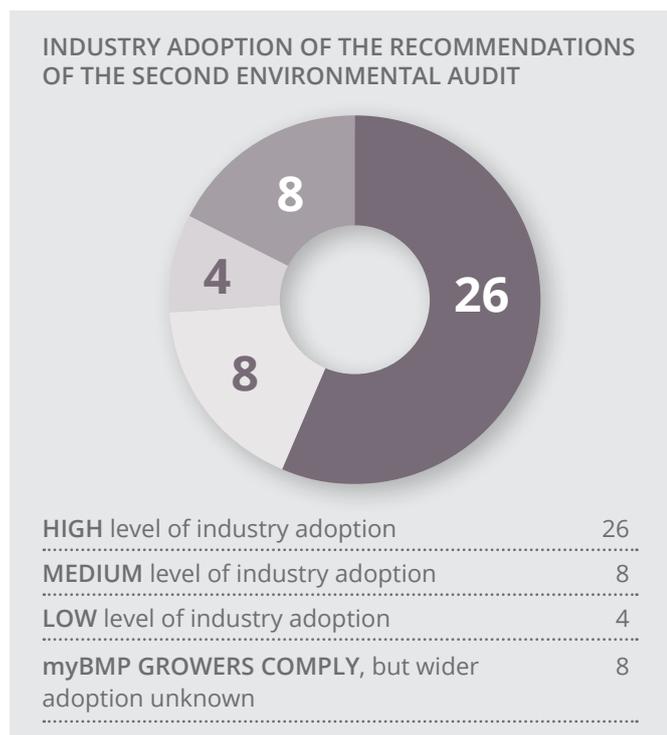


Monitoring greenhouse gas emissions in a cotton farming system



## Key industry achievements in environmental performance since 2003

This Third Environmental Assessment reviewed the extent to which the industry adopted the recommendations of the Second Environmental Audit (2003). The assessment covered 46 recommendations and these have been rated as shown below.



The finding of this assessment is that the majority of the recommendations have been adopted at a high level. In particular, there has been a high level of adoption in areas such as water, chemical and natural resource management. There were some recommendations particularly in the area of chemical management (including a large number of sub-recommendations) that were incorporated into myBMP. Growers who have been audited and gained myBMP certification have adopted these recommendations. However wider adoption by growers is unknown and could only be determined through myBMP audits or other specific on-farm studies.

### Major achievements

The major achievements of the industry in improving its environmental performance since 2003 are listed below. Evidence for these findings is provided in the main body of the report.

- Effective and responsible management of the industry's use of genetically modified cotton varieties.
- The substantial reduction in the use of chemicals particularly insecticides and residual herbicides for cotton growing and the disappearance of serious off-farm impacts in rivers and wetlands.
- Major gains in water use efficiency in cotton growing calculated at three to four per cent per year and effective management and stewardship of water resources on-farm.
- Major advances in grower attitudes and action concerning natural resource management on-farm and active engagement in landscape and catchment wide natural resource management, particularly management of deep drainage, riparian management, groundwater conservation and delivery of ecosystem services.
- Significant uptake of integrated pest management (IPM) and the link being established between IPM and biodiversity conservation in terms of ecosystem services on-farm and at a landscape scale.
- Development of an integrated research, development and extension system that delivers priority research and development and extends this to growers through an online best management practices program (myBMP) and the extension activities of the industry's key organisations such as Cotton Australia and the commercial sector.

## Priorities for future industry action to improve environmental outcomes

This assessment notes the significantly changed context in how the industry now faces its environmental management challenges. The operating environment for the industry is much more complex and demanding in terms of improving business productivity and profitability; global competitiveness and market expectations of environmental stewardship; the policies, programs and regulatory requirements of governments relating to the environment; the long-term pressures on Murray Darling Basin water resources and the prospective introduction of a Murray Darling Basin Plan; and public expectations for good environmental and social stewardship.

This Third Environmental Assessment considers that the priorities for the industry in continuing to improve its environmental performance are as listed below. Evidence for these findings is provided in the main body of the report.

1 Delivering and demonstrating environmental performance that meets the needs of a demanding

global market environment in terms of the corporate social responsibility aspirations of retailers, the values held by consumers and wider public perceptions of cotton growing.

- 2 Re-invigorating myBMP so that it is linked to market drivers and the commercial needs of growers, its purpose and objectives are clarified and the program is valued and widely used by cotton growers and is recognised by governments and the market.
- 3 Maintaining effective crop protection through risk management for mitigating against potential insect resistance and developing weed resistance.
- 4 Continuing to make significant improvements in water use efficiency and water quality on and off-farm to achieve further productivity and environmental benefits, and in preparation for future droughts.
- 5 Continuing to prioritise on-farm natural resource management in the context of catchment-wide resilience and targets. The location of cotton growing



Cotton grower Hamish Johnstone at Macintyre Downs measuring on farm energy use with Energy Calc.

in riverine landscapes subject to variable climate and the impact of climate change means on-farm practices that contribute to catchment health and resilience will in turn improve the resilience of cotton farms.

- 6 Successfully dealing with energy efficiency, greenhouse gas emissions and climate change issues in response to the national and international agendas around these issues. This includes continuing to prioritise these issues in research, development and extension and improving monitoring and reporting on performance.
- 7 Achieving effective outcomes on land and water use conflicts particularly the impact of coal mining and coal seam gas extraction and issues around the Murray Darling Basin Plan when approved.

- 8 Improving the monitoring, evaluation and reporting of the uptake of best management practices by growers and the actual environmental outcomes that result.
- 9 Meeting the new challenges for research, development and extension (RD&E) that are arising from an increasingly complex and interrelated operating environment. The Cotton Research and Development Corporation will face increased responsibility for the effective delivery of RD&E with the conclusion of the Cotton Catchment Communities Cooperative Research Centre.



Cotton growers Hamish Millar, Damien Erbacher at "Burima" Macquarie Marshes with Adam Kay, CEO Cotton Australia

# Recommendations of the Third Environmental Assessment

Taking into consideration the findings of this assessment and the priority challenges listed above, the following recommendations are proposed to the industry to advance its environmental stewardship agenda and performance.

## Recommendation 1

*It is recommended that Cotton Research and Development Corporation work with its grower base, Cotton Australia, the industry's value chain, cotton industry service providers, the Australian Government and relevant state government agencies to develop a five-year RD&E strategy for continuous improvement in environmental management and performance in cotton growing.*

### Rationale

Recommendation 1 addresses priorities numbered 3-9 above. The rationale of the environmental RD&E strategy is to develop a strategic and risk management approach to environmental management and performance that will meet emerging market requirements, the commercial and practical needs of growers, public policy requirements and the broader expectations of the Australian community on environmental stewardship in agriculture. The strategy should outline intended pathways for the uptake of R&D by growers and establish key performance metrics to measure outcomes. It is acknowledged that the environmental RD&E strategy would be integrated into the industry's existing planning framework and plans particularly the next strategic R&D plan of the Cotton Research and Development Corporation (i.e. for 2013-2018).

## Recommendation 2

*It is recommended that the industry undertakes a significant re-appraisal of myBMP and its role in the industry's assurance to markets and other stakeholders of best practice environmental stewardship by growers.*

### Rationale

Recommendation 2 addresses the priority numbered 2 above. myBMP needs to be re-appraised to clarify the

present confusion in its overall purpose, objectives and value to growers. Of particular importance is the clarification of the objectives of grower certification under the program. The re-appraisal also needs to address how myBMP can deliver results to the industry from a consideration of what consumers, retailers, the community and governments are demanding in terms of the sustainability of cotton growing. From the reappraisal, a marketing and implementation strategy needs to be developed to more effectively market the benefits of myBMP to growers and to re-invigorate the program to meet its objectives. In addition performance metrics need to be specified to measure outcomes. This should include accounting for the numbers of growers (or farm businesses) who are participating and the level of their participation.

## Recommendation 3

*It is recommended that Cotton Research and Development Corporation and Cotton Australia collaborate on establishing accurate and up to date databases of cotton growers and key industry stakeholders to ensure that the industry organisations effectively engage levy paying growers and influential stakeholders on industry plans and performance reporting regarding environmental management and practices.*

### Rationale

Recommendation 3 addresses all of the priorities listed. The present databases of growers and key industry stakeholders are inadequate for effective engagement on priority industry issues. This was apparent during this study when samples were established for the surveys of growers and stakeholders respectively. In addition, the more favourable production conditions over the past two seasons has seen many new growers enter the industry without previous experience. These growers need to be targeted in extension activities to ensure that they adopt best management practices. The need for accurate and usable databases is reinforced by the requirement of the Rural Research and Development



Cotton grower, Anthony Barlow “Wyadrigah” Mungindi assessing the condition of native vegetation on his property with David Carr, Border Rivers Gwydir CMA consultant.

Policy Statement (Australian Government, July 2012) for CRDC to prepare an extension plan that incorporates adoption pathways and strategies for improving the uptake of R&D.

#### Recommendation 4

*It is recommended that the industry continue to commission independent environmental assessments of cotton growing in five-yearly time periods to establish longer term trends in its environmental performance and data sets that provide evidence based assessments over long periods of time. It is also recommended that a practical monitoring, evaluation and reporting framework be established that will support evidence-based annual reporting on the outcomes of environmental management in cotton growing.*

##### Rationale

Recommendation 4 addresses all of the priorities listed. The industry has a 21 year history of independent environmental assessments and is unique amongst Australian agricultural industries in documenting performance information and assessments over such a long period. With increasing demands for evidence-based performance reports from markets, governments and the community, the industry should continue to build on this record. While the annual reports of the Cotton Research and Development Corporation and Cotton Australia report on achievements, these and other environmental reports from the industry could be improved by establishing a monitoring, evaluation and reporting framework that includes a practical number of environmental metrics. The industry has put a lot of effort into researching sustainability indicators, but it has not reached a position on a workable set of metrics that can be used and meet the demands of target audiences.

#### Recommendation 5

*It is recommended that the cotton industry value chain, including the grower sector, actively engage with market based initiatives such as the Better Cotton Initiative to monitor international consumer preferences and retailer strategies*

*and actions so that this intelligence can be incorporated into industry strategies and actions for improvements in environmental practices that are market driven.*

##### Rationale

Recommendation 5 meets the priority numbered 1. The industry competes in a global market. Key international retailers which operate in that market have strong corporate social responsibility agendas and are setting sustainable cotton targets. This is being partly driven by environmental interest groups, consumers and the wider public directly engaging retailers to influence those companies to improve and demonstrate sustainability through the value chain including on farms. The industry also needs to be engaged with retailers and consumers to both understand their positions and to have influence in the setting of sustainability targets to ensure that they are reasonable and practical in commercial terms.

#### Recommendation 6

*It is recommended that the industry continue its market research on consumer, community and stakeholder perceptions of the environmental performance and practices of cotton growing that updates and extends the previous studies to take account of how individuals and organisations now access information through contemporary media which has changed considerably since these studies.*

##### Rationale

Recommendation 6 addresses the priorities numbered 1 and 9. It follows that the industry needs to be armed with sophisticated market research information to influence the perceptions of consumers, the community, politicians, government officials and environmental groups. The information gathering and media world is changing rapidly and the industry needs to keep abreast so that its voice is heard and it is able to substantiate its performance. Cotton Australia has recently commissioned a small market research survey on the perceptions of key policy makers of the cotton industry.



Australian Government  
Cotton Research and  
Development Corporation



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Full report available at: [www.crdc.com.au](http://www.crdc.com.au)