

# Cotton Outlook

Special Feature

June 2013



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# The Pursuit of Excellence

By Mike Edwards, Cotton Outlook

Cotton has historically been one of the crops most heavily supported by government programmes, albeit varied in their scale and structure in different parts of the world. Yet one of the most successful cotton industries receives virtually no government subvention at all. This apparent paradox prompted Cotton Outlook to invite the various contributors to this Special Feature to shed light on the driving forces behind the impressive achievements of Australia's cotton sector.

Those achievements are all the more remarkable for the fact that, in the absence of a domestic spinning industry, producers rely for their livelihood on a sometimes volatile, and invariably challenging, international market. They also operate in a climate that provides its own severe challenges, as was the case when drought during the early part of this century decimated the Australian cotton crop, and more recently when flooding affected parts of the cotton-producing region.

From such adversity, perhaps, has sprung an even greater determination to succeed. Even the undoubted tenacity of Australia's cotton producers, however, would be put to the test, without the technical innovation, varietal improvements and other benefits of a coherent structure for research and transfer of technology. This marriage of producer know-how and technical expertise has propelled the country's cotton sector to the top rank, both in terms of yields, amongst the highest in the world, and a fibre quality that commands a significant and reliable premium in the marketplace. In terms of sustainability too, Australia has impressive credentials to offer - witness the early adoption of a Best Management Practice regime that can be seen as a forerunner of more recent international initiatives to minimise the environmental impact of cotton.

The 2012/13 season's lint outturn promises to be of near record proportions. At the time of writing, it is estimated that well over half has been committed from first hands, at prices presumed to be generally remunerative. For the time being, world prices are holding at levels comfortably above their long-term average. Water appears in good supply, and there must be every possibility, on present indications, that another bumper crop can be achieved in 2013/14.

Broader economic and political factors far beyond the producer's control have assisted the consolidation of success in the field. The shift eastward of spinning capacity since the turn of the century, and of course the emergence during the same period of China as the world's foremost raw cotton import market, have placed Australia, more than ever, in an enviable geographical position. In 2012, China imported over 800,000 tonnes of raw cotton from Australia, the third largest supplier, behind the United States and India. If this does indeed prove to be the Asian Century, Australia's present and future generations of cotton producers are well positioned to capitalise on the opportunities offered.



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# Making it Happen - Cotton Production with Minimal Government Support

By Adam Kay, CEO, Cotton Australia

Cotton Australia aims to ensure a successful future for the country's cotton growers and regional communities by maintaining a sustainable, viable industry and promoting the benefits to the wider Australian community. In implementing our strategic plan, we acknowledge that the Australian cotton industry is not confined to just cotton growers but includes the talent, expertise and commitment of all those along the value chain.

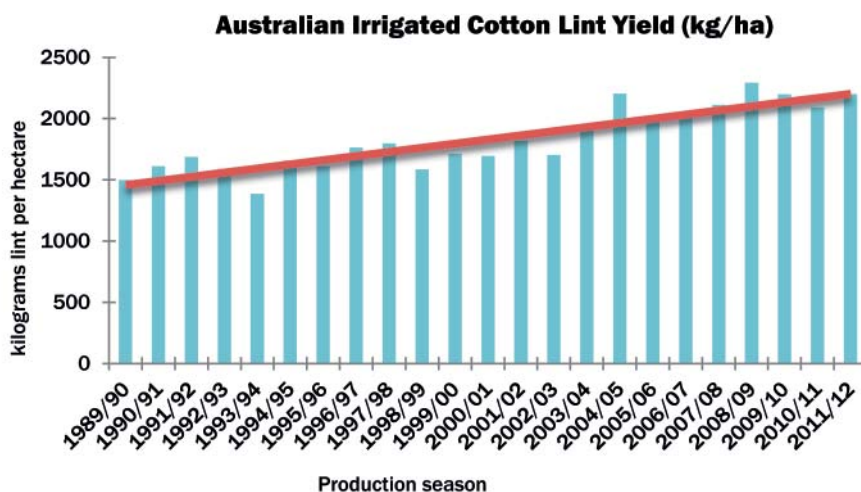
The vision of creating a more profitable and sustainable cotton industry sounds great in theory, but it can be difficult to realise. Cotton in Australia has always understood its place in the context of Australian agriculture as a competitive export industry, free from government handouts and subsidies, but working in concert with regulators and agencies that reflect the values and priorities of the Australian community.

The strength of the Australian cotton industry is that progress has been built on an entrepreneurial culture and management expertise at the farm level, together with an insatiable thirst for knowledge and solutions to everyday problems. Virtually all Australian cotton is exported, and has always been sold and shipped in the year of production. This is not accidental, but the outcome of a globally competitive industry committed to a quality product, located close to our major markets.

Australia's currency has had a floating exchange rate since 1983 and there is no direct cotton market intervention in Australia. The Australian Government's Department of Foreign Affairs and Trade provides Australian cotton merchants with an Export Market Development grant to promote our cotton and its services overseas to become established exporters or establish new markets. The grants are provided by

AUSTRALIA and incentives are provided to export businesses that can return significant net benefit by exporting Australian produced products.

Australia is famous as the 'island continent', providing a natural barrier to major non-endemic pests and weeds. All Australian governments - federal, states and territories - work within a national framework of biosecurity to protect Australia's plant and animal industries from exotic pest damage. The government and industry biosecurity partnership provides



active import protection as well as on-farm surveillance and incursion risk management. Cotton Australia is the industry member of the national organisation for crop plant biosecurity, Plant Health Australia, as are all Australian governments.

FAO model certificates provide a standard wording and format, and the Australian Department of Agriculture Fisheries and Forestry biosecurity division issues electronic phytosanitary certificates for shipment to all countries importing Australian cotton.

Focusing on its strengths and opportunities is what has accelerated the Australian cotton industry's progress and helped define and map its future. Australia is also a leader in irrigated water use efficiencies; reduced use of pesticides; in the development and application of best practices; and in environmental stewardship. These principles have served the industry well and allowed it to quickly respond, adjust, adapt and embrace new technology, techniques and research at both the farm and industry level.

They have also produced tangible results - Australia's cotton industry has achieved a 40% increase in water productivity over the last decade. Australian cotton growers have almost doubled their irrigation water use index from 1.1 bales/megalitre in 2000-01 to 1.9 bales/megalitre in 2009-10.

A 50-year commitment to the adoption of research has been the basis for a transformation in the Australian

cotton industry over the last decade. The modern industry has continued to develop in partnership with government, not dependent on it. Australian cotton growers readily adopt new research and technologies without government subsidies to remain efficient and competitive.

Australian cotton growers invest in research through a statutory levy on each bale of cotton produced. The levy has funded research, development and extension over decades, and complements processes of collaboration, cooperation and partnership of commercial and government agencies.

The results have been astonishing. Australia is a world leader in the development of conventional and genetically-modified cotton, and the attainment and advancement of yields, which are the highest in the world.

Policies and research projects are conceived at the grass roots level by cotton growers elected to participate and influence those objectives. Grower involvement in research and development is hands-on and bill-fold through direct grower representatives' time and a levy paid by growers on every bale produced. The levy of \$A2.25 per bale is approximately 0.5% of the farm gate value of annual production and is invested directly into R&D.

Individual growers form regional Cotton Grower Associations (CGAs) and the CGA representatives'

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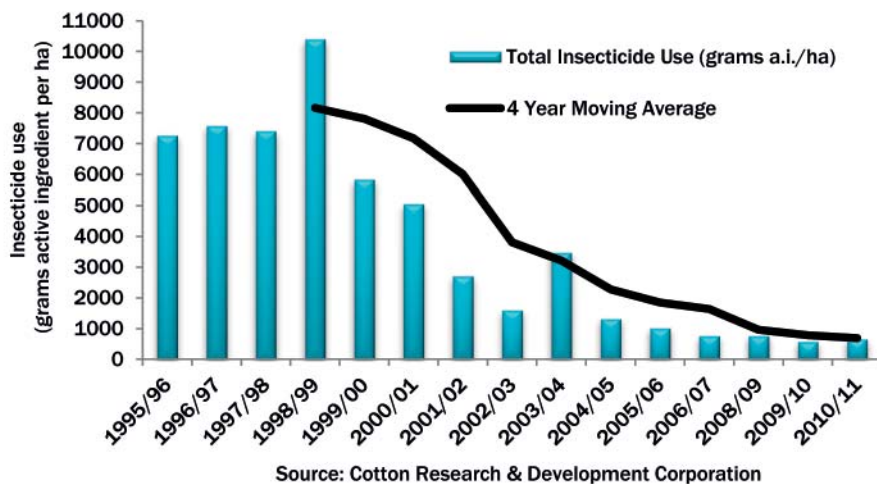
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research outputs to all cotton growers.

A key platform of the Development and Delivery (D&D) of Australian cotton research is the industry's Best Management Practices (BMP) program. Cotton BMP provides guidance to growers on sustainable practices for farming, the environment and workforce management and transforms research into adopted practice. Cotton BMP is Australia's cotton environmental stewardship system and has achieved social licence and environmental credibility wins

priorities are passed to a wider industry portfolio of committees managed by Cotton Australia. Cotton Australia Advisory Panels prioritise the investment of research funds through the Cotton Research and Development Corporation (CRDC), which is a statutory industry and government partnership managed by the Australian Government Department of Agriculture, Fisheries and Forestry.

The strong grower commitment to research is accompanied by a culture of continual adoption of research and technology. Australia's cotton industry has a joint program of agricultural extension that has a specific goal of developing and delivering valued

for the Australian industry for more than 15 years. Australian BMP cotton certified by Cotton Australia has occupied a growing market niche beyond the farm gate.

This programme utilises a team comprising both technical specialists and regional officers to produce the latest online resources and publications, as well as conducting grower information days. The team collectively improves and maintains the cotton BMP programme and assists growers to participate and prepare to gain BMP certification.

A recent report by the Australian Productivity Commission (2011) on the investment of producer funds contributed to Australian rural research estimated that,

## A culture of continuous improvement and environmental performance reporting

Demonstrating good environmental performance and a commitment to continuous improvement are key objectives of the Australian cotton industry. In addition to embedding the Best Management Practices (BMP) program, the industry has maintained a process of independent assessments of the industry's environmental performance.

Initiated more than 20 years ago, the assessments have charted the high level of adoption of best management and other recommended improvements, and the impact to the industry from ongoing research and increased environmental awareness at grower level. The most recent independent environmental assessment noted the beneficial changes in the industry:

*"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... 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." – Third Environmental Assessment of the Australian Cotton Industry, conducted by Inovact Consulting (2012)*

Key achievements of the Australian cotton industry in improving its environmental performance as highlighted in the most recent 2012 Environmental Assessment include:

- substantial reduction in the use of chemicals for cotton growing
- major gains in water use efficiency in cotton growing (at 3-4% per year) and effective management and stewardship of water resources on-farm
- the effective and responsible management of the use of biotechnology-based crops
- improvement, by cotton growers, of soil, riparian and native vegetation management, which is contributing to improved biodiversity and delivering important ecosystems services. The significant uptake of integrated pest management (IPM) is now a major success story in cotton growing in Australia.



for every dollar invested in R&D, the average return after 25 years is \$10.51, broadly equating to a rate of return of around 50%.

The cotton industry has always been an early adopter of technology and pioneered the government regulatory system for commercialisation of the first biotechnology-based crops in Australia in 1996. Biotechnology has been adapted by local breeding programs and applied research has resulted in growers achieving a 10-fold reduction in pesticide use over the last decade. The gene technology regulatory framework in Australia provides an assessment of safety to the community and environment from biotechnology traits that are then carefully managed for resistance risk, to ensure their sustainability.

Australia is renowned in the world as the home of FibreMax cotton varieties. The industry has always placed a high priority on cotton variety development by investing in breeding to improve yield and fibre quality as well as pest and disease resistance and regional adaptation. In recent years, more than 75% of the Australian cotton crop has achieved strength of 30GPT and higher, with Micronaire between 3.5 - 4.9.

Australian seed breeders and agronomists are constantly striving to improve both quality and yield traits - while growers, ginners, classers and shippers work hard to ensure zero contamination. The entire Australian cotton crop is machine picked. Approximately 80% of Australian cotton harvest equipment has been upgraded to the latest on-board module picker over the past three years.

Best Management Practice certification extends down the supply chain, and with 37 modern gins located in key producing areas, we can process approximately 60,000 tonnes per week. Cotton is classed through four modern certified classing facilities, and the industry funds CSIRO (an Australian Government body) to conduct independent audits to ensure the highest standards are met. Australian classing rooms also participate with international check tests (SITC) to ensure consistency between HVI machines.

Improved irrigation water supplies, combined with high yielding varieties and world best agronomic techniques, have seen Australian production exceed 900,000 tonnes per annum since the 2011 harvest and production is expected to exceed this level for the foreseeable future.

The entire Australian crop is exported, predominately through Brisbane, Sydney and Melbourne ports. Peak season shipments can exceed 150,000 tonnes per month (158,900 tonnes in June 2012). Australia's proximity to Asia, combined with modern logistics infrastructure and a stable political and financial system, mean our shippers are able to supply the cotton customers' demand, when they need it.

Our goal at Cotton Australia, as custodian of the industry's future, has been to remain abreast of these opportunities and to identify, educate, and cultivate a broad network of independent, capable and responsible decision makers. As an industry, we are all working harder and smarter - not dependent on, but in collaboration with, government.



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# Australian Industry Rides its Third Wave

By David Dowling, Editor,  
Australian Cottongrower

The mechanised lie detectors, otherwise known as cotton pickers, have now been let loose in the 2013 Australian cotton crop. It's a period which is rich in hope but full of uncertainty and trepidation as all the hard work of the past six months comes down to the only two things that really count - yield and quality.

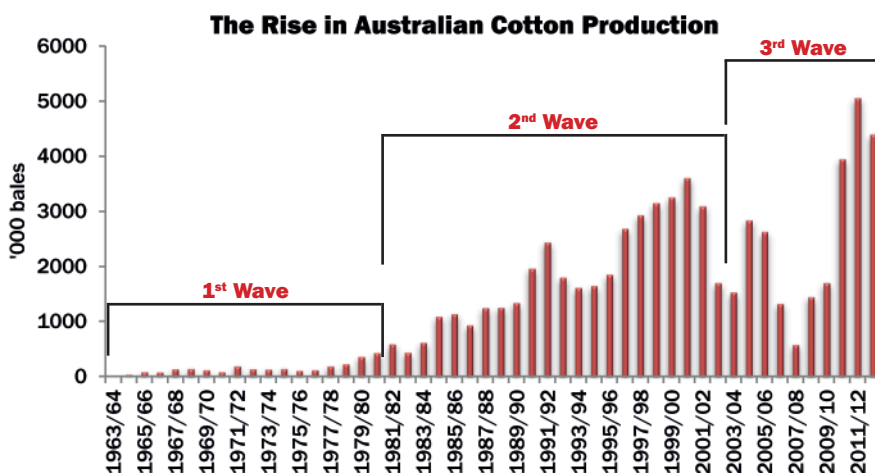
Because of the expanded geographical spread of the cotton industry in recent years, it's hard to get a handle on the season that reflects the conditions in every area. But overall, you would have to say that the 2012-13 season has been 'pretty good.' Of course, it has been too hot in some areas, too cool at some times and definitely too wet at other times. Individual farms have suffered from various setbacks and disasters such as hailstorms and disease outbreaks, but the crop is almost certainly to be the second biggest ever grown in Australia at about 4.3 million bales - with the three biggest all in the past three years.

There seems no doubt that the modern Australian cotton industry is now experiencing its "third wave" of development since it started in the Namoi Valley 50 years ago. The past three years have seen a paradigm shift in the productive capacity of the Australian industry - a shift which was hidden for up to 10 years by the devastating drought of the first decade of the 21st century.

It's hard to define long term trends in Australian cotton production. It is production subject to the vagaries of a highly variable climate, probably more variable than in any major production area in the world. And because it depends primarily on irrigation water availability in the arid environment of northern New South Wales and Queensland, cotton production varies more than just about any other Australian agricultural commodity.

So when you look at a graph of Australian cotton planted area and production over the past half century, it shows huge annual variability, although with a generally increasing trend. What the raw data obscures, though, is that the correct measure is the area planted and the bales produced when irrigation water and soil moisture levels are not limiting factors.

For while price is an important consideration for cotton farmers, as it is for all agricultural producers, by far the most important element in planting





1990s, but by the end of the century, Australia was a consistent producer of three million bales of cotton - as long as the water was available.

### **The third wave**

Production over the next decade started a long decline until by 2007-08, it fell to levels not seen for 25 years. Many factors were involved, including government and community attitudes to water use and pesticides, but the most significant impact was the biggest drought in Australia for a century. For many people in the industry, it seemed it would never end - but then it did.

The seeds for the next wave of expansion were already being sown during this dismal time. Bollgard cotton revolutionized the way we grow the crop and took some of the mystique out of cotton crop management. Instead of spending all their time managing insects, growers and consultants turned their attention to other aspects of management and yields rose accordingly, along with a constant supply of world leading varieties from the CSIRO-CSD pipeline.

considerations is water availability. For just about every season for the past 50 years, the potential gross margin for irrigated cotton in northern NSW and Queensland has been higher than for any alternative crop - and often by a considerable amount. In other words, if irrigation farmers have water available, they will almost invariably plant cotton, unless prices are at absolutely disastrous levels. And, in recent years, an increasing number of dryland farmers on the Darling Downs and in northern NSW have started taking a similar attitude to dryland cotton. Cotton has become the default crop choice in these areas.

So the correct way to look at Australian production over time is to consider the potential production in those times when sufficient water is available to plant a 'big' crop. It then becomes a step-wise function, with distinct periods of new development, and plateaus of production.

### **The first wave**

Obviously, the first wave started with the development by pioneers such as Paul Kahl, Frank Hadley, Auscott and others in the Namoi Valley. Soon other growers followed their example and generally prospered, even though they sometimes survived by the skin of their teeth. For the first 16 years, cotton was mostly confined to the Namoi Valley, with more problems from floods than droughts. It wasn't until 1978-79 that production got above 200,000 bales - at which level we started to satisfy Australian spinners' requirements and turned our attention to exports in a big way.

### **The second wave**

The second wave was driven by expansion into areas such as the Macquarie, Gwydir, Darling Downs, St George and central Queensland. In six years, production went from 200,000 bales to over one million bales, but it didn't stop there. Insecticide resistance slowed things down and so did the droughts of the early 1980s and early



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Blinded by the light as the pickers roll through the night. *Jamie Condon*

The drought also forced a dramatic improvement in water use efficiency in both irrigated and dryland situations. Growers were growing much more cotton with less water. And, of course, those new varieties made it possible to grow cotton in much shorter season environments such as southern NSW.

Efficient new technology such as round module pickers and precision agriculture techniques made it possible to grow the crop with much less labour.

So all the requirements were there - we just needed the water, which of course arrived in large quantities a couple of years ago. So the third wave has taken Australian production to the next step of around 4.5 to 5.0 million bales.

### **The fourth wave?**

I don't have a crystal ball and find it hard to predict what will happen next week, let alone over the next 10 years. The recent drivers of production are likely to continue for some time.

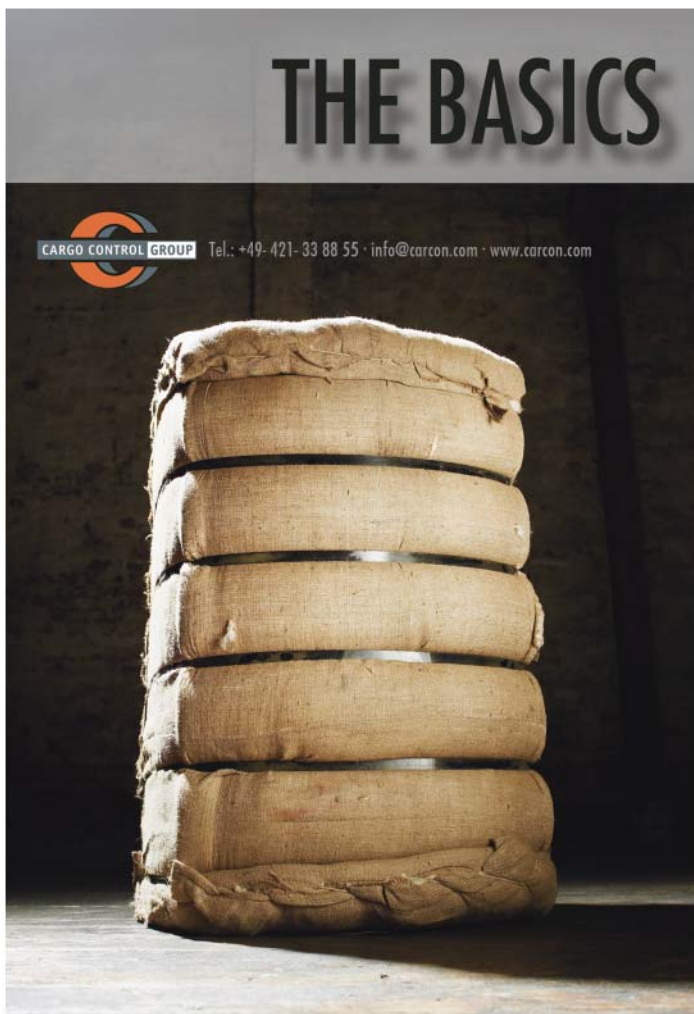
On the positive side:

- Better varieties, possibly with new GM attributes such as drought tolerance;
- Continued expansion in cooler southern production areas; and,
- Possible expansion into northern Australia. The latest proposals are for new production areas on the Flinders River and other areas of the Gulf, but we have heard magical stories of the potential of the north many times before.

On the negative side:

- Greater political pressure on water availability in the Murray-Darling Basin;
- Increased worldwide production as GM cotton revolutionizes production in countries such as India; and,
- Possible impacts of climate change, although these may be negative or positive and we currently lack the ability to accurately predict them, certainly on a regional scale.

At a seminar in Toowoomba the late 1980s, one of the speakers predicted that Australia would eventually produce over five million bales and that cotton would overtake wool as the major natural fibre in Australia. No-one believed him at the time of course. So it just goes to show anything is possible - 10 million bales anyone?



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# A Foreigner's Experience of Investing in Cotton Farming in Australia

By Alex Woo, Chairman,  
Central Textiles (HK) Ltd.

The Darling Downs, just west of Toowoomba in Queensland Australia, are renowned for their rich, deep, black, vertisol soil. As one visiting US farmer famously said, "Hell, we use this stuff as fertilizer in our country." This was where Central Textiles, a cotton spinner and denim maker in Hong Kong, decided to venture into cotton growing. It began with the purchase of an 844 hectare (2,085 acre) property on the Darling Downs, in 1989. This initial investment - incorporated as Janerin Pty Ltd. - was complemented with three additional, adjacent properties, acquired over a five-year period. The operation presently consists of 2,890 ha (7,141 acres), on which cotton, sorghum, wheat and soybeans are the predominant crops grown - mostly under irrigation.

Janerin is accredited under the Best Management Program (BMP) certified by Cotton Australia - an Australian independent industry organization ([www.cottonaustralia.com.au](http://www.cottonaustralia.com.au)). A BMP-accredited farm abides by strict environmental standards, which are independently audited on a regular basis, and address

issues such as safe and minimal insecticide use, efficient water management, energy efficiency, soil health and nutrition, protection of natural fauna and flora and the safety and on-going training of its human resources.

Water is an issue that exercises the minds of farmers, communities and governments throughout the world and the efficient use of this scarce resource forms the platform of Janerin's daily operations, as well as the on-going endeavours for innovative improvement. Significant financial resources have been invested in the improvement of water application and delivery systems. While flood irrigation is still the major method of application, a long-term programme is in place to convert to Lateral Irrigation - a computerized, controlled mobile overhead sprinkler application. Open water ditch transfer systems which travel kilometers throughout the properties are also being converted to underground piping, yielding an additional 20% greater water utilization, through the reduction of seepage and evaporation. The timing and quantity of water application is also an integral aspect of the water efficiency equation, and the company utilizes modern scientific equipment to identify and monitor soil moisture deficits. In-field, electronic capacitance probes transmit soil moisture from field to computer to aid the schedule of irrigation application.

The Darling Downs soil consists of 35% clay, and the contraction and expansion of the clay is conducive to the self-mulching process, whereby soil material consistently mixes itself. The Australian Society of Soil Science visited Janerin in 2010, and concluded - in a submission to the Australian Government - that thanks to its vertisol soils, the Darling Downs was one of only two areas in Australia that exceeded both state and national averages for crop yields, and that few others had the combination of

Alex Woo and farm manager Stewart Leadbetter on Janerin's cotton farm.



inherent natural chemical fertility, high capacity to hold water, location in good natural rainfall zones and access to quality groundwater for irrigation. This unique soil is rich in nutrients and lends itself to the growing of many crop types, unlike many sandy type soils that are often restricted to mono-cropping. These cropping alternatives are a useful management tool for crop rotation in preserving the soil structure and implementing planting programmes that reflect the financial advantages alternative crops present from season to season. While synthetic fertilizers are used to supplement crop nutritional requirements, natural fertilizers such as cow, fowl and pig manures are also applied when available in useable quantities.

Pest control is a major focus of the Australian cotton industry, and Janerin adopts the industry's Integrated Pest Management (IPM) approach contained under the BMP guidelines. This approach uses "soft" chemicals that protect the natural insects that are predators to the destructive ones, while having a minimal effect on the environment. This approach, together with the planting of cotton with transgenic traits (Bt), has been a key element in reducing substantially the number of chemicals applied to the cotton crop. Our cotton crop is now sprayed only twice a season for insect control, compared to ten years ago when some eighteen sprays were applied when conventional varieties were grown.

The interest in Australian farming land by foreign investors has been stimulated over the last couple of years as other countries and investment houses recognize

the valuable quality of this pristine farming land. The topic of "feeding the world" has gained great momentum and the importance of this scarce farming land resource is only now being appreciated. Australian farming land is some of the best in the world and, together with the Australian cotton industry's commitment to resource efficiency and environmental awareness, it is poised to remain a focus for foreign investment.

Janerin benchmarks the farm's financial, environmental, operational and resource performances to the cotton industry benchmarks each year. It continually out-performs the top 20% of growers who participate in the joint Australian Cotton Research and Development Corporation and Boyce Accountants cotton growers' survey. This is due to its long successful relationship with Robert Plummer and Peter Harris from Rural Project Management (rpm@gil.com.au). RPM provides a comprehensive management service to farm investors such as Janerin. In addition, we were fortunate to have Stewart Leadbetter as our Farm Manager since 1989 when we acquired our first farm. Together with Stewart we have a good team in Damien Ebbert - our Operations Manager; Michael Hegarty - our Agronomist and Matthew Holding our external Cotton Consultant. The trust and ability of these people is evidenced by their longevity with our company.

Janerin has had a good and profitable experience in investing in Australian farming, and would encourage interested Chinese and other investors to do the same. We would be happy to share our experience.

## *Central Textiles uses BMP cotton from its farm in Australia*



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CENTRAL TEXTILES GROUP



# The Role of CSIRO in Australian Cotton Research

By M. van der Sluijs, M. Bange, G. Constable, S. Downes, S. Gordon,  
L. Henderson, D. Llewellyn, & L. Wilson

## Introduction

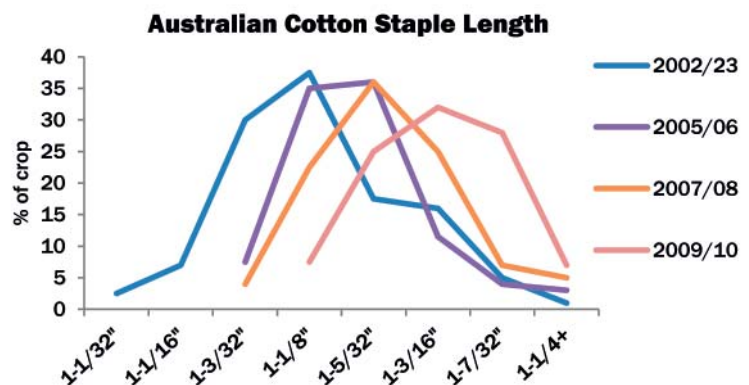
The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is the national government body for scientific research in Australia. It was founded in 1926 and currently employs over 6,600 staff across 50 sites in Australia and in other parts of the world. The primary roles of CSIRO include contributing to meeting the objectives and responsibilities of the Australian Federal Government and providing new ways to benefit the Australian community and the economic and social performance of a number of industry sectors through research and development.

CSIRO has made and continues to make major contributions to the Australian cotton industry through the integration of a range of research disciplines which have helped to underpin a profitable and sustainable cotton industry. The whole of industry approach has delivered GM cotton varieties with greatly improved insect and herbicide tolerance and world beating fibre, yield and quality. This has been combined with the necessary crop management and ginning support to ensure that Australia's cotton industry is both economically and environmentally sustainable into the future. Cotton research is led by internationally recognised scientists in disciplines that reflect the key focus areas, for a whole of industry approach. Links with industry are a key element of the research undertaken with support provided by the Australian Cotton Research and Development Corporation and Cotton Breeding Australia (a joint venture between CSIRO and Cotton Seed Distributors).

## Breeding

The CSIRO cotton breeding group develops cotton varieties with high yield and fibre quality with resistance to pests and diseases. These varieties have been critical in making the Australian cotton industry economically viable and environmentally sustainable. The breeding program was initiated in the mid 1970s and has developed varieties that have been bred and selected on the basis of yield, resistance to local pests and improved fibre quality, which has resulted in these varieties quickly replacing imported US varieties. This improvement in quality was reflected in increased demand from international spinning mills and since 1984 a premium has been paid for Australian cotton. Figure 1 shows the substantially improved fibre length from Australian cotton over the seven years from 2003 to 2010; this improvement has been due to the release of new varieties with longer fibre. Improvements

**Figure 1.** Example of fibre length improvements



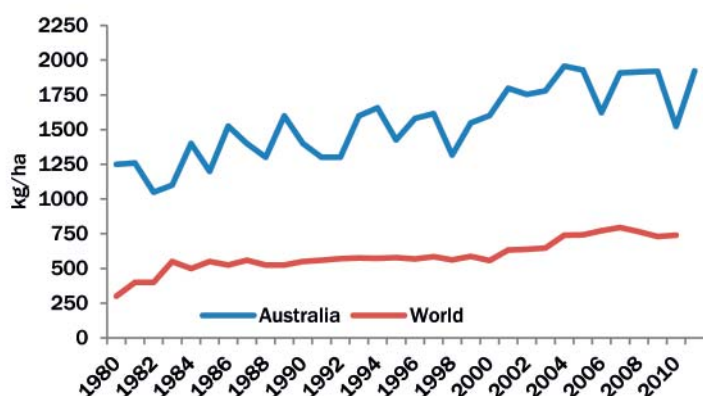


in fibre fineness have also been obtained from breeding. Cotton yields in Australia have been improving constantly for the last 25 years (Figure 2). It has been calculated that up to 70% of that improvement was due to higher yielding CSIRO varieties. Almost 100% of the current Australian cotton production is based on varieties which contain traits for insect and herbicide resistance licensed from Monsanto or Bayer.

### Biotechnology

The underlying biology, biochemistry and chemistry of the cotton fibre is complex and genomic, genetic and transgenic approaches are being used to increase understanding of the inter-connected genetic and biochemical networks that regulate fibre development and fibre structure and hence the final yield and quality of the cotton fibre. This in depth knowledge will aid in the development of premium Australian cotton varieties through development of molecular tools and traits.

**Figure 2. Cotton lint yield in Australia compared with world yields**



The application of high throughput DNA marker technologies will allow breeders to more successfully combine quality and yield traits that are currently limited by undesirable linkages and that would otherwise require very large populations to be screened. Such markers should therefore speed up the delivery of premium varieties through conventional breeding. The development of cotton plants with completely novel fibres with altered cell wall composition or structure (either through GM or non-GM approaches) could open up new uses for the fibre in either textiles or manufacturing as nanocomposites. This is being approached through a number of strategies including chemical and radiation mutagenesis and GM techniques. While these modifications will take many years to be released in a commercial variety, the potential technology could transform the industry into a supplier of specialty fibres and so establish niche markets for Australian cotton relative to other producers.

### Crop Physiology and Management

Utilising the CSIRO developed varieties and knowledge gained from the other cotton projects, this project group develops and delivers pest, agronomy and systems management solutions that improve yield,

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fibre quality and resource use efficiencies to further enhance the sustainability of Australian cotton systems. New knowledge of the cotton plant and crop processes (yield and quality) and their relationships with climate variables such as water, temperature, light and nutrients are generated. This assists in the development of plant and crop simulation models that can be used to assess trait and crop performance under different climates (including climate change scenarios) and management; and assessing the performance of plant traits from the breeding and biotechnology programs that may lead to improvements in yield and fibre quality at a whole-plant and crop level. Key drivers are water availability, international market access through improved fibre quality, improved grower profitability (managing inputs and costs), system diversification and adapting to climate change/variability. The group extends new management packages that: reduce reliance on chemical pesticides for integrated pest management; increase water use efficiency while maintaining or increasing yield; reduce reliance on nitrogen fertilisers and reduce N<sub>2</sub>O emissions; develop agronomic systems to maximise fibre quality of varieties to exceed expectations of cotton spinners; and deliver research outcomes into forms accessible by industry, especially using the internet with novel decision support tools.

Skip row configurations (Figure 3) are one crop management system being investigated in both dryland

**Figure 3.**



and irrigated systems to improve the reliability of yield and quality.

The uptake of transgenic cottons producing Bt proteins has been spectacularly successful in reducing pesticide use against the larvae of *Helicoverpa* spp, the primary pests. CSIRO has a major effort to monitor resistance frequencies in *Helicoverpa* spp and assess the effectiveness of current resistance management strategies and contribute to new strategies. The reduction in pesticide use has changed the pest and beneficial insect populations in cotton. CSIRO researchers are now focussed on the broader integrated pest management requirements to ensure that the range of sucking pests can be effectively managed.

A particular challenge has been contamination of cotton lint with honeydew (Figure 4), a sugary substance secreted by aphids and whitefly. The honeydew encourages growth of sooty moulds and results in problems with processing that can result in significant penalties. Research is investigating the fate and degradation of the contaminant in the field.

### Post Harvest Cotton

The post-harvest project area ensures that the quality of new CSIRO varieties meets the quality demanded by spinning mills around the world. The post-harvest cotton group leads research into the assessment of fibre quality in terms of textile



performance. To do this, the group has access to an industrial-scale, state of the art yarn and fabric manufacturing mill as well as an accredited testing laboratory. The group also develops instrumentation for measuring fibre properties, both for classification of cotton and process management, and develops new process technologies to reduce fibre damage during ginning, as well as yarn production modelling to provide benchmarking to spinning mills. Industrial scale ginning and spinning trials are undertaken to assess new varieties and crop treatments in terms of textile process efficiency and product quality.

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# Marketing a Million Tonne Crop

By Phil Ryan, President,  
Australian Cotton Shippers Association

CONSECUTIVE good seasons have generated a marked rebound in Australian cotton production - and with it, an increased presence in global cotton trade.

Including the crop being harvested now, Australian production in the last three seasons has averaged just

over 1 million tonnes per year - which compares to an average of just 375,000 tonnes during the preceding eight years of drought that ran from 2002/03.

Prior to the drought breaking rains of 2010/11, our previous record production had been just under 800,000 tonnes.

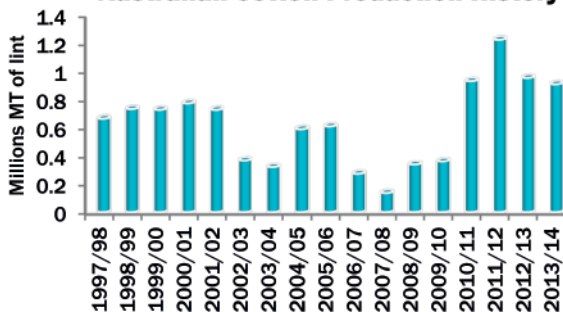
The good news is that large production years look set to continue, with Australia's major water storages still at historically high levels of capacity at the conclusion of another irrigation season.

This suggests production should continue at close to 1 million tonnes through until at least the 2013/14 season.

Irrigation water availability typically underpins Australian production - accounting for 90-95% of output. When irrigation water is available, there is very little "swing" away from cotton in Australia, with high yields (up to 2.5 tonnes of lint per hectare) meaning that alternate crops cannot compete on a gross margin basis.

Dryland area, by comparison, will swing in and out of cotton - largely depending on price relativities with grain sorghum, the major competing dryland summer crop in cotton regions.

**Australian Cotton Production History**



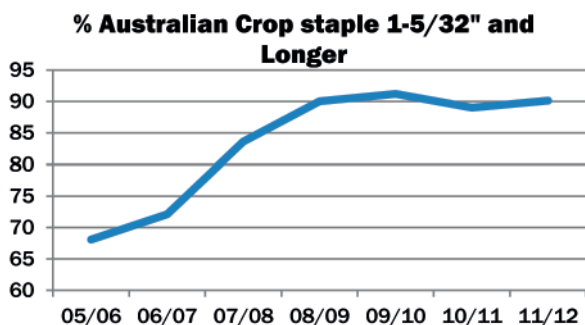
**Australian Cotton Water Availability  
end of 2012/13 season**

Region	Dam	March 2013 Capacity	March 2012 Capacity
Central Qld	Fairburn	81.20%	105.80%
St George	Beardmore	100.80%	99.70%
Darling Downs	Leslie	74.10%	91.30%
Macintyre	Pindari	60.20%	100.10%
	Glenlyon	89.30%	99.20%
Gwydir	Copeton	74.40%	91.30%
Namoi	Keepit	38.10%	98.60%
	Split Rock	88.60%	82.10%
Macquarie	Burrendong	41.30%	113.60%
Southern NSW	Burrinjuck	37.10%	107.20%
	Wyangala	78.90%	101.60%

## Capacity Challenges

Clearly, the rapid increase in production initially created a range of capacity challenges for the Australian cotton merchant community, as warehouses, trucks and container space needed to be secured to ensure the efficient movement of cotton. Additional staff, and associated training, needed to be procured at the same time.

The industry has been able to adapt remarkably quickly - with monthly shipments for the record 2011/12 cotton crop averaging just under 110,000 tonnes per month.



This means that Australia has been able to efficiently ship successive crops with minimal carryout.

### Why Australian Cotton?

The ability of the Australian trade to deliver these efficient logistics solutions is part of our trading success. As well as our ability to "get the cotton out" efficiently, transit times to major markets are short - assisting our customers with just-in-time inventory management and working capital requirements.

Typical transit times to South East Asian and North Asian markets are between 10 and 12 days (direct service), with exports to the sub-continent typically taking around 3 weeks to arrival - depending on trans-shipment requirements.

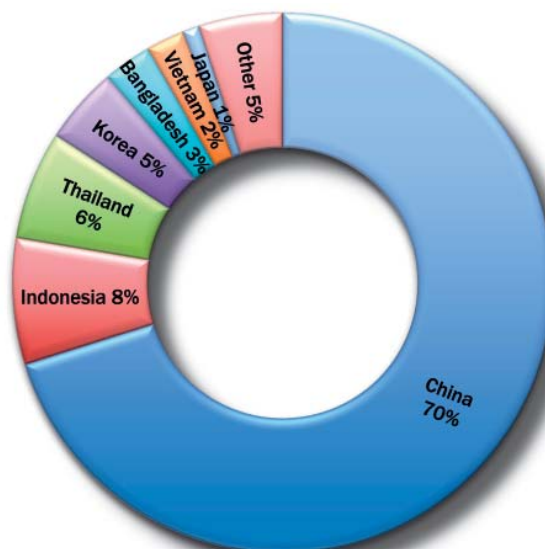
Consistent, even running quality, and zero contamination are hallmarks of Australian cotton shipments. Continual improvements in fibre quality characteristics also make Australian cotton the fibre of choice for our major customers. For example, over the last four seasons, around 90% of the Australian crop has produced fibre length in excess of 1-5/32".

### Major Trading Partners

Australia has been fortunate, in that our major increase in supply coincided with a rapid increase in Chinese import demand in an effort to rebuild strategic reserves. Thus, China has taken the lion's share of Australian production - accounting for almost 70% of our export volumes from the 2012 harvest.

Our traditional #2, #3 and #4 markets of Indonesia, Thailand and South Korea have also been important, and in the last few seasons Australia has re-cemented our "preferred supplier" position - accounting for

### Australian Cotton Export Destinations 2012 Harvest



around 20% of each market's import requirements. (This equates to around 7.5%, 6.5% and 4.5% of our exports respectively).

New markets are also emerging for Australian cotton - particularly Bangladesh and Vietnam - and these trading relationships will become increasingly important in the future, particularly if China's import appetite diminishes.

Whilst we are confident China will remain our major export customer, we are not expecting them to continue taking 70% of our production year in, year out!

### Developing New Markets

Thus, the development of new markets is a critical part of the Australian Cotton Shippers Association's long term strategy. This is never easy - particularly during periods of high price volatility. ACSA has taken a proactive stance and engaged with customers in a range of markets via the Australian Government's Export Market Development (EMD) Program.

This has involved EMD delegations of ACSA representatives holding seminars in a range of markets - communicating to customers the quality, logistics and reliability benefits of using Australian cotton. An additional focus has been made on new customers, with the importance of contract sanctity a key theme of market presentations. In order to continue effectively marketing one million tonne Australian cotton crops, our number one priority is to ensure that bales are shipped on time, and according to contract.



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# Managing Cotton Risk in Australia

By William Dwyer,  
Senior Manager - Advisory, FCStone Australia

Australia, being a land of extremes has, throughout its history, been one of the most unforgiving continents for undertaking agricultural production. During any growing season, when discussing the crop with any grower, you are likely to hear the word “too” in any discussion. It is either too hot, too cool, too wet, too dry and, in recent years, prices have been too low. Now low prices is certainly a theme that we hear repeated across the globe when discussing returns to the grower, but when you see cotton prices, not four months ago trading below the cost of production at around A\$380/\$400 per bale, while the A-Index of world cotton cash values was trading at above the 10 year average, on face value, one may well side with the grower in agreeing that he has a point worth arguing.

One thing that any cotton farmer will tell you is that making farm decisions is difficult at the best of times. With farm input costs on the rise, making any decision that will increase the cost of producing a bale of cotton has become increasingly difficult. Balance those costs with important marketing decisions that will ultimately determine that cotton farmer's bottom line at the end of the season, one must wonder how cotton farmers anywhere are able to get any sleep at night.

Cotton farmers in Australia have managed to survive the last decade through all manner of challenges thrown at them, from environmental challenges, having endured the most protracted drought in living memory, to lobby on water allocation restrictions to irrigators, to extremes in ex-gin price paid to farmers for their toil, particularly over the past two years. It is hardly surprising that there is more than idle curiosity when it comes to the question of how the Australian cotton farmer manages risk in an environment, both climatically and economically speaking, that is so

uncertain. Australian cotton farmers produce their crop on an arid continent, with no crop insurance apart from hail insurance, in a market with zero government price support, and no domestic consumption.

While market-based tools for the reallocation of production risk are highly limited in Australia, thankfully those risks can be mitigated at least in part, thanks to the collegiate approach of farmers to adopting better agronomic practices, particularly in areas where there is a surety of adequate water. Dryland cotton cropping systems in Australia do face an increased variability in production, which we have certainly seen over the years, in particular when cotton prices in the 2010/11 marketing year rallied so profoundly that the uncertainty of even picking a crop off dryland in many areas was worth the potential return.

Noting the perennial agronomic challenges that face all Australian cotton growers, there has been much shock and awe over the past two years when it came to absolute returns to the Australian cotton grower, no more so than those growers new to the industry. In 2011, cotton prices bid to the grower at one point exceeded some A\$1,000 per bale, while in 2012, after world prices and subsequently futures prices slumped, bids ended up around A\$360/bale. These recent extremes in the absolute value paid to the Australian cotton farmer have been the perfect storm of volatility in the three components of price, those being a falling value in ICE cotton futures, a falling basis from the panic-driven highs and an incredibly resilient Australian Dollar. In the absence of government-supported minimum prices, many cotton growers have taken it upon themselves to move away from merely selling spot or forward cash cotton, to a more portfolio approach to managing their cotton price-risk exposure.

Due to the high correlation between the US cents per lb component of price for Australian bales paid to the grower and prices posted on the Intercontinental Exchange (ICE) cotton futures contract, the understanding of the use of futures and options as a key tool in the management of cotton price risk, has improved greatly. Growers have been able to lock in that futures component of price as a hedge against any depreciation in world cotton values. This was particularly the case when cotton prices were falling and there was a distinct lack of liquidity in the forward cash market for Australian cotton on ex-gin terms.

Other futures-indexed price risk management tools are available to certain growers only, those being swaps in the form of OTC (Over the Counter) products. Now as mentioned, these products are not accessible to everyone and are typically available to more sophisticated risk managers, with more than a basic understanding of hedging. The OTC structures adopted by the more sophisticated cotton growers in Australia have been used as a modified price risk management strategy that combined varying levels of price protection with varying levels of price enhancement over the use of exchange-traded futures and options. It is important to point out that no price risk management strategy is without an element of risk and it is important that advice is sought on the benefits and risks of any strategy, but it is fair to say that some strategies have added A\$20 per bale to the bottom line of growers that implement and manage their strategy correctly.

While that futures component of price had been locked in, the grower still faced the volatility of two other crucial components of price, namely basis and currency. Thankfully, basis is usually a little easier to predict than the absolute value of cotton, and many cotton growers were able to lock in relatively good levels, with the high grade basis remaining historically buoyant. Australian basis paid by merchants, ex-gin, has traded within a range of 700 points down to around 100 points over May cotton futures in the past two months. This basis collapse is somewhat predictable, given the effect of higher world prices on the eagerness of consumers to make new purchases. As such, with new crop not yet in hand, merchants with fairly long basis positions, presumably some at their limit, were unable to maintain high basis bids to the grower, but those growers that locked in basis earlier are in good shape!



Lastly, one of the most difficult to manage components of price has been that of the Australian dollar. At the time of writing, with an AUD of around US\$1.0400, an on-call basis of 700 'on' fixed, versus ICE cotton futures at 90.00 cents per lb, equates to some A\$466 per bale. This is quite a respectable improvement from the A\$360 per bale bid to the grower at the end of 2012, and even today's cash bid to the grower of A\$450 per bale. Why? As mentioned earlier, the firm basis is no longer there. If we refer back to the average AUD/USD of 0.7750 going back to the beginning of 2000, that same basis futures combination of 97.00 US cents per lb would translate back to the grower in the amount of A\$625 per bale. Similar risk management strategies are available to growers to manage their currency exposure, but only a small number of growers are actively managing that risk. This is changing!

With the cost of production equating to around \$380-\$400 per bale, coupled with the risks involved in producing cotton in such an unforgiving climate, more and more growers are looking forward, in such a way as to manage the components of price in order to protect margins and, more so, to enhance margins. With the right help, an effective cotton price risk management can be developed, managed and accounted for, so that margins can be maintained and even enhanced in these difficult to navigate market conditions.

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