In 2015, the Cotton LEADS™ program entered its second full year. The Cotton Foundation recognises the strong value of communicating the continuous improvements that U.S. cotton producers are making. The Cotton LEADS™ program is helping cotton compete with man-made fibres for market share by illustrating cotton producers’ efforts at responsibly providing a reliable supply of quality cotton for textile manufacturers and leading apparel brands and retailers.

Though the Cotton LEADS™ Program is not a certification program, U.S. cotton producers are adhering to five core principles that give end-users confidence they are getting responsibly-produced fibre.

Helping make this possible is the Fieldprint® Calculator, an online tool developed by Field to Market® for U.S. cotton producers to assess how production decisions affect their farming operation’s overall environmental footprint. Specifically, the Calculator enables them to compare an individual field’s sustainability performance to the state and national agricultural data contained in the “National Indicators Report” in the areas of: land use, soil conservation, soil carbon, water use, energy use and greenhouse gas emissions.

I am also encouraged by the growth in the number of Cotton LEADS™ partners, which now exceed 350 from across the global cotton textile supply chain. I’m optimistic even more firms will sign “The Commitment to Cotton” to become partners in the coming year. The Cotton Foundation and U.S. cotton industry organisations will continue to keep these partners informed of Cotton LEADS™ activities.

As we enter the third year of the Cotton LEADS™ Program, the momentum for continuous improvement in cotton production continues to build both within the program, and our industry in Australia.

The clear message from brands, retailers and manufacturers is that cotton produced in Cotton LEADS™ founding countries satisfies an ever increasing demand for cotton grown with the highest regard for the natural environment, workers rights and safety.

Delivering this signal back to our growers from the supply chain gives them the encouragement to continue striving to better their production practices and this is an important part of what the Cotton LEADS™ Program delivers in Australia.

The personal effort and investment, over many decades, at an individual farm level cannot be underestimated and it is heartening to see so many textile businesses support what our growers are achieving.

The challenges facing the global cotton industry are complex and many. It is only through efforts like the Cotton LEADS™ Program, where farmers, industries and like-minded businesses work together to achieve change, that we will meet these challenges.

On behalf of all cotton growers in Australia, thank you for supporting our industry through your involvement and support of the Cotton LEADS™ Program.
The year in review

102 NEW PARTNERS
JOINED THE COTTON LEADS™ PROGRAM, BRINGING THE TOTAL TO MORE THAN 350 INDUSTRY PARTNERS

SIX
Cotton LEADS™ partner engagement events introduced partners to the Australian and U.S. cotton industries and provided updates of continual improvement progress

COLLABORATIVE COTTON RESEARCH PROJECTS INITIATED BETWEEN SCIENTISTS IN AUSTRALIA AND THE U.S. TO JOINTLY IMPROVE COTTON PRODUCTION PRACTICES IN BOTH COUNTRIES

Life Cycle Analysis Project underway to map the impact of cotton from field to consumer

Partner Post e-newsletter distributed worldwide in six languages

The Cotton LEADS™ Program is committed to responsibly-produced cotton through national and international efforts that are focused on the natural environment, best practices and traceability.

The program and its partners recognise that cotton growers at national level in Australia and the U.S. have a strong track record of positive change, operate in a robust regulatory environment that sets rigorous standards and have a commitment to continual improvement.

COTTON LEADS™ PARTNERS BY COUNTRY

5 CORE PRINCIPLES OF COTTON LEADS™ PROGRAM

1. COMMITMENT to the social, environmental, economic and regulatory factors required to produce world-class cotton

2. RECOGNITION that sustainable and responsible cotton production requires continual improvement, investment, R&D and the sharing of best practices information among growers and industry

3. UNDERSTANDING that leading change in responsible and sustainable cotton practices will have the most positive impact when implemented in collaboration among farm, regional, national and international programs

4. BELIEF in the benefit of working cooperatively with similar programs that seek to advance responsible and sustainable cotton production in an effort to keep global cotton competitive in world fibre markets

5. CONFIDENCE in a cotton identification system that ensures traceability from farm to manufacturer
Partner communication and engagement

The number of Cotton LEADS™ partners rose from 252 in December 2014 to 354 in December 2015, a 40% increase. Partners in the program represent all aspects of the textile supply chain from brands and retailers to manufacturing and spinning. These companies pledged their support by signing a ‘Commitment to Cotton’ to include cotton grown in Australia and the U.S. on their preferred supplier lists.

“During 2015 the Cotton LEADS™ program brought more than 100 new partners into the global community of companies that encourage and support responsible cotton production,” Senior Vice President of Global Supply Chain Marketing at Cotton Incorporated, Mark Messura said.

“Leading manufacturers, brands and retailers such as Hanesbrands, Kohl’s, Aeropostale and The Life is Good Company all recognise that we need to work together to support responsible and sustainable supply chains and sourcing. Cotton LEADS™ cotton producers provide the confidence that their downstream supply chain partners need,” he said.

Cotton LEADS™ partners engaged with Australian and U.S. cotton organisations through regular program updates, digital communications and special partner engagement events.

World’s largest fabric fair sees Cotton LEADS™ founding members and partners come together to promote responsible cotton

Forty-nine exhibitors at the Intertextile Fabric Fair, held in Shanghai in October 2015 were supporters of the Cotton LEADS™ Program and its efforts to promote responsible cotton production.

The event attracted over 75,000 delegates from all over the world, showcasing the fabrics and fibres from over 4,500 businesses including cotton from the U.S. and Australia. The Cotton LEADS™ Program was highlighted through billboard and trade advertising and partners were presented with plaques in recognition of their continued commitment.

In an exciting outcome, three new Cotton LEADS™ Partners joined the program during the show – Jiangsu GuoTai GuoMao Co., Ltd., Changshu Huamao Textile Technology Co., Ltd. and Jiangyin Quanshun Textile Co., Ltd.

Partner engagement events held in six locations

Following the success of Partner engagement events in 2014, the Cotton LEADS™ Program expanded efforts in this area during 2015, with events held in six locations throughout the year.

These meetings were a unique opportunity for brand, retailers and manufacturing partners to meet cotton producers and industry representatives from Australia and the United States. A number of industry leaders were involved including Cotton Australia Chairman, Lyndon Mulligan, Cotton Incorporated President and CEO, Berrye Worsham and Cotton Australia Director and cotton grower Fleur Anderson (pictured left).

Partners were provided with updates on responsible cotton production practices and leading research and development activities, along with discussion among partners about the issues facing global cotton.
2015 Cotton LEADS™ partner events:

Shanghai, China
19 January

Hong Kong, China
20 January

Mexico City, Mexico
21 April

Lima, Peru
23 April

Gastonia, N.C., USA
12 May

Tokyo, Japan
21 October

Partner Post translated into six languages

In order to make the Cotton LEADS™ Program information more accessible to a wider range of partners, the quarterly e-newsletter, Partner Post, was translated and distributed in Chinese, Japanese, Korean, Spanish, Turkish and English.

With the number of partners growing steadily, the importance of keeping them informed of achievements and activities in responsible cotton production practices in Australia and the U.S. remains critical.
The path to continuous improvement

The cotton industries of Australia and the U.S. have, through the Cotton LEADS™ Program, formally identified their commitments to continual improvement in 2015 and beyond. The Continuous Improvement Commitment, launched early in 2015, outlines a number of key areas for research, best practice and innovation in Australia and the U.S.

The Cotton LEADS™ Program recognises that although cotton faces many shared challenges such as water stewardship and pest control, efforts to improve at a national level can differ between countries. Below is a summary of commitments to continual improvements that have been made by the Australian and U.S. cotton industries.

**Australia**

- **Grow** on-farm Best Management Practices program (myBMP), with the aim of getting a greater number of growers through to complete myBMP certification.
- **Explore** and use Integrated Pest Management (IPM) programs to reduce reliance on a few key products and maintain low total insecticide use as pest threats and product availabilities change.
- **Invest** in research, demonstration trials and decision support tools focused on industry-wide projects to monitor and demonstrate best practice, crop nutrition research and training for advisors and farmers.
- **Better understand** the condition and connectivity of natural vegetation on cotton farms, building on several studies investigating wildlife and their habitats on cotton farms.
- **Develop** a carbon footprint calculator for cotton farms which determines carbon sequestration and emissions associated with agricultural production, as well as the net primary productivity and carbon sequestered by native vegetation.
- **Conduct research** and implement tools to improve water efficiency, including where main losses occur (evaporation and seepage across the fields, conveyance system and on farm water storage).
- **Develop** specific sustainability targets that boost farm productivity, increase water use efficiency, reduce carbon footprint, enhance biodiversity, reduce work related injuries and fatalities and facilitate increased sustainability reporting across the supply chain for cotton.

**United States**

- **Test, improve and implement** the Fieldprint® Calculator, a farm-level management tool for measuring impacts and promoting best practices.
- **Conduct** the Natural Resources Survey with U.S. cotton producers to identify currently used technologies, best practices and the rates of technology adoption.
- **Conduct** research and implement tools to improve water efficiency through precision irrigation techniques, optimised rainfall capture and improved plant water use efficiency.
- **Promote** ultra-low Gossypol cotton seed as a feed and food source in order to maximise the value of the cotton plant and address growing food scarcity concerns.
- **Conduct** research and implement tools to improve nitrogen use efficiency and management, such as sensors on tractors to make real time adjustments in applications.
- **Introduce** technologies that reduce water, energy and chemicals in textile manufacturing, specifically textile wet processing.
- **Develop** alternatives to chemistries used in textile manufacturing that meet safety standards while achieving desired performance, such as non-fluorine and formaldehyde-free finishes.
Sharing best practices

COTTON CULTIVATED

In 2015, Cotton Incorporated launched a new website that gives the cotton growing community quick and easy access to important cotton information. Cotton Cultivated is a portal that integrates research and best practices from websites, downloadable documents, social media and real-time news feeds to share the latest cutting edge information for improving production practices.

www.cottoncultivated.cottoninc.com

MYBMP ONLINE SUSTAINABILITY PLATFORM

The Australian cotton industry’s myBMP program is a voluntary farm and environmental management system that provides self-assessment mechanisms, practical tools and auditing processes to ensure Australian cotton is produced with the highest possible standards. The online ‘myBMP’ system was re-launched in 2010 providing growers and industry with a simpler way to access the information.

Through myBMP, all Australian cotton growers have a resource bank to access the industry’s best practice standards, which are fully supported by scientific research and development, resources and technical support.

www.mybmp.com.au

The Founding Organisations of the Cotton LEADSTM Program recognise that leading change in responsible and sustainable cotton practices will have the most positive impact when implemented in collaboration among farm, regional, national and international programs.

At the country level, both Australia and the U.S. are committed to the provision of cotton production best practice information to their respective cotton industries and beyond. Both countries remain committed to leading global efforts to advance responsible and sustainable cotton production in an effort to keep global cotton competitive in world fibre markets.

“…The cotton growing community has indicated that searching for and isolating cotton production information can quickly become an overwhelming task. The Cotton Cultivated site is aimed at helping users find cotton specific information as quickly and easily as possible”

Dr. Ryan Kurtz, Director of Agricultural Research for Cotton Incorporated
Research collaboration to jointly improve cotton production in Australia and the U.S.

A deepening relationship between cotton researchers in the U.S. and Australia has seen a number of exchanges and visits throughout the year, with the aim to streamline research efforts between the two countries to advance the Cotton LEADS™ program. The joint research efforts are part of the Cotton LEADS™ core principle to share information globally that can improve cotton production practices for all farmers and improve the worldwide competitive position of cotton relative to synthetic fibres.

In January 2015, a group of the world’s leading cotton scientists came together in Australia to discuss research collaboration opportunities, tour a number of leading cotton farms and visit research managers to better understand the issues faced by Australia’s cotton growers.

“Thanks to the Cotton LEADS™ program we’ve been able to focus on the areas that will deliver the most for both countries in our quest for continuous improvement throughout the textile supply chain,” CRDC Program Manager, Allan Williams said.

In July 2015, a number of senior staff from Australia’s Cotton Research and Development Corporation (CRDC) visited Cotton Incorporated to further explore areas of future collaboration in agricultural research and textile manufacturing. Three broad areas of interest were identified:

- Increasing product value.
- Evaluation of sustainability metrics.
- Developing technologies to support the farm of the future.

CRDC also toured Cotton Incorporated’s Research Center to learn more about ongoing research to reduce water, energy and chemical use in cotton textile manufacturing.

Cotton Life Cycle Assessment underway

In what will be the most comprehensive analysis of its kind, the Life Cycle Inventory and Assessment for cotton, conducted by Cotton LEADS™ Founding Organisations began this year. Throughout the second half of 2015, data were collected for cotton production, textile manufacturing and consumer end-use, with model development and data analysis scheduled for late in the year and early 2016.

Several Cotton LEADS™ Partners are participating in this important study, providing a great example of how the Program works with its partners to benefit them and responsible cotton production and manufacturing.

Cotton LEADS™ Partners have stepped forward to engage with founding organisations and encourage responsible production efforts.

January 2015, Cotton Incorporated Research Team meets with Australian Cotton Industry including growers, merchants and scientists in Sydney, Australia.
The 17 southern cotton-producing U.S. states experienced a variety of weather patterns including a cool, wet spring during planting for some, drought during the growing season for many and hurricane deluges during harvest for others over the 2015 crop year. Farmers planted 23% fewer acres in 2015 than in 2014 but slightly more than 2013. Decisions about which crop to plant were influenced by weather and moisture at planting, but higher grain prices relative to cotton was the major cause of the reduced acreage.

At time of publication, the 2015 cotton crop was estimated to be 13.3 million bales harvested from 8.17 million acres. The estimated average yield was 784 pounds/harvested acre, about 5% below the five-year average. The 2015 cotton harvest consisted of a diversity of grades, with average staple length and fibre strength at near all-time highs for much of the Cotton Belt.

Weather and low cotton prices are just a few issues U.S. cotton growers faced in 2015. In order to better understand the challenges facing growers and to develop technologies to better meet their needs, the U.S. cotton industry conducted the Natural Resource Survey. The survey of U.S. cotton producers was conducted to assess cotton’s impact on the environment, providing an effective means to understand farm inputs, production trends and technologies used to minimise cotton’s impact on the environment. A similar study was conducted in 2008 allowing the industry to benchmark and measure progress over the past six years. The 925 survey responses were representative of the U.S. cotton growing states.

The 2015 Natural Resources Survey findings indicate the technologies adopted by U.S. cotton growers are contributing to continuous improvement both in terms of increased yields and reducing environmental impacts due to increased resource use efficiency. Improvements in water-use efficiency, soil management and precision technology adoptions are highlighted.

Use of water efficiency systems increase

Irrigation methods are an important factor for conserving water resources and maximising water use efficiency. Since 2008, U.S. growers have used less surface irrigation and more pressurised systems such as pivots and drip irrigation, which are easier to precisely control and operate. Most pivots are operated at low pressures to save energy and reduce evaporative water losses and can be turned on with the touch of a switch, making it easy for producers to irrigate exactly when water is needed.

A well-designed surface system, such as a furrow, can be just as efficient as a center pivot. Most U.S. producers using surface irrigation systems employ computer model simulations to determine the exact flow rate of water needed for each furrow to maximise water use efficiency. Sixty-two percent of growers with furrow irrigation systems use tail water recovery systems, which reduce nutrient runoff, lower sedimentation in streams, and decrease water usage requirements.

Drip irrigation is one of the most efficient technologies a grower can employ to maximise water use efficiency. With the increased adoption of drip irrigation and improvements to the other irrigation methods, there is great opportunity for continuous improvement in water use efficiency for U.S. cotton producers.
Land use and soil management improves

Conservation tillage and no till practices, employed by 64% of U.S. growers, have led to effective soil conservation and soil health improvements.

From 2008 to 2015, growers using no-till practices increased from 36% to 45%. The move from conventional tillage practices to conservation/no till in many cases saves the grower money as less time and energy is required compared to conventional tillage methods. In three of the four U.S. cotton producing regions, these conservation practices led to significant decreases in energy and labor inputs.

In the cotton off-season, farm land can be used for various crops or cover that can increase revenue as well as create benefits for the land such as suppressing weeds, building soils organic matter and supporting beneficial soil microbes. Growers using winter cover crops (48% of respondents) produced higher cotton yields, especially with native vegetation (5% increase) and planted cover crops (4% increase) compared to farms with no winter crops.
Precision farming technology improves efficiencies and yields

Growers’ use of precision farming technologies significantly increased from 60% in 2008 to 84% in 2015. These types of technologies enable growers to more accurately manage agriculture inputs (e.g., fertiliser, water, herbicides) and increase the probability that a plant gets the correct level of inputs at the right time. These technologies can require significant financial investment, however, survey data did indicate growers using these technologies reported higher cotton yields than those who did not.

Field monitoring, such as soil moisture sensors, GPS enabled soil sampling and computer-based decisions aids are being adopted by U.S. growers in order to increase the accuracy and precision of water and nutrient application rates. The recorded yields and water use efficiency were higher for growers using irrigation scheduling and moisture monitoring programs. Increased field monitoring also had benefits in regards to nitrogen use in most cases. Growers using nitrogen testing produced higher yields and nitrogen use efficiencies in most scenarios.

<table>
<thead>
<tr>
<th>TECHNOLOGY USED</th>
<th>2008</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto-steer or GPS guidance</td>
<td>46%</td>
<td>69%</td>
</tr>
<tr>
<td>Guidance systems</td>
<td>44%</td>
<td>64%</td>
</tr>
<tr>
<td>Real-time flow control</td>
<td>55%</td>
<td>60%</td>
</tr>
<tr>
<td>GPS-based swath control</td>
<td>32%</td>
<td>51%</td>
</tr>
<tr>
<td>Grid soil sampling</td>
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</tr>
<tr>
<td>Soil map</td>
<td>31%</td>
<td>37%</td>
</tr>
<tr>
<td>Yield monitor</td>
<td>11%</td>
<td>20%</td>
</tr>
<tr>
<td>Aerial or satellite imagery</td>
<td>12%</td>
<td>13%</td>
</tr>
<tr>
<td>Hand-held GPS</td>
<td>10%</td>
<td>9%</td>
</tr>
</tbody>
</table>

Herbicide resistant weeds continues to be a concern for many U.S. cotton producers who use a variety of integrated pest management solutions and technologies to address the issue. Since 2008, producers are taking advantage of new technologies to be more precise and efficient in their weed control applications with 92% reporting at least one upgrade in the last 10 years, including GPS-based swath control, guidance systems and real-time flow control. Since 2008, more growers (33%) indicated they had fields that received no foliar insecticides during the season, representing 21% of reported cotton acres. These improvements in technologies have led to more efficient use of farm inputs and more precise application enabling growers to apply plant health products only where they are needed.

"Over the past seven years, we have seen significant improvements in U.S. cotton production with a 10% improvement in water-use efficiency, 9% increase in no-till acres, and increased adoptions of precision technologies. U.S. producers’ investment in technology has led to more efficient cotton production systems, resulting in both economic and environmental benefits to the producers and society as a whole." Dr. Ed Barnes, Director Agricultural and Environmental Research, Cotton Incorporated
Case Studies – USA

COTTON GROWER CASE STUDY

Steve Stevens improves water use efficiency by 40%

Steve Stevens, from Tillar, Arkansas, is an industry leader in environmental stewardship, using a number of on-farm management tools to improve irrigation water use efficiency, reduce erosion and nutrient losses and increase profitability.

The use of PHAUCET irrigation has helped Stevens to reduce irrigation water requirements by as much as 40%. It is also important for Stevens to know what impact farming practices such as tillage and the use of cover crops has on the quantity and quality of water leaving the farm. For the past four years, Stevens participated in the University of Arkansas Division of Agriculture’s Discovery Farms to assess edge of field water quality, enabling him to make improvements in fertilizer efficiency by retaining nutrients on the farm.

The use of cover crops and reduced tillage practices has greatly improved soil health. On-farm modifications and adjustments, coupled with the use of tools such as the Field to Market® Fieldprint® Calculator, have helped Stevens become more aware of the impact of his practices on the farm’s environmental footprint.

Stevens works to disseminate best-practices learned on his farm through a variety of programs and engagements including USDA-NRCS Stewardship Program, as a participant of the USDA-NRCS Mississippi Healthy River Basin Initiative (MRBI) program and Field to Market’s® Sustainable Agriculture Summit. Stevens was also nominated for the White House Champions of Change Award.

COTTON GROWER CASE STUDY

Ron Raynor finds success in double cropping and no-till

No-till and double cropping have been hugely successful in U.S. growing regions with adequate year-round rain to be more responsible and maximize profits as costs of inputs increase. Ron Raynor, of Goodyear, Arizona, has the solution for irrigated, high-heat agriculture in the desert. For over 10 years, Raynor produces a no-till, double-crop of durum wheat, cotton, and alfalfa on a family farm with his two brothers and two nephews.

The two practices complement each other to keep crops growing 365 days a year. Raynor does not wait on primary or seedbed tillage, a planting rain, or a crop to dry after a harvest rain. No-till allows planting 2-3 days after harvest since the harvested field is also the seedbed. Irrigation allows precise crop scheduling of germination and crop maturity by timing the last irrigation to shut the crop down on schedule.

Making this work requires a clear understanding of the soil surface and chemistry. Unlike flood irrigation, no-till forces the plant residue and organic matter to accumulate at the soil surface, just where Raynor wants it to prevent crust ing and allow water infiltration and soil cooling. Two inches below the surface, organic matter is derived from dead roots creating pores for movement of oxygen and moisture deeper into the soil. Raynor pays special attention to the soil surface chemistry and adjusts the pH only when needed to counter any negative effects of sodium salts on soil tilth.
RESEARCH CASE STUDY
Conservation tillage to improve soil nutrients

Conservation tillage research and practice has been done for many years, with early goals to reduce soil erosion. More recently, resources have been devoted to develop a better understanding of how chemical, physical and microbiological properties are affected when soils are managed with conservation practices.

The research provides blueprints for the development of improved cotton production systems with better soil quality that increases productivity and reduces losses of soil and nutrients to surrounding ecosystems. A long-term comparison between conventional and conservation tillage has shown higher amounts of organic matter present in the surface of soils under conservation tillage. Soil improvements have resulted in cotton plants experiencing less drought stress during short-term rain-free periods.

In 2015 the research was expanded to evaluate how using a crimson clover winter cover crop influences nutrient accumulation by young cotton plants and the microbes in and around cotton roots when cotton is grown with conventional and conservation management. Species diversity of bacteria and beneficial fungi in the cotton rhizosphere is being determined. A more thorough knowledge of how soil management influences these organisms will be useful in designing more nutrient use efficiency cropping systems.

In this 65 acre field alone, this Tennessee producer saw savings of 65,000 lb CO₂e, 873 million BTU, 2700 lb of N, 3100 lb of P₂O₅, and $5,400 in fertiliser cost by using variable rate application of fertiliser.

TECHNOLOGY CASE STUDY
Impacts of variable rate fertiliser using the Fieldprint® Calculator

Nutrient management through site-specific soil sampling is possibly the most simple, yet beneficial precision agriculture management strategy a grower can use to reduce nutrient run-off, optimise yields and increase profitability.

Research collects cotton production data for use in the Field to Market® Fieldprint® Calculator to compare traditional management strategies to newly adopted strategies, with the overall goal of increasing the sustainability of cotton production. By entering data from 80 U.S. cotton fields into the Fieldprint® Calculator, variable rate application (VRA) of fertilisers was found to reduce the amount of energy used by up to 60% and greenhouse gases emitted by up to 51% because less fertiliser, on average, was applied than the producer’s traditional uniform rate. In turn, this reduces the amount of nutrients that could pollute surrounding waterbodies. The research conducted using the Fieldprint® Calculator to measure and compare management practices demonstrates that reducing field inputs can lead to continuous improvement of responsible cotton production as well as increase producers’ profitability.

Soil and nutrient comparison of conservation (left) and conventional (right) tillage.
The cotton industry is an integral part of the Australian economy, worth more than $2 billion per annum in export earnings and helping to underpin more than 150 rural communities. The industry is made up of approximately 1,200 farms in regional New South Wales (NSW) and Queensland as well as cotton ginning facilities and a range of associated support industries. About 65% of Australia’s cotton is grown in NSW with the remainder grown in Queensland.

Australia’s cotton industry is underpinned by an enormous research effort that is funded by cotton growers in partnership with the Australian government.

The cotton research program invests around $15 million a year in priority areas including soil health and nutrition, water and pest management, human capacity and the value chain.

The Australian cotton industry continually improves its practices, finding new ways of doing things better, smarter and more efficiently. Cotton growers themselves are scientists, constantly investigating new and practical ways to save more water, reduce chemical use, improve soils and biodiversity, increase yields and improve profitability. Hundreds of partnerships between willing growers and Australia’s cotton research bodies allow field trials to be conducted every year, ensuring research outcomes are practical at farm level.

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**2015-16 RESEARCH PORTFOLIO INVESTMENT**

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<td>21%</td>
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</table>

50 Farmers  
21 Industry  
11 Consumers  
16 People  
2 Performance

**ANNUAL PRODUCTION ON AVERAGE FOR THE LAST FIVE YEARS [2009 - 2014]**

- **Irrigated planted area was**  354,775 ha
- **Dryland planted area was**  96,074 ha
- **Irrigated crop yield was**  9.85 bales/ha  \([2236 \text{ kg/ha}]\)
- **Dryland crop yield was**  4.09 bales / ha  \([928 \text{ kg/ha}]\)

| Total production was 881,463 metric tonnes \([3.9 \text{ million bales}]\) |
| The gross value of production was $2 billion |
| Average cotton area per farm 495 ha |
myBMP – the industry’s flagship program

myBMP is the industry’s flagship environmental program that helps to ensure the Australian cotton industry produces economically, socially and environmentally sustainable cotton. Forty five percent of Australia’s cotton is grown on farms participating in the myBMP program.

It sets out best practice farming techniques and the latest cutting edge R&D information in a web-based system to help growers be responsible farmers. Progress is recorded, monitored and audited in 11 key areas of farm operations including soil health, water management and human resources. Over 500 practices are included, where growers benchmark current performance against agreed industry best practices – and myBMP then supports growers to improve in the areas required to achieve full certification.

In 2015, the myBMP program continued to gain momentum, with more growers registered across the cotton growing regions and a full review of a number of modules to ensure the latest science, government regulation and best practice information was included.

Australia’s CottonInfo team

CottonInfo is a joint venture for the delivery of research and development between peak grower body Cotton Australia, the Cotton Research and Development Corporation (CRDC) and Cotton Seed Distributors (CSD), a grower-owned commercial seed company.

This five-year, $9.3 million program employs a team of specialists in cotton growing regions who work closely with staff from the parent organisations to deliver important research and extension information directly to growers. The CottonInfo team provide growers with the latest information, driven by research, on a range of cotton topics – from soil health and plant nutrition to biosecurity and water use efficiency.

CottonInfo’s primary goal is to translate research findings into improved management practices that boost industry sustainability and profitability, using the well-regarded myBMP system.

Water use practical change

Improvements in water use in the Australian cotton industry are the result of significant practice change as well as plant breeding. The industry has improved its water use efficiency by over 40% in the last decade. According to the 2014 Australian Grown Sustainability Report, practical examples of farm management changes include:

- **70%** of farmers use soil moisture probes, up from 40 percent in 2006 (highest of all agriculture industries in Australia)
- **96%** of irrigators improved their furrow irrigation system or changed to an alternate irrigation system
- **49%** of irrigators made changes to the flow or size of their siphons
- **35%** redesigned fields

Other practices include irrigating to deficits, better accounting of soil variations, changed bed shapes, using irrigation scheduling probes, furrow irrigation system optimisation evaluations, pump optimisation and reducing distribution losses.
Country Report – Australia

WATER USE PRACTICE CHANGE STRATEGIES APPLIED BY COTTON FARMERS

CottonSafe: Keeping growers safe

Worker rights and safety is an important component of the Cotton LEADS™ Program. The Australian cotton industry’s CottonSafe campaign, led by Cotton Australia, provides growers with access to the latest work health and safety (WHS) information tailored specifically for the Australian cotton industry. In 2015, CottonSafe was additionally delivered via a series of workshops in all cotton valleys, attended by hundreds of interested growers.

CottonSafe allows growers to effectively identify hazards, assess risks and implement plans to control them. The information assists growers in providing a safe working environment for all employees and contractors in accordance with applicable, robust regulations, reducing the rate of injury and easing financial pressures. Cotton Australia’s continued emphasis on farm health and safety is having a positive reach, with cotton representing less than 0.02% of all injury claims in Australian agriculture.

Worker safety, particularly around harvest time, is of paramount importance to the Australian cotton industry. In 2015, hundreds of growers attended workplace health and safety workshops hosted by Cotton Australia.
COTTON GROWER CASE STUDY

A carbon positive cotton farm

An uncertain climatic future means that minimising the carbon footprint of Australia’s cotton industry makes good environmental sense. The Kahl family’s 1,200 hectare property “Redbank”, near Wee Waa in New South Wales, carefully manages land-use proportions in pursuit of carbon neutrality.

However, “Redbank” has gone beyond carbon neutrality to become carbon positive, sequestering more carbon annually than it is emitting. Farm owner James Kahl cuts down the emissions on his property through a holistic rotation system, diversifying with crops that generate smaller carbon outputs and retaining large tracts of river red gum vegetation that stores as much as 300 tonnes of carbon per hectare.

Successful land use management and the maintenance of riparian zones sees “Redbank” sequester approximately 1185 kilograms of carbon per hectare over and above the carbon emitted.

RESEARCH CASE STUDY

Janelle Montgomery in pursuit of water use efficiency

Australian grown cotton is considered to be some of the world’s most water efficient. Large amounts of research, planting optimal varieties, implementation of technology and new on-farm practices have resulted in a 42% increase in water productivity over the last decade.

Cotton researcher Janelle Montgomery and her team have been at the forefront of these developments, championing water use efficiency and improving awareness and understanding of growers, researchers and cotton consultants.

Importantly, Janelle has focused on sharing her findings with industry and she has linked with grower and industry groups on a realm of projects, including research into surface irrigation optimisation, infrastructure utilisation and alternate irrigation systems.

Janelle and her team measured water use on farms from Emerald to the Murrumbidgee to establish Australian irrigation use benchmarks. These standardised calculations are also used to show improvements in the industry’s irrigation efficiency. The Gross Production Water Use Index (bales per megalitre) is an excellent indication of this improvement with Australian cotton growers improving their water use efficiency by 3-4% per year since 2003.
TECHNOLOGY CASE STUDY

Insight into future farming

The Australian cotton industry and its research partners are constantly looking to predict the future, in order to be able to adapt quickly to the changing needs of agricultural systems and the society in which we operate.

The Cotton Research and Development Corporation is involved in a partnership researchers at the National Centre for Engineering in Agriculture to develop adaptive and intelligent farming systems that use automation and robotics technologies. These are being designed to seamlessly interface with commercial on-farm operations to optimise use of resources and farm inputs.

This cutting edge research seeks to support farmers to choose the right management strategy in the right place, at the right time. Some of the leading-edge agricultural research and technologies being developed include:

- Real-time interaction with on-farm data provided by mobile augmented reality.
- Smart weed spot sprayers.
- Adaptive irrigation machines.
- Irrigation and farm management apps.
- Unmanned Aerial Vehicles (UAVs).
- Semi-autonomous machinery.
- Phenotyping (Centre for Crop Health).
- Farm energy systems.
- Weather/seasonal forecasting models.
- Alternate construction materials, including composite fibres.

Source: CRDC Spotlight Magazine, Spring 2015

COMMUNITY CASE STUDY

Looking after our rivers: Native fish release in the Macquarie

Almost 20 years ago, the Macquarie Cotton Growers Association, in conjunction with local councils and the state government began an annual release of fingerlings (baby fish) into the local Macquarie River, to help build the population of native fish.

Two decades on, the community is proud to have restocked over 200,000 fingerlings into the river system and has noticed an improving riverine environment that is testament to the local cotton industry, and its community.

Two species of native fish are alternately released each year, the Murray Cod and Golden Perch, with around 20,000 released in three locations. Local cotton growers and members of the community use canoes to scout out fish habitat locations and spread the fingerlings around so they have the best chance of survival.

This great community event brings together government, farmers and the community who all appreciate that rivers are crucial to the survival of small towns and farming industries, and that they need to be looked after for the future generations.

Source: Cotton Info Blog 2015

University of Southern Queensland’s Cheryl McCarthy is looking at the application of mechatronic engineering and machine vision for agriculture.

Warren community members release fish fingerlings into the Macquarie River earlier this year.
BROS EASTERN CO., LTD.

With operations in China and Vietnam, BROS EASTERN CO., LTD. is one of the largest top-dyed mélange yarn suppliers and a globally recognised leader in the textile supply chain for their innovation in responsible practices.

As a Cotton LEADS™ partner, BROS EASTERN is leading the way in responsible production through their environmentally-friendly EcoFRESH™ mélange yarn that is exclusively composed of Cotton LEADS™ cotton. In 2013, Bros launched the EcoFRESH™ Yarn product, a blend of specially treated cotton fibres and untreated natural cotton fibres.

This unique blend can create a range of mélange yarn effects while reducing the amount of water, energy and chemistry required during the dyeing process. BROS EASTERN is committed to responsible practices and demonstrates their commitment by creating desired products made from responsibly-produced Cotton LEADS™ cotton and extending their efforts beyond agriculture to manufacturing.

“Our EcoFRESH™ Yarn is manufactured from 100% Cotton LEADS™ cotton which is recognised for its good micronaire range, whiteness and excellent dye absorbency, allowing us to be more responsible in our supply chain. We are committed to responsibly-produced cotton and are proud to support the Cotton LEADS™ program.”

CHAIRMAN MR. YANG WEIGUO, BROS EASTERN CO., LTD
The year ahead for the Cotton LEADS™ Program

The Cotton LEADS™ Program continues to gain momentum, with more partners from all aspects of the supply chain joining and an increasing awareness amongst partners of the efforts in continual improvement being made in the founding countries.

The cotton industries of Australia and the U.S. will continue to build on this momentum, with plans for 2016 focused on partner recruitment, engaging with existing partners, further development of joint research initiatives and an effort to highlight partners “Leading the Way” in their own commitments to reducing the environmental footprint of the textile supply chain. The networking of Cotton LEADS™ Partners to develop a “web” of like-minded businesses that can continue to source cotton from responsible suppliers and learn from each other will also be a focus in 2016.

Partners will be kept up to date on Cotton LEADS™ Program initiatives and events, provided with information on how to source cotton from responsible sources, given updates from the U.S. and Australia as progress is made in sustainable cotton production and provided with reports on specific programs to improve cotton’s environmental footprint.

During 2015, the Cotton LEADS™ program supported its partners by working with them to evaluate and trace cotton use in their supply chains, to help retailer and brand partners educate their supplier networks about responsible production and to work with investment and nongovernmental organisations to understand the scientific measurement of continual improvement efforts.

COMING IN 2016
UPDATED COTTON LIFE CYCLE ASSESSMENT

The year ahead for the Cotton LEADS™ Program

COMING IN 2016
UPDATED COTTON LIFE CYCLE ASSESSMENT

The most authoritative and definitive scientific assessment of the impact of cotton in production, manufacturing and use.

The study will provide a roadmap for continual improvement efforts over the next decade.
The Cotton Foundation's overall mission is to strengthen U.S. cotton’s position in the highly competitive fibre market. The Cotton Foundation gives U.S. raw cotton’s agribusiness allies opportunities to support the U.S. cotton industry by supporting general research and education projects.

Cotton Australia is the peak body for Australia’s cotton growing industry, advocating on behalf of more than 1200 cotton farming families in NSW and Queensland. The organisation fosters a world class agricultural industry that’s sustainable, valued for its economic and social contributions and produces a top quality product in demand around the globe.

The Australian Cotton Shippers Association promotes the interests of the members of the Association in overseas markets, preserves the sanctity of contracts and the integrity of the Australian cotton trading industry, and facilitates compliance with contractual obligations and adherence to arbitration awards.

The National Cotton Council of America’s mission is to ensure the ability of all U.S. cotton industry segments to compete effectively and profitably in the raw cotton, oilseed and U.S. manufactured product markets at home and abroad. The organisation is the unifying force in working with the government to ensure that cotton’s interests are considered.

Cotton Incorporated is an independent, not-for-profit company dedicated to promoting the use of cotton. The company provides technical and marketing support to assist companies working with cotton. Cotton Incorporated is funded by U.S. upland cotton producers and importers of cotton products in the United States.

Cotton Council International (CCI) is the export promotion arm of the National Cotton Council of America. CCI’s mission is to increase exports of U.S. cotton, cottonseed and U.S. manufactured cotton products through activities that affect every phase of the marketing supply chain.
The following are signed Cotton LEADS™ partners as of December 2015. The Cotton LEADS™ program would like to sincerely thank these companies for their support in leading the way to responsible production and sourcing.

# 1888 Mills, LLC

A Advance Denim Co., Ltd.
AEON Topvalu (China) Co., Ltd.
AEON TOPVALU CO., LTD.
Aerostarle
Al-Karam Textiles Pvt. Ltd.
Alps Industries Limited
Amana Woolen Mill
Amber Cotton Mills Ltd.
Ambika Cotton Mills Limited
American & Efird, LLC
Anita’s Textiles Ltd.
American & Efird, LLC
Ambika Cotton Mills Limited
American & Efird, LLC
Arvind Ltd
Autex Trading, S.A. de C.V.
Azul Textil S.A.
Arvind Ltd
Arun Textiles Pvt Limited
Arvind Ltd
Artextil S.A.
Arvind Ltd
Arun Textiles Pvt Limited

B Baby Fresh
Badshah Textiles Ltd.
Banhardt Manufacturing
Batuhan Pazarlama
Bell and Barnett
Bengal Knitex Ltd.
Bengal NFK Textiles Limited
Beximco Ltd.
Black Peony (Group) Co., Ltd.
Bondex Group Limited
Brandix Textiles Ltd
Brooks Brothers Group, Inc.
Bros Eastern Co., Ltd.
Buhler Quality Yarns, Corp.

C C.I. Integrated Apparel Solutions S.A.
Caliphil Enterprise Co., Ltd.
Cargill Cotton
Cantagona Cotton Works
Carolina Cotton Growers Cooperative
Casablanca International Ltd.
Catayla Industrial, S. de R.L. de C.V.
Central Marketing Group
Changshu Huamao Textile Technology Co., Ltd.
Changshu Huashang Garment Co., Ltd.
Changshu Zhongliang Import & Export Co., Ltd.
Changshu Fucheng Craft Silk Fashion Co., Ltd.
Changshou Huaqi Apparel Co., Ltd.
Chia Her Industrial Co., Ltd
Chiem Patana Textiles Co., Ltd.
Chonbong Co., Ltd.
Chun Au Knitting Factory Limited
Cia. Industrial Nuevo Mundo S.A.
Compañía Industrial Romosa SAC
Cone Denim
Condenim (Jia Xing) Ltd.
Contemparia Fabrics, Inc.
Cotswold Industries Inc.
Cotton Homey Co., Ltd.
CREDITEX S.A.A.
Crystal Group
Crystal SAS

D Datsun Weaving Factory Ltd.
Deliagacy Industrial Co., Ltd.
Denim North America
Dezhou Huayuan Eco-Technology Co., Ltd.
Diamond International Corporation Ltd.
Dongguan Kefang Textile Co., Ltd.
Dong-II Corporation

E Edwin Co. Ltd.
El Rosario de Puebla, S.A. de C.V.
Esquel Group
EVISO Group Limited
Exclusive Bettwasche Gebr. Graser GmbH & Co. KG

F Federation Sanhe (Fujian) Co., Ltd.
Feroze 1888 Mills Ltd.
Ford Glory Limited
Foshan City Shunde Chaihu Textile Co., Ltd.
Foshan Seazon Textile and Garment Co. Ltd.
Fountain Set Limited
Franky & Ricky, S.A.
Frontier Spinning
Fruit of the Loom, Inc.
Fujian Septwolves Industry Co., Ltd.
Fung Fat Knitting Mfg. Ltd.
Fuzhou Xianglong Textile Co., Ltd.

G Getzner Textil AG
Global Dyeing
GoldDaio (Suzhou Industrial Park) Hygiene Products Co., Ltd.
Green Textile Co., Ltd.
Growthy Textile Ltd.
Grupo Industrial Miro
Grupo Iris Textiles, S.A.
Grupo Romatex, S.A. de C.V.
GTN Group of Companies
GTN Industries Group
Guangdong Best’n Fashion Clothing Co., Ltd.
Guangdong Zhonghua Cotton Textile Industry Co., Ltd.
Guangzhou Fangfang Fashion Design Co., Ltd.
Guangzhou Micici Apparel Co., Ltd.
Guangzhou Zengcheng Guangying Garment Co., Ltd.
Gunze Limited

H H.W. Textiles Co., Ltd.
Hamrick Mills
Handsome Textile Ltd.
Hanesbrands Inc.
Hangzhou Lianchenghuahuo Industrial Co., Ltd.
Hanoi Textile and Garment Joint Stock Corporation
Hansae Co., Ltd.
Hansoll Textile Ltd.
Hermann Buhler AG
Hermin Textile Co., Ltd.
Hilasal (Textiles San Andrés)
Hilaturas Los Angeles, S.A. de C.V.
Hirdaramani Group
Hoa Tho Textile Garment Joint Stock Corporation
Homegrown Cotton, LLC
Huafang Co. Ltd.
Huafu Top Dyed Melange Yarn Co., Ltd.
Hue Textile Garment J.S.C

I Ibea Shanghai Textile Co., Ltd.
Idrees Textile Mills Ltd.
Illinpin Spinning Co., Ltd.
IMAP Export S.p.A.
Imperial Group Guatemala
Inadera Mills
Indigo Trade Mexico, S.A. de C.V.
Indus Dyeing & Manufacturing Co., Limited
Industrias Apparel
Island Textile Mills

J J. Wingfield
Jasonwood Jeans Corp., Ltd.
Jegen Textilien AG
Jiangmen Daxing Knitting Co., Ltd.
Jiangsu A-Z Group Co. Ltd.
Jiangsu GTG Eastar Co., Ltd.
Jiangsu GTG Hubo Co., Ltd.
Jiangsu Guotai Litian Enterprises Co., Ltd.
Jiangsu GuoTai GuoMao Co., Ltd.
Jiangsu Taida Textile Co., Ltd.
Jiangsu White Rabbit Textile Group Co., Ltd.
Jiangyin Alfa Apparel Co., Ltd.
Jiangyin City Shenli Knitting Co., Ltd.
Jiangyin Liyang Textile Co., Ltd.
Jiangyin Quanshun Textile Co., Ltd.

K Kahee Co., Ltd.
KAHARA Corporation
Kamal Yarn Ltd.
Kang Na Hsiung Enterprise Co., Ltd.
Kangwaal Textile Co., Ltd.
Kaynak Tekstil
Kaysar-Roth Corporation
K-Boxing Men’s Wear (Shanghai) Co., Ltd.
Keer Group
KImpekst Tekstil
King America Textile Group
Koh’s Corporation
Kunshan Wuzhou Jiasheng Clothing Co., Ltd.
Kyungbang Limited

L La Colonial Fabbrica De Hilos S.A.
La Poblana, S.A. de C.V.
Linyi Aotai Textile Co., Ltd.
Linz Textil AG
Lives SAC
Liztex