ADAM KAY
CEO, Cotton Australia

The past year has been a challenging one for the Australian industry, with a cold start that led to one of the hottest and driest summers in recorded history. I’m pleased to report that although it was a tough cotton season, the resilience of our growers shone through and we harvested a four million bale crop during 2017, worth $2.5 billion to the nation.

The Cotton LEADS™ Program has remained a core partnership for our organisation, and our close relationship with Cotton Incorporated and others in the program has deepened over the course of its history. One significant outcome has been the strong collaboration that’s developed between the cotton research bodies in Australia and the U.S. with a number of exciting joint initiatives planned.

A very promising development has been the increased number of major international brands that have chosen to join the Cotton LEADS™ Program this year. These brands are including cotton from Australia and the U.S. in sustainable cotton strategies and recognising our country-wide achievements in sustainable, ethical cotton production. It gives our farmers a great sense of pride that such high-profile brands are seeking their product, due to the leading practices they’re using to remain efficient producers of high-quality natural fibre.

With the Cotton LEADS™ Program heading into its fifth year, it is important to reflect on the program’s achievements, challenges and plans for the future. There is no doubt that the cotton farmers in Australia and the U.S. are well placed for a future that demands responsible raw materials, and the Cotton LEADS™ Program continues to provide an important platform for our growers to tell their story to supply chain customers.

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

GARY ADAMS
President/CEO, National Cotton Council of America

After being founded four years ago by the U.S. and Australian cotton industries, Cotton LEADS™ continues to educate the cotton supply chain on 1) the responsible growing practices and environmental gains within the two countries and 2) how the self-investment by growers contributes to those gains. However, as a way to ensure we are building upon the gains U.S. cotton already has achieved, I’m pleased to report that the National Cotton Council adopted a resolution earlier in 2017 calling for the creation of the COTTON USA Sustainability Task Force.

Chaired by Louisiana cotton producer Ted Schneider, the task force subsequently collaborated with U.S. cotton industry associations on developing goals for measurable continual improvements in environmental stewardship, farm productivity and resource efficiency such as land, water, air, input and energy use. As a result, the U.S. cotton production goals being pursued by 2025 are reducing: 1) the amount of land needed to produce a pound of cotton fiber by 13%; 2) soil loss by 50%, in balance with new soil formation; 3) energy to produce seed cotton and ginned lint by 15%; and 4) greenhouse gas emissions by 39%. The goals are increasing: 1) water use efficiency (more fiber per gallon) by 18%; and 2) soil carbon in fields by 30%.

Already one of the few cotton-growing countries that has stringent national-level oversight of farm practices, we now believe the United States may be the world’s only country with these kinds of measurable, quantified goals. U.S. cotton’s global customers already appreciate they are being provided with quality fiber in a timely manner. Now, the hope is that they will have increased awareness of and appreciation for how that fiber is produced in an environmentally responsible way.

With this expanded sustainability reach, we believe the U.S. cotton industry can become the supplier of choice for those committed to only buying fiber produced with sustainable and responsible environmental, safety and labor practices.

Perhaps even more leading companies will join the 500-plus Cotton LEADS™ partners, as Hugo Boss, Gap Inc. and Walmart did this past year.
The Year in Review

The Cotton LEADS™ Program is committed to responsibly produced cotton through national and international efforts that are focused on sustainability, people and supply chain traceability.

The program and the founding organisations in Australia and the U.S. have a strong track record of continuous positive change, underpinned by robust government regulation and national research and development programs. Both countries are committed to cotton production that leaves a minimal footprint on the natural environment, and produces cotton with positive social outcomes for the communities in which it is grown.

**5 Core Principles of the 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 fiber markets

5. **Confidence** in a cotton identification system that ensures traceability from farm to manufacturer
Working Together Towards Responsible Cotton Production

Research Exchanges in the United States and Australia

Leading cotton researchers from the U.S. and Australia met several times during the year to progress a number of joint initiatives to further responsible cotton production in both countries.

In March, a team of U.S. cotton researchers visited Australia to exchange information that will further research efforts in cotton genetics and breeding. The team visited a number of Australia’s most innovative growers to look at common challenges around water management, high temperatures and crop fertility.

Following this visit, senior representatives of Australia’s Cotton Research and Development Corporation (CRDC) visited their peers at Cotton Incorporated Headquarters in Charlotte, North Carolina during June.

On the agenda was a number of collaborative research projects that are progressing to find joint solutions that can assist both countries and the global cotton industry.

This included a visit to North Carolina State University, which is being funded jointly by CRDC and Cotton Incorporated to investigate the shedding of microparticles from different types of fabric.

The group also met to develop a range of potential topics for collaboration in the future and identify a set of priorities to take further.

“It’s always a wonderful opportunity to catch up with our U.S. counterparts. We share many common challenges and it’s becoming more and more important to collaborate. The meeting helped us prioritize those challenges we can best work on together,” CRDC R&D Manager Allan Williams said.

Research exchanges in the United States and Australia
ICAC SEEP Committee
The Australian and U.S. cotton industries both have representatives on the International Cotton Advisory Committee’s Expert Panel and the Social, Environmental and Economic Performance of cotton (SEEP). Dr. Kater Hake (Cotton Incorporated) and Dr. Bill Norman (National Cotton Council) sit as members, and it is chaired by Cotton Research and Development Corporation’s Allan Williams.

SEEP recently prioritised its activities for the next two years, one of which will be compiling information on soil health from around the world. Soil health is fundamental to cotton production, and also influences the two most significant impacts of cotton production, as assessed using Life Cycle Assessment methodology: greenhouse gas emissions and water use.

This work, proposed and to be supported by Cotton Incorporated, will gather and share site-specific best practices for soil health. In this project, SEEP will expand the existing knowledge base on soil health and organize it into cotton grower relevant practices and information. Once assembled, it will be a freely available resource for the cotton industry to improve its environmental footprint and resource use efficiency regarding the critical inputs of fertilizer and water. It is vital to our industry’s success that global expertise sharing through ICAC SEEP continues to address concerns such as productivity and environmental impacts.

Leading Australian Cotton Breeder Contributes to U.S. Breeder Tour
Three staff from Australia’s CSIRO Cotton Breeding Program (Warwick Stiller, Warren Conaty and Susan Jaconis) attended the 2017 Cotton Breeders Tour held in September in Arizona, U.S.

Warwick Stiller was asked to give presentations on work being conducted in Australia that was relevant to colleagues in the U.S. The first was around the significant impact that breeding has made on the sustainability and profitability of Australian cotton production and some keys to success that could be applied to other production areas, such as the U.S. The second provided learnings on the way the Australian cotton industry has addressed its Fusarium issue through breeding and other coordinated industry responses.

“Overall, I believe it is crucial that Australia and the U.S. continue to share ideas and have open dialogue around these issues, which are common to both our industries. Ultimately, we are all aiming to improve the sustainability of cotton production through responsible use of resources and best practice, which will not only directly benefit the producer, but will have flow-on effects all the way to the consumer.”

Dr. Stiller

Warwick Stiller shares successful research to fight the FOV (Fusarium) disease.
The Cotton LEADS™ Program was represented at the Cotton 2040 Project during the year, an initiative of global NGO Forum for the Future to build demand for sustainable cotton around the world.

The 'Building Demand' workstream is a collaboration between cotton identity programs and major brands including a number of Cotton LEADS™ partners. It aims to increase demand for sustainable cotton within organisations, by building the business case for sustainable cotton and providing tools for accessing it in the marketplace.

The Cotton Foundation completed a major project to assess the life cycle of cotton, with Australia’s Cotton Research and Development Corporation contributing data for the first time, as part of its commitment to the Cotton LEADS™ Program. The research project was also strengthened by the involvement of many of the Cotton LEADS™ Partners.

The primary objective of this Life Cycle Assessment (LCA) was to provide robust and recent life cycle inventory (LCI) data for global cotton fiber production, textile manufacturing and consumer use. This allows us to ensure accurate representation of the impacts from cotton in other LCAs.

Building on the initial life cycle inventory (LCI) and analysis (LCA) released in 2010, the updated research provides a more comprehensive snapshot of cotton – and its relationship to the environment – across all phases of product life. A larger pool of global consumers was included in the update to more accurately reflect the impact of consumer use and disposal of cotton textiles.

When the entire cotton life cycle is considered, the textile manufacturing and consumer use phases dominated most of the impact categories, as illustrated by the data for a knit, collared casual shirt (one of three products assessed). For the life cycle phases outlined (agricultural production, textile manufacturing and consumer use), textile manufacturing was the largest contributor to 12 of the 14 impact categories. The major sources of potential impact for manufacturing were wastewater emissions from wet processing facilities, energy use in yarn manufacturing and weaving, and upstream production of energy and process chemicals. The agricultural phase had significant impacts on eutrophication potential and blue water consumption. Nitrogen fertilizer production and use and irrigation water contributed the largest share to impacts in the agricultural production phase. While the consumer use phase was not a primary driver for any one metric, the impact of laundering and disposal was similar in magnitude to the textile manufacturing phase on several metrics, such as energy use and greenhouse gas emissions.

With the Cotton LEADS™ Program heading into its fifth year, the founding organisations are taking the opportunity to reflect on the program’s successes, review its strengths and challenges, and make plans for the program’s next phase. A key part of this review will be the Cotton LEADS™ Partner Survey, conducted during 2017 to collect feedback from partners on issues such as current sourcing strategies, sustainability initiatives, communication requirements and program satisfaction.

Cotton Life Cycle Assessment Results

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Cotton LEADS™ Program Review Planned

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The number of Cotton LEADS™ partners rose from 436 to 503 during 2017, with representation across brands, retailers and manufacturers now extending to 29 countries around the world.

Importantly, a number of major international brands joined the program this year, sending a strong message to farmers and the supply chain that cotton from Australia and the U.S. is being recognized as having been grown with the highest care for the natural environment and the industry’s people.

The Cotton LEADS™ partners are united behind a common vision to source responsibly produced cotton in their supply chains, delivered by the Cotton LEADS™ program founding countries Australia and the U.S.

Major Brands Partner with the Cotton LEADS™ Program

In perhaps the biggest show of support for the Cotton LEADS™ Program to date, a number of major U.S. and European brands joined the program during 2017 to demonstrate their support for responsible cotton production in Australia and the United States.

Hugo Boss, GAP Inc., Wrangler, L.L.Bean and Walmart all signed the Commitment to Cotton and are now including Cotton LEADS™ cotton as part of their sustainable cotton sourcing strategies.

“This is great news for the program and shows the momentum that continues to build with awareness of the continuous improvement efforts in Australia and the U.S. These efforts begin on the farm with the commitment of cotton producers and continue with the research and support of our cotton industry organizations. Retailers and brands recognize and encourage that commitment,” said Mark Messura, Senior Vice President Supply Chain Marketing, Cotton Incorporated.
Q&A with Heinz Zeller, Head of Sustainability & Logistics, HUGO BOSS

Q: What does it mean to Hugo Boss to be a partner in the Cotton LEADS™ program?

A: The five core principles of the Cotton LEADS™ program – focused on producing sustainable cotton – match well with our own cotton commitment. The transparent disclosure of the continuous improvement programs and results achieved for issues like water, soil, pest management or biodiversity, while also applying the LCA methodology, are key requirements we are looking for when it comes to sustainable cotton farming. The availability of long and extra-long staple cotton and high purity of cotton fibers are critically important for HUGO BOSS products.

Q: Why are nationally based cotton identity programs like the Cotton LEADS™ program an important option for brands?

A: To have a transparent supply chain worldwide, it is essential to have recognized national sustainability programs in place in order to respond to the enormous complexity of the cotton system. Furthermore, the Cotton LEADS™ traceability with its unique bale identification number enables an efficient way of getting the transparency we require in the cotton supply chain.

Q: How is Hugo Boss incorporating the Cotton LEADS™ program into its overall sustainability strategy?

A: The Cotton LEADS™ program is one of our strategic alliances as part of our sustainable cotton commitment. About 50% of the raw materials are cotton fabrics and therefore cotton is the most important raw material. Hence the Cotton LEADS™ program has become an important partner for the HUGO BOSS sustainable sourcing strategy.
Partner Engagement

Partner Engagement Events: Mexico, Peru and United States

In 2017, the Cotton LEADS™ program hosted three partner meetings in Lima, Peru, Mexico City, Mexico, and Charlotte, NC. The goal of the events was to keep partners informed of program activities, and to highlight the research and sharing of best practices that is taking place within the grower community.

Partners heard presentations on continuous improvement efforts, the lifecycle assessment results and the recent goal setting by the U.S. industry. A key topic was also how to incorporate program partnership into marketing efforts within the supply chain and to consumers. Following the presentations, partners were able to ask questions and participate in a dialogue with agricultural experts as well as network with fellow partners.

“Partner companies joined the Cotton LEADS™ program not only to recognize the responsible production efforts of U.S. and Australian cotton farmers, but to stay informed, aware, and ahead of the curve on the latest efforts in sustainable cotton production. Through meetings with our global partners, the Cotton LEADS™ program informs and engages partners,” said Mark Messura, Senior Vice President of Supply Chain Marketing at Cotton Incorporated.

“Partners can both learn and challenge us to keep leading the way in responsible production, research and measurement. And most importantly, partners are joining together with cotton organizations to find improvements in production and measurement. This collaboration really underscores the importance of a total effort by stakeholders to tackle the challenge of sustainability,” Mr. Messura said.
Promoting Cotton LEADS™ Partners Globally

Industry tradeshows offer a unique opportunity to interact with manufacturers, brands and retailers throughout the supply chain. In today’s environment, nearly every discussion includes questions about sustainability, as companies want to know more about where their raw material comes from.

Cotton LEADS™ founding organizations share the facts on cotton at tradeshows such as Shanghai Intertextile, Outdoor Retailer and Premiere Vision. In addition, program partners that are doing good things in the industry are highlighted and promoted with these efforts.

“Shanghai Intertextile continues to be a leading tradeshow for the industry. The message of sustainability is becoming even more important and visible. Companies value what the program offers and many are eager to promote their partnership and responsible activities to their supply chain as well as their end consumer. It is great to recognize our partners’ efforts at this show,” said William Kimbrell, Senior Director, Cotton Incorporated Supply Chain Marketing Asia.

“Outdoor Retailer focuses on active and outdoor products. The companies attending are dedicated to environmental stewardship and the concept of getting more while using less. We have a positive story to tell about cotton as a raw material and how these efforts are supported by partners of the Cotton LEADS™ program,” said David Earley, Senior Director, Cotton Incorporated Supply Chain Marketing U.S.

Attendees at the Outdoor Retailer tradeshow discuss how cotton is doing good for the environment.

Cotton LEADS™ founding organizations recognize joining partners at Shanghai Intertextile.
Walmart is dedicated to learning more about cotton production and putting its learnings into action. “Walmart is excited to be a part of the effort to advance sustainability, and especially to reduce greenhouse gas emissions, in the cotton textile supply chain. With the collaboration of our suppliers and the Cotton LEADS™ program, we can build momentum and a more focused approach to achieve our goals of delivering sustainable products to our customers.”

KEN LANSHE, VP GM TECHNICAL, QUALITY & SUSTAINABILITY

WALMART

Going Big on Sustainability

Walmart is more than the global leader in retail – they are also a global leader in large-scale sustainability initiatives. To achieve its three overarching goals – to be 100% powered by renewable energy, create zero net waste and sell products that sustain the environment – will take bold thinking, collaboration and firm dedication.

Walmart believes that customers shouldn’t have to choose between a product they can afford and one that is good for the environment. By learning more about the cotton growing industry, Walmart aims to put these ideals into action in a more impactful way, driving trust and transparency into the apparel and textile value chain. Walmart believes they have an opportunity, and responsibility, to conduct business with a ‘shared value’ approach – operating in a way that helps strengthen communities, is good for society and is also good for the environment. Walmart joined the Cotton LEADS™ program to develop a deeper understanding of the textile and apparel industry and work together to identify and address key issues facing cotton.
WRANGLER
Tough Denim. Gentle Footprint.

Do a good job and help out. These two values are central to the American spirit and epitomize Wrangler’s commitment to sustainability. Seventy years after the iconic denim brand made its first pair of blue jeans, Wrangler launched a healthy soils initiative to assist and encourage U.S. cotton growers to adopt best practices for soil health.

The initiative’s science-backed soil health platform promotes no-till farming, crop rotation and cover crops, which build crop resilience to weather disruptions while improving yield, reducing water and energy inputs, preventing erosion and reducing greenhouse gas emissions.

The pilot program launched this year with help from the Newby Family, seventh-generation farmers in Athens, Alabama. The brand plans to expand the program for the 2018 growing season to another 12 U.S. cotton farms.

With additional time-bound goals for water, waste, chemicals and energy, Wrangler is truly taking care of the land, the industry, its community and the future.

Wrangler’s sustainability by the numbers:

- 3 billion liters of water saved since 2007
- Zero waste at all five distribution centers
- 70k employee volunteer hours since 2005
- 8,600 MT of sustainable cotton purchased in 2016

Wrangler is proud to work with cotton farmers like the Newby Family (pictured) to increase yields while decreasing environmental impacts.

JOEONE Promoting Responsible Cotton in China

JoeOne, the leading bottoms wear brand in China, recognizes there is more to their business than the products they develop and sell. Sustainability is a key element. Whether it is providing a high-quality work environment for employees, sourcing product from sustainable raw materials or raising awareness at the consumer level, JoeOne is committed to do what it takes.

To date, JoeOne has featured Cotton LEADS™ hangtags on more than 1.5 million JoeOne cotton products. And, they are not done yet. For JoeOne, their efforts to promote responsible cotton to the consumer have raised awareness and helped to stimulate demand for their cotton product lines. The Cotton LEADS™ program has provided JoeOne with an opportunity to communicate responsibly produced cotton directly to the consumer and these efforts will continue to be a part of their sustainability strategy.

“Being an enterprise citizen, we realize that we should take our social responsibility to our community. That’s why we were very glad to join the Cotton LEADS™ program. We hope we can support the use of cotton from the Cotton LEADS™ program in our supply chain.”

MR. CANGJIE LIN, EXECUTIVE VICE PRESIDENT AND BOARD MEMBER
Q: You have been to a cotton farm. What did you think?
A: I was impressed with the technology and investment by the cotton farmers in making sure they not only grow the highest quality cotton, but also protect the environment and the natural resources on their farms. The soil and moisture monitoring, as well as the equipment investment required, has evolved over the past 20 years. I was really impressed with the efficiency improvements they have made to make sure our cotton is not only sustainable, but cost effective.

Q: What does sustainability mean to Fruit of the Loom?
A: It is making sure every touch point in our supply chain is efficient in the consumption of resources, from the energy to drive our process, to the water we consume and the effluent released. It’s about making sure everything we do doesn’t just meet environmental standards, it far exceeds them – anywhere in the world that we operate.

Q: Why did you join the Cotton LEADS™ program?
A: Environmental sustainability is important to us because it is important to our consumers. Our consumers are very concerned about the raw materials and everything in our supply chain. It was clear to us that the vision of the Cotton LEADS™ program matched our vision for an environmentally friendly supply chain – making sure we are fully transparent to our consumers about the raw materials in our supply chain. It was a natural fit that aligned with our core values and principles. It delivers on our promise to our consumers.
Increasingly, consumers around the globe want assurance that their food and textiles are produced responsibly. They are concerned about the future of the planet, and the U.S. cotton industry shares those values. With the world population estimated to reach 9 billion by 2050, the U.S. industry is doing its part now to find new ways to improve the environment while producing more.

The U.S. cotton industry’s efforts go beyond the cotton field. Farm families work to protect the land cotton is grown on as well as the entire farm. The farm or ranch’s footprint includes acreage for other crops, farm animals, pasture land, wetlands, woodlands, wildlife and living areas for families, homes, gardens and recreation.

Cotton is seldom grown as a mono-crop in the U.S. Since cotton is farmed as a multi-crop, it encourages leveraging with other commodities that share the same stewardship efforts. For example, the industry partners with the food and fiber supply chain through the Field to Market Coalition (FTM) for Sustainable Agriculture. FTM is dedicated to promoting sound science, developing metrics impact and charting a path for continuous improvement. With more than 125 major organizations, including brands and retailers, agribusiness, government research organizations, wildlife and conservation civil society groups, the Coalition ensures they all are working toward continuous improvement.

The FTM coalition developed measurement tools for growers to assess their own fieldprint using the web-based FieldPrint® Calculator, and it is developing verification programs to chart field-level progress over multiple years. The alliance has analyzed independently collected survey data, which has documented clear progress in reducing cotton’s environmental footprint. Following decades of steady progress, the U.S. cotton industry now is setting its sights even higher.
In 2017, a Cotton Industry Sustainability Task Force was formed to focus on long range strategic goals for sustainability. The task force, made up of leaders from all industry segments including farmers, ginners, warehousemen, cottonseed handlers, merchants, cooperatives and U.S. spinning mills, came together to frame 10-year goals for continuous improvement. The group identified six key performance indicators for cotton, on which to establish a baseline and set new targets.

The task force set objectives for advances in land use efficiency, soil conservation, water use efficiency and soil health, as well as reducing energy and greenhouse gasses. The goals were adopted by the National Cotton Council’s (NCC) board of directors as nation-wide industry policy. The NCC is the unifying force of all seven segments of the U.S. cotton industry including 74 regional and state interest organizations.

The recommendations of the task force were grounded in sound science and aided by a focus group including some 20 cotton scientists, economists, engineers, textile specialists and sustainability experts. The diverse group of researchers, organized by Cotton Incorporated, was asked to push the boundaries of science, technology and productivity to new heights.

“The goals are meant to continue the trend of improvement and to bolster efforts through setting new reductions. By announcing these goals, the industry is committing to public accountability and transparency in its continued journey of sustainability.”

TED SCHNEIDER, LOUISIANA PRODUCER AND CHAIRMAN OF INDUSTRY-WIDE SUSTAINABILITY TASK FORCE

2025 GOALS TO FURTHER REDUCE U.S. COTTON’S ENVIRONMENTAL FOOTPRINT

| ▼ 13% Land use – area need to produce a bale of cotton |
| ▲ 50% Soil conservation – all fields in balance with new soil formation |
| ▲ 18% More fiber per gallon of water |
| ▼ 39% Reduced greenhouse gas emissions per pound of fiber |
| ▲ 30% Increase soil carbon – number of fields that build carbon |
| ▼ 15% Reduce energy to produce and gin a pound of fiber |
Charting a path to reach new targets requires the development of a strategic research and education plan to meet the KPIs for each goal.

**Reducing the number of acres required to produce a bale of cotton by 13%** can be achieved through the complex interaction of many disciplines: plant physiology and pathology, entomology, agronomy, soil science, and agricultural and biological engineering to name a few. There is a need to increase the speed of releasing new varieties to improve yields, reduce inputs and make the cotton plant more resilient. Advances in plant breeding using conventional breeding in combination with developing a gold standard for sequencing the cotton genome will aid in accelerating variety development. By combining conventional selective breeding with modern targeted molecular biology, practical solutions can be developed faster than either of the methods alone. The future will incorporate the new process of gene editing, still in its infancy, to move naturally occurring genes within the genome.

**More fiber from a gallon of water** is a bold undertaking. Two thirds of U.S. cotton is grown solely with rainfall nature provides. Finding new ways to capture excess rainfall and make it available in times of deficit is a high priority. Making the plant more tolerant to extremes of water stress, whether flooding or drought, is needed to add resilience. Research will be conducted to fine tune small amounts of supplemental irrigation to dramatically reduce risks of crop failure. A reduction of 18% of the water used to produce a bale of cotton is achievable.

**Reducing greenhouse gasses** is part of the U.S. cotton industry initiative to deal with unpredictable and extreme effects of weather. While GHG emissions reductions add new dimensions to its research agenda, the U.S. cotton industry has set its 10-year goal for reducing GHG by 39%. The goal parallels agricultural reduction targets set in the Paris climate accord agreements. Cotton scientists participating in the workshop believe that reaching the GHG target is achievable with a multifaceted focused research agenda of improvements in energy use, advanced genetics, enhanced soil health, research on the 4 Rs of nutrient management, and low energy precision water application systems.

**Amassing soil carbon** is essential to meeting new productivity and efficiency goals. Increasing the number of fields that employ practices to increase soil carbon is one of the metrics used to gauge industry’s progress on this goal. The industry objective of increasing by 30% the number of fields to be carbon-positive can be done by an emphasis on conservation tillage, effective cover crops and high residue management.

**Tools and technology to improve supplemental irrigation will help U.S. growers achieve the goal to become more water efficient.**

**Educating Cotton LEADS™ partners about soil health and biodegradability: naturally degraded cotton (white) underwear always beats synthetic (blue).**
Soil conservation is about landscape management. The goal is to decrease soil losses to water and wind erosion by 50% to reach sustainable levels. Innovative farmers are already demonstrating that refined management tools such as conservation tillage, soil cover crops, nutrient management, contour planting, land leveling and water management structures are proving effective in saving soils, so new soils are generated faster than that lost to erosion.

Energy used to produce a pound of cotton has been documented in the life cycle analysis of cotton. Compared to the energy needed to make manmade fibers, cotton’s use of fossil fuels is low. Even when accounting for embedded energy of tillage and inputs of manufactured plant protection and fertilizer products, the energy used to produce cotton is continually reducing. When the energy of the oil extracted from cottonseed is considered, the cotton plant is distinctly energy-positive. Nevertheless, the U.S. cotton industry’s goal is to reduce dependence on fossil fuels even further. Increasing effectiveness of nutrients, precise placement of plant health products and enhanced genetics will help reach the 15% energy reduction goal.

“The U.S. cotton industry will assess environmental impacts of the KPIs using science-based metrics and benchmarks developed by Field to Market: The Alliance for Sustainable Agriculture. While the goals are aspirational, they are doable.”

Dahlen Hancock, Texas Producer, Chairman of Cotton Incorporated

RESEARCH FOR PROFITABLE SOLUTIONS AND REDUCED IMPACT

406 Direct managed outside research and education projects funded by industry

167 U.S. research and education projects supported by qualified states support groups

$10m Funding allocations by industry organizations

Educational Tools to Implement Best Practices

As technologies are released and proven through research, getting new tools and management practices in the hands of farmers is important to the overall industry strategy. The U.S. supports a vast network of extension specialists, employed by the state universities, who provide on-ground support to farmers and farm organizations.

In addition, digital media such as the Plant Management Network (PMN) is increasingly being used for technology transfer. Cotton Incorporated is developing plans to expand efforts with the PMN, an online publishing service. The PMN has a history of success in enhancing the health, management and production of agricultural crops. These efforts with the PMN will feature webcast modules to support moving the national average for each KPI to the 10-year goal. Modules, developed by researchers and extension scientists, will concentrate on translating research findings to on-farm practices and explaining how the practices impact KPIs. A special emphasis will be on overcoming barriers to adoptions aimed at reducing input costs and preserving yield.
GROWER CASE STUDY

RN Hopper Hosts Field Day to Share Residue Maintenance System

From Petersburg, Texas, RN Hopper is one cotton grower who is passionate about improving cotton’s environmental footprint. The region has limited rain, irrigation water and soils historically low in organic matter. Without the water to grow high-residue cover crops, such as cereal rye, RN uses no-till and a corn-wheat-cotton rotation to keep his soil covered all year long. If extra residue is needed, he carefully meters out the soil water or irrigation to grow residue on the least amount of water.

His residue maintenance system has evolved over 20 years of missteps and successes, but for the past four years he has hosted a field day on his farm to help neighbors avoid missteps, see the equipment needed and walk fields. RN also supports a massive amount of research on his farm with local university scientists, USDA-NRCS and irrigation consultants, who present their results at his field day. In addition to reaching 150 local growers with his field day, RN joined a Citizen Scientist program in 2017 with university soils and climate scientists to allow more growers to create conservation tillage production practices on their own farms that maximize rain water efficiency in this arid region. And in 2018 RN will launch a two-day short course on ‘getting started in conservation tillage’—all with the goal of making cotton competitive.

GROWER CASE STUDY

Donny Lassiter is Investing in Farming’s Future

For cotton farmers like Donny Lassiter, leaving less of his crop to luck and more to technology has paid off. Donny grows a range of crops on his family farm in northeastern North Carolina, from cotton to peanuts, wheat to soybeans, corn, pumpkins and chufa. By adopting new farming technology over a decade ago, Donny’s been conserving not just natural resources but also financial ones. He’s found that good environmental practices are also good economics, saying, “it’s worked out well for everyone”. Donny uses GPS technology to reduce annual fertilizer waste. The device keeps the machine straight and cuts off the sprayer when it goes out of bounds, easily delivering a more precise application. By only using fertilizer where it’s needed, he’s using 25% less.

You’ll find him using more organic fertilizers, no-till farming, and winter cover crops to maintain the structure of the soil for spring cotton planting. And he’s even experimenting with flying drones over the farm to scout crops and manage pests, as well as mapping the soil with infrared imagery to develop crop fertility plans.

By being open to a trying new methods and technologies, Donny’s been able to “ride the wave of progress or even get out a little bit ahead”. And by sharing his learnings with other farmers in the region, he’s able to impact the local industry for the better.

For cotton farmers like Donny, growing a more successful future for everyone is always worth the investment.
RESEARCHER CASE STUDY

Dr. David Stelly Delivers Genetic Breakthroughs for Cotton

With four decades of experience spanning cytogenetics, germplasm introgression and genomics, Dr. David Stelly’s focus has been on the introgression of wild species to increase the genetic diversity of cotton.

His research was instrumental in the development of the CottonSNP63K Array, which enables high-quality genotyping of breeding materials. With Dr. Stelly’s research, the cotton community is able to better connect genotype (cotton’s genetic code) with phenotype (performance in the field) in order to develop new cotton varieties that are higher yielding with lower inputs.

Dr. Stelly is the recipient of the 2017 ICAC Cotton Researcher of the Year award. He has authored or co-authored 150+ publications, is Past Chairman of the International Cotton Genome Initiative and Past President of the National Association of Plant Breeders (NAPB). Twice, he has been awarded the Cotton Genetic Research Award.

COMMUNITY CASE STUDY

Cotton Seeds for the Future

Maintaining seeds of native and wild cotton is an essential service for global cotton.

When cotton geneticists and breeders from around the globe need an exotic gene with a trait for disease resistance, fiber strength or drought tolerance in their breeding program, they order seeds from the National Cotton Germplasm Collection. Ten thousand accessions, collected from around the world, are kept safe in this gene bank. Without the collection, many of the exotic seeds and their desirable alleles would be lost, never again to be available for future generations.

Seeds in the USDA repository are kept viable, characterized and catalogued for key properties and made available to geneticists and breeders. Plant breeders must plan many years into the future as they know that a diverse gene pool is essential to maintaining strong varieties. The collection allows the possibility of discovering the genes that confer resistance that may protect cotton’s future.

“Our national cotton germplasm collection shares seeds around the world. However, it is only useful if it is properly characterized and has viable seed in desirable quantities. Keeping this collection is an insurance policy against extinction of many of these lines.”

DON JONES, COTTON INCORPORATED AGRICULTURE DIRECTOR OF GENETIC RESOURCES
The Australian cotton industry remains firmly committed to sustainability and continuous improvement. Today, Australian cotton growers grow more cotton on less land, with more efficient water use and less impact on the environment than ever before.

These achievements have been gained incrementally, over decades, and have required an all-of-industry response to the challenges posed by cotton production. At the core of Australian cotton’s success are two key factors: a sustained commitment to cotton research and development, and the industry’s myBMP program (Best Management Practices).

Transparency, collaboration, resilience and a willingness to engage with communities, government, NGOs and other agricultural sectors are also key ingredients to success.

The Australian cotton industry benchmarks and collects sustainability metrics across the whole industry that clearly show practice change and significant reductions in major inputs such as water and pesticides. The majority of Australia’s cotton farmers are using best practice, regardless of whether or not they’ve achieved full myBMP certification.

Cotton Australia and the Cotton Research and Development Corporation (CRDC) have continued to protect the important commitment to matched government funding for research and development. For the 2017-18 research funding round, the CRDC Board approved $22 million in research investment for 200 projects.
**myBMP Update**

Cotton Australia’s work to encourage grower engagement with myBMP is accelerating, with more than 75% of cotton farms now registered in the system and more than 15% of Australia’s cotton crop produced by fully certified farms. myBMP helps growers reduce on-farm risk, meet regulatory requirements, implement industry best practice and improve business management.

myBMP is structured into 10 modules covering all areas of Australian cotton production including:

- **BIOSECURITY** – Avoidance, management and control of pests and diseases
- **ENERGY AND INPUT EFFICIENCY** – Efficient energy inputs such as electricity, fuel and fertilizers
- **FIBRE QUALITY** – Growing the best quality cotton possible
- **HR AND WORKPLACE HEALTH AND SAFETY (WHS)** – Managing employees and contractors while providing a safe workplace
- **INTEGRATED PEST MANAGEMENT (IPM)** – Management of pests, weeds and diseases
- **SUSTAINABLE NATURAL LANDSCAPE** – Managing the vegetative and riparian assets on farm
- **PESTICIDE MANAGEMENT** – Pesticide management, storage and use on farm
- **PETROCHEMICAL STORAGE AND HANDLING** – Managing fuels and lubricants on farm
- **SOIL HEALTH** – Maintaining and/or improving soil quality
- **WATER MANAGEMENT** – Water quality, efficiency of storage and distribution

The past year has seen particular effort by the Cotton Australia and CottonInfo teams to work together to achieve more engagement with the program. In the past year, the number of growers registered in myBMP grew by 16% and 170 cotton farms are now fully myBMP-certified.

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**Improving the livelihoods of Australian farmers and their communities.**

The benefits of Australian cotton’s sustainability program are felt at many levels in Australia, including on the farm, at a whole-of-industry level and in more than 150 communities in NSW and Queensland where cotton is grown. The outcomes of Australian cotton’s commitment to myBMP and a transformational change in the production system includes:

- Pesticide use decreased by more than 90% in the past decade, making workplaces safer and drastically reducing the impact on the natural environment
- Water use efficiency increased by 42%
- Yields increase year on year – Australia produces yields three times the world average
- Land use efficiency gains – 30% less land needed to grow a tonne of Australian cotton compared to a decade ago
- 42% of farm area is dedicated to native vegetation and biodiversity management
- Continuous improvements in quality – including low contamination

The average cotton farm in Australia employs 6.6 people and in non-drought years it’s estimated the industry employs more than 10,000 people. Cotton is a major commodity, representing 30 to 60 percent of the gross value of the total agricultural production in regions where it is grown.

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**Australian Cotton Production – 5 Years**

Number of hectares of Australian cotton planted and bales produced over the past five years.

**Australian Cotton Production since 1960**

Australia’s cotton growers produce yields three times the world average.
Country Report – Australia

Keeping Our Workers Safe
Safety is an important component of every cotton farming operation. To help growers keep families, staff, contractors and visitors safe, Cotton Australia delivered its annual CottonSafe campaign. Safety resources and templates engage workers and contractors to help them identify and assess hazards on farms, and to develop and implement plans and procedures to minimize risks.

Cotton Australia’s resources are linked to the industry’s myBMP program, specifically its modules on human resources and WHS, pesticide management and petrochemical storage and handling. These modules provide growers with practical safety tools to implement best practice on farm.

Building Capacity
Each year, Cotton Australia, the CRDC and other industry bodies support a number of leadership programs to increase the capacity of the cotton workforce now and into the future, including to build the skills of emerging leaders.

These programs include:
- The Australian Future Cotton Leaders Program for 15 emerging cotton industry leaders to develop leadership knowledge, skills and experience
- The Peter Cullen Water and Environment Trust’s Science-to-Policy Leadership Program for individuals currently working in the science, policy or management of water
- Nuffield Australia Farming Scholarships for exemplary cotton growers or farm managers
- The Australian Rural Leadership Program for established leaders currently working in or for the Australian cotton industry

Leading the Way on Cotton’s Social Agenda

Industry-wide Workforce Plan
The Australian cotton industry recognizes that people are at the heart of sustainability, and that they are the industry’s greatest asset. Late last year, a whole-of-industry workforce strategy was endorsed, setting a clear plan for delivering priority on-farm workforce needs. Cotton Australia is now implementing this strategy, with key activities including Workplace Health and Safety workshops for growers.
Sharing Knowledge to Problem Solve Together

Cotton Collective Industry Forum Unites the Industry

More than 500 cotton growers from across Queensland and NSW gathered in Griffith (Southern NSW) in August to discuss issues of importance facing the industry and catch up on the latest developments in sustainable farming.

The two-day Cotton Collective Industry Forum covered a huge range of topics, from research and development, connected agriculture and technology, to positioning Australian cotton in the world fibre market. According to Cotton Australia CEO, Adam Kay, this event is a critical engagement opportunity.

“"The 2017 Cotton Collective brought together the whole industry to discuss the most important issues facing growers,” Mr. Kay says. “It was also an extremely valuable forum for those in the industry to learn about the latest technology, which is crucial to maintain the industry’s high standards for productivity and efficiencies.”
LEADING THE WAY:
INTEGRATED PEST MANAGEMENT

Andrew Watson, Cotton Grower, Boggabri NSW

Australian cotton grower Andrew Watson has not sprayed an insecticide (apart from research trials) on his cotton in the past 12 years of cotton growing on the family farm east of Boggabri in the Namoi Valley. Andrew is a leader in the adoption of Integrated Pest Management and the aim of his management style is to protect and build up populations of beneficial insects and other predators on the farm as a way to manage pests.

Andrew and his agronomy team carefully measure and monitor both insect pests and beneficial insects found in the crop during the season, and these records are used to make decisions.

Even in this past season of high insect pressure across all valleys, Andrew didn’t record any pests that were over the thresholds, a measurement for when pest levels become high enough to apply a pesticide.

Simply put, “We don’t spray because we don’t go over thresholds, and I put a lot of this down to preserving our beneficials and other predators,” Andrew says.

LEADING THE WAY:
GOING SOLAR TO IMPROVE EFFICIENCIES

Andrew Gill, Cotton Grower, Narromine NSW

The installation of a 400-panel solar diesel hybrid irrigation bore pump on a 300-hectare cotton farm in Central West New South Wales has led to cuts in fuel costs, greater irrigation efficiencies, and a massive reduction in greenhouse gas emissions.

Attracted by the drop in the price of solar panels and the prospect of the system paying for itself in less than four years, Andrew Gill and his family decided to install a solar diesel hybrid system at one of the pump sites on their Narromine farm. The move has slashed diesel use by between 45,000 and 55,000 litres a year. Over 25 years, that equates to a saving of more than 1 million litres of fuel and a reduction of more than 3000 tonnes in carbon emissions.

According to Andrew, this technology was a win-win that included both environmental and financial outcomes.

“Solar is a way for us to have a better handle on what our input costs are going to be throughout the next 20 years of production. It is not often you can get that level of foresight,” he said.

Andrew said he was continuing to look into ways to fine-tune the system and improve its efficiency. Convinced that solar is the way of the future, he plans to introduce more solar pump stations throughout the farm.

The CottonInfo team is now looking to share the outcomes of this project with others in the industry, as a way of reducing overall emissions and promoting cost savings.


LEADING THE WAY:
MANAGING RESISTANCE IN GM COTTON

Dr. Sharon Downes, Cotton Research Scientist, Narrabri NSW

The use of GM technology in the Australian cotton production system has led to a significant reduction in pesticide use, when paired with the industry’s leading Integrated Pest Management strategies. Successfully managing resistance over a 20-year period has required an industry-wide approach based on cutting-edge research.

Dr. Sharon Downes leads CSIRO Food and Agriculture’s IPM and Resistance Evolution research team. She has been located at the Australian Cotton Research Institute since 2004, and has made a significant contribution to the Australian Cotton Industry through her work on resistance evolution in *Helicoverpa* to the toxins contained in Bt cotton.

This includes resistance monitoring data that allows the industry to judge how to effectively manage and adapt the Bt Resistant Management Plan (RMP) for Bt cotton. Dr. Downes has made a significant contribution to establishing robust and practical strategies for managing resistance in Australia for both Bt cotton and the insecticides used to control all insect pests.

LEADING THE WAY:
VALUING RIPARIAN ASSETS

Auscott Midkin, Moree NSW

It’s been 14 years since work on the regeneration of riparian areas was initiated at Auscott’s ‘Midkin’ property back in 2001 as part of the company’s commitment to myBMP. Bordering an adjacent creek, the riparian areas – made up of native vegetation – cover almost a quarter of the property.

The method of regeneration was to cease dryland farming and grazing in areas close to the creek to allow the country to rejuvenate naturally. Non-native grasses and weeds were also controlled to promote the regrowth of native vegetation.

Auscott CEO Harvey Gaynor, who was Midkin farm manager at the time, says the approach to regeneration was to “let nature take its course”.

“We tried to work with nature rather than recreating it,” said Harvey. “By leaving the land alone, it regenerated itself the way nature intended. We didn’t plant any trees or grass, but allowed natural regrowth, which occurred largely after a single flood event.”

“When necessary we tried to recreate nature as best we could, which led to the selective clearing of the Coolibah tree species to create diversity in the age, size and number of Coolibah and other tree and grass species,” he said.

Retention and improvement of native vegetation is an important component of the Australian cotton industry’s myBMP program.

The Cotton Foundation
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
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.

Australian Cotton Shippers Association
The Australian Cotton Shippers Association is an association of cotton merchants. ACSA members are engaged in the entire cotton supply chain from field to processing at the gin, to cotton classing, warehousing, shipping and delivery to final consumer. ACSA represents the interests of the cotton industry specifically in relation to the procurement and marketing of the Australian cotton crop.

National Cotton Council of America
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
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.

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The following are Cotton LEADS™ partners as of December 2017. The Cotton LEADS™ program would like to sincerely thank these companies for their support and engagement. Thank you for LEADING THE WAY to responsible production and sourcing.

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