



# annual report 2014



# A Word from the Founding Organisations



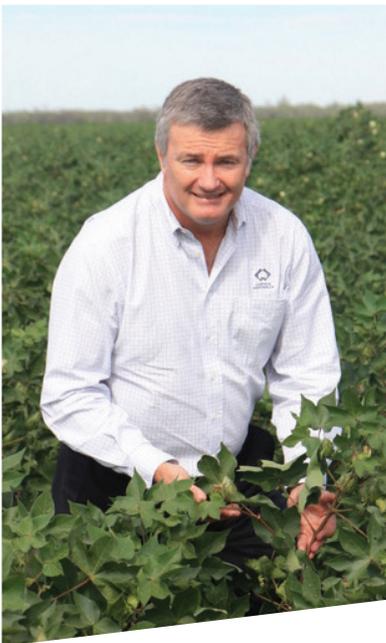
**MARK LANGE**  
Executive Director  
Cotton Foundation

The Cotton Foundation was very eager to be a founding organization of the Cotton LEADS™ program alongside Cotton Australia. We are appreciative of the unified efforts of the supporting organisations: the Australian Cotton Shippers Association, National Cotton Council, Cotton Incorporated and Cotton Council International.

The U.S. cotton industry has enthusiastically embraced this program since it was initiated in 2013 to advocate and demonstrate continuous improvement and responsible cotton production practices. It is gratifying to see how quickly the Cotton LEADS™ program attracted more than 240 partners. Our goal is that more yarn spinners, textile and apparel manufacturers, retailers, brands and even other cotton industry firms will become partners.

The Cotton LEADS™ program provides a platform to escalate awareness of these producers' environmental advances—gains made as they operate in a regulatory environment unlike anything faced by the world's other cotton producers.

Another plus is that the Cotton LEADS™ program is an investment in improvement by cotton producers themselves. The Cotton LEADS™ program is creating real, measurable benefits and improvements without adding additional costs to the supply chain. This program works environmentally and economically—great for the farm, for business and great for all of us—that's a real solution that meets the challenges that face all of us.



**ADAM KAY**  
Chief Executive Officer  
Cotton Australia

The Cotton LEADS™ program, initiated at the end of 2013, came at a perfect time for the Australian cotton industry. Our growers had reached a 20-year milestone in the formal adoption of best management practices on farm and this anniversary coincided with an increasing awareness in the textile supply chain about the responsible production of fibre, fabric and finished products.

The Cotton LEADS™ program became a vehicle for telling our story that could show the world that cotton in the U.S. and Australia was grown with the highest standards, protecting our natural resources and taking good care of our people.

Never before had the U.S. and Australian cotton industries collaborated in such a way, around perhaps the most important issue facing our industries—responsible cotton production. Cotton Australia and our associated industry bodies have embraced the concepts of the Cotton LEADS™ program and feel heartened that over 240 businesses in the textile supply chain support and acknowledge our efforts to grow high quality crops with as little environmental impact as possible. This message back to our farmers fuels their enthusiasm for finding ways to continually improve, to grow more with less and to be as efficient as possible as we face the future together.

This first Annual Report of the Cotton LEADS™ program sets out some of our activities, initiatives, successes and challenges in the first year of the program and sets out our commitments for the coming years. We hope that wherever you fit in the complex textile supply chain we can continue to work with you towards a common goal of responsible cotton production across the globe.

# About the Cotton LEADS™ Program

The Cotton LEADS™ program is committed to responsibly-produced cotton through national and international efforts, built around five core principles focused on the environment, best practice and traceability.

The program recognises that cotton growers at national levels 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. Importantly, both Australian and U.S. cotton industries also have strong cotton research programs that monitor and measure progress, and both countries can offer supply chain traceability.

The Cotton LEADS™ program gives its partners in textile manufacturing and retail a practical solution to increase the global supply of responsibly-produced cotton by including cotton from Australia and the U.S.

## 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 fibre markets
- 5 CONFIDENCE** in a cotton identification system that ensures traceability from farm to manufacturer

# 17%

**OF THE WORLD'S COTTON IS PRODUCED BY AUSTRALIA AND THE U.S.**

“The first phase of the Cotton LEADS™ program was aimed at raising awareness of the significant environmental gains already achieved by cotton growers in Australia and the United States and their commitment to continual improvement.”

**MARK MESSURA**  
Vice President,  
Global Supply Chain Marketing,  
Cotton Incorporated



## BIOBASED CERTIFICATION FOR THE COTTON LEADS™ PROGRAM

In late 2014, Cotton LEADS™ cotton was recognised by the United States Department of Agriculture (USDA) BioPreferred® Program, as cotton produced in Australia and the United States received a 100% biobased certification.

Biobased products are composed in whole, or in significant part, of biological products, renewable agricultural materials or forestry materials. The program is designed to spur economic development by providing new markets for farm commodities, increasing the use of renewable agriculture resources and contributing to reducing adverse environmental and health impacts.

# Partner Report and Engagement

Throughout 2014, a key focus of the Cotton LEADS™ program was for businesses in the global textile supply chain to commit as partners. As of 31 December 2014, the program had 252 partners in 22 countries. 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.

Cotton LEADS™ partnerships were signed with spinning mills and manufacturers in most of the world's textile producing countries, as well as leading retailers and brands in many of the world's fashion capitals.

With a strong emphasis on corporate social responsibility, many Cotton LEADS™ partners are already working very hard to improve their environmental footprint, and the program offers great opportunities for knowledge transfer to improve cotton production overall.

Collaboration and working cooperatively with others who share the values of the Cotton LEADS™ program is important, and a number of events were held during 2014 to facilitate this.

## GROWTH IN LEADS™ PARTNERS COMMITTED EACH MONTH



## Partner Engagement Meeting and Great Ideas in Cotton Conference

The Cotton LEADS™ program hosted its first partner engagement meeting in Hong Kong on 21 May 2014 for 26 newly signed partners. The event was a unique opportunity for partners to meet cotton producers and industry representatives from Australia and the United States. Cotton Australia Chairman and cotton grower, Lyndon Mulligan, and U.S. cotton producer, Jimmy Dodson, co-chaired the event that provided insights on responsible cotton production practices in Australia and the U.S. and outlined the extensive investment in research and development activities that keep cotton both competitive and responsible in these countries.

## Great Ideas in Cotton Conference

On 22 May 2014, Cotton Incorporated hosted the Great Ideas in Cotton conference that included a speaker program and exhibition hall focused on product and process innovations that reduce environmental impacts in textile manufacturing. This event is a prime example of how Cotton LEADS™ founding organisations are working beyond agriculture to help the entire textile supply chain be more responsible through information exchange. The event was open to Cotton LEADS™ partners and the broader textile industry, with 290 people from 119 companies attending.

## Intertextile Shanghai

The Cotton LEADS™ program participated in the world's largest textile apparel tradeshow, Intertextile Shanghai Apparel Fabrics, 20-23 October 2014, to raise awareness of the program and engage with existing partners. Three Cotton LEADS™ founding organisations (Cotton Australia, Cotton Council International and Cotton Incorporated) hosted prominent exhibitions where delegates and visitors could learn more about the Cotton LEADS™ program and responsible cotton production practices in Australia and the United States. The Cotton LEADS™ program was further promoted through extensive editorial coverage, billboard and print advertising. In addition, 35 Cotton LEADS™ partners exhibited individually, and during the show leading athletic apparel supplier, Top Star, became the newest partner. During Intertextile, an executive delegation of Adam Kay, CEO Cotton Australia; Kevin Latner, Executive Director Cotton Council International; and J. Berrye Worsham, President and CEO of Cotton Incorporated met with leading manufacturers, brands and retailers to discuss the Cotton LEADS™ program and present plaques to existing partners.

## Partner Post

A regular e-newsletter was developed and distributed to Cotton LEADS™ partners during 2014 to keep them informed of achievements and activities in responsible cotton production practices in Australia and the U.S. A number of research and cotton grower profiles, as well as reporting of engagement activities were a key method for ensuring Cotton LEADS™ partners were aware of program developments.

## U.S. Farm Tours

Cotton Incorporated, one of the supporting organisations of the Cotton LEADS™ program, continued to invest in the education of the textile industry in 2014 with a series of farm tours held in October. This event provided a unique opportunity for Cotton LEADS™ partners, brands and retailers to meet U.S. cotton producers on their farms and learn first-hand how U.S. cotton is leading the way with traceable, transparent and responsible cotton production. Through this initiative, growers educate the textile industry about how cotton is grown and share the tools and technologies they use to improve and reduce their impact on the environment. Attendees are able to follow the traceable path of U.S. cotton production from the field to the gin and the classing office where fibre properties are measured.

Jimmy Dodson co-chairs the partner engagement meeting in Hong Kong.



Adam Kay shares Australia's commitment to responsible cotton production at the Great Ideas in Cotton Conference.

The commitment of program partners was promoted throughout Intertextile Shanghai.



Adam Kay and J. Berrye Worsham meet with partners at Intertextile Shanghai.



Nathan Reed and Ramey Stiles, U.S. cotton growers, explain how cotton is harvested to brands and retailers.



## Country Report U.S.

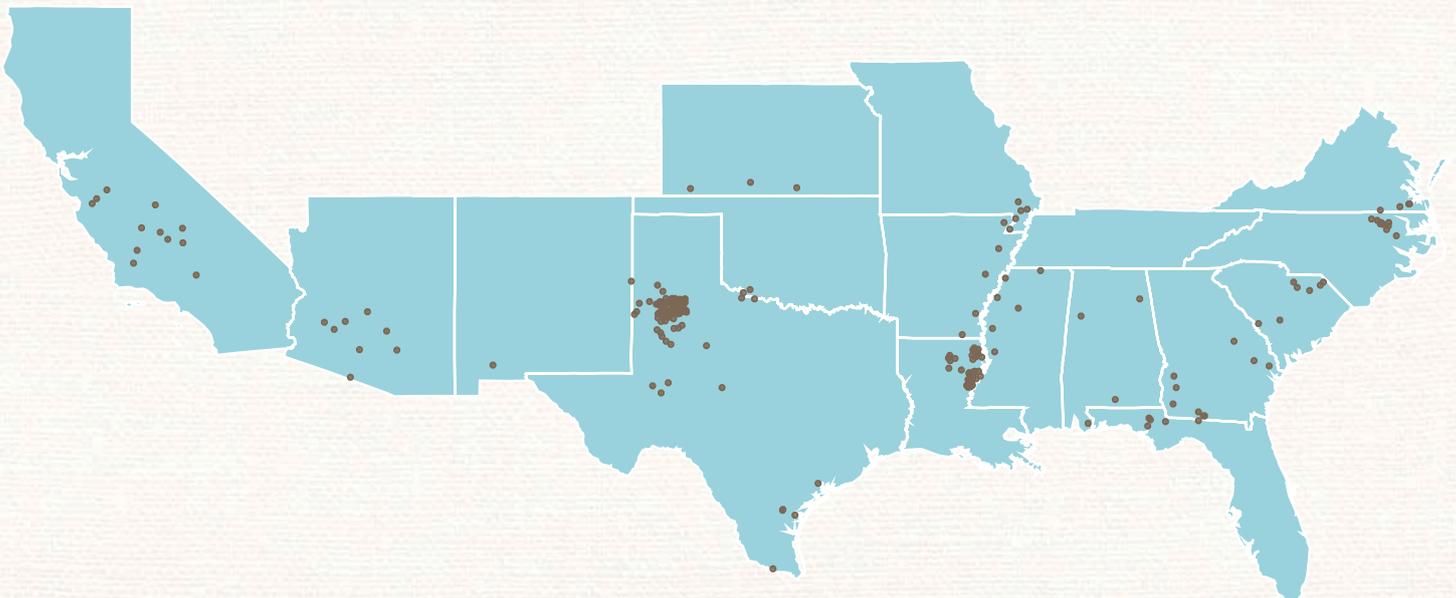
Cotton is produced in 17 southern states spanning the nation from the Atlantic to the Pacific Oceans. The production areas have diverse weather patterns, soil conditions and varying degrees of water availability. Having planted 10.4 million acres and harvested 12.9 million bales in 2013, growers increased plantings to over 11.4 million acres and harvested 16.2 million bales in 2014.

Southeast and Mid-south farmers had near-ideal conditions with ample rainfall, whereas California dealt with a multi-year drought. Mid-south corn farmers shifted some acres to cotton because soil conditions during corn planting time were not suitable. Cotton's adaptability to hot-and-dry weather accelerated a shift from grains to cotton in the Southwest, which had lower than normal rainfall.

Just as the cotton plant is adaptable to a wide range of environmental stresses, cotton farmers are quick to adjust to climate and economic uncertainties. Growers adapt and respond to seasonal variations by using a range of sophisticated crop and risk management tools and services. These tools also enable U.S. cotton producers to grow cotton more efficiently and more responsibly. For example, growers receive timely pest management guidance through the State Extension Service; and develop conservation plans with wildlife specialists from the Natural Resources Conservation Service (NRCS). Tools like Global Positioning Systems (GPS), in combination with field sensors, enable growers to precisely apply nutrients when and where they are needed.

### U.S. COTTON FIELDS

USING FIELD TO MARKET® FIELDPRINT® CALCULATOR  
SELF-ASSESSMENT TOOL



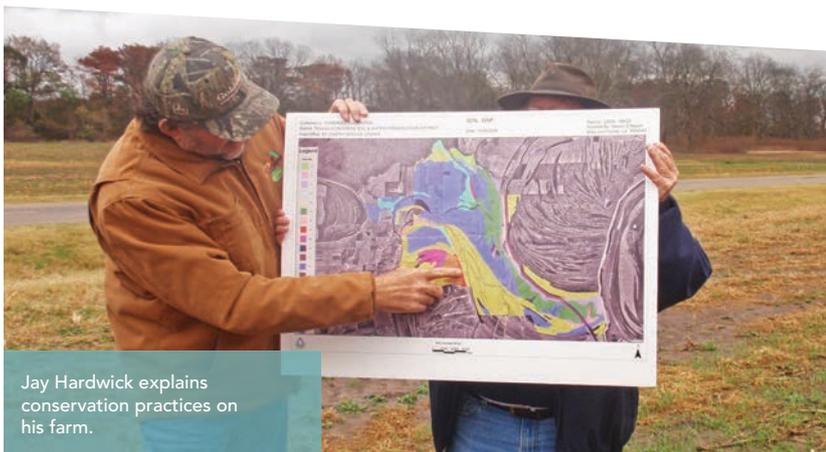
“This is an invaluable tool to growers. Last year, I ran the program on several fields and in most cases it validated that what I was doing was on target; however, we ran the calculator on a new field and it helped us identify several opportunities for improvement.”

JAY HARDWICK, U.S. COTTON GROWER

A more recent tool being promoted to growers is the Field to Market® Fieldprint® Calculator, a self-assessment software tool that measures the environmental impacts of production practices. Geographical location and satellite imagery enables the program to automatically pull soil, topography and climate data from the NRCS cloud database. The farmer adds information such as crop rotations, production practices, inputs and harvest conditions to generate an environmental footprint for each field. These data sets establish the current fieldprint baseline to evaluate important production and environmental factors, such as changes in greenhouse gas emissions, energy usage, soil conservation, soil carbon levels, irrigation water management and land use efficiency.

By the end of 2014, more than 188 cotton fields belonging to 133 farmers in 71 counties in 17 cotton producing states had been mapped and fieldprints developed for individual grower use. With this base from 2014 being established, growers will be encouraged to use the tools to gauge the effect of future practices. Jay Hardwick, who has worked to test the program since its inception, is one grower who has already made changes. Hardwick used the tool on a recently acquired field to determine a baseline fieldprint and to compare that baseline to a crop with various land improvements: no-till, grassed waterways, sediment control structures and riparian strips next to the bayou. The calculator showed dramatic improvements in runoff water quality, improved soil carbon levels and reduced soil loss, greenhouse gas emissions and energy use. Cotton yields were expected to improve as a result.

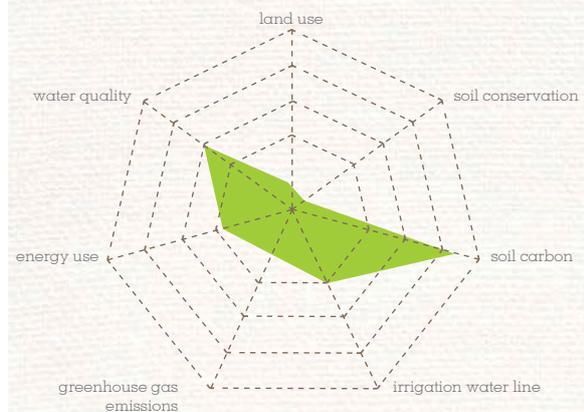
The Cotton LEADS™ program is supporting the mainstream adoption of the calculator as a means for growers’ self-assessments. In the years to come, new measures will be added and baselines will change as farmers stay on the path towards continuous improvement. As early-adopters see results, tools such as the Fieldprint® Calculator will become more widely adopted and used to monitor progress toward national agriculture goals.



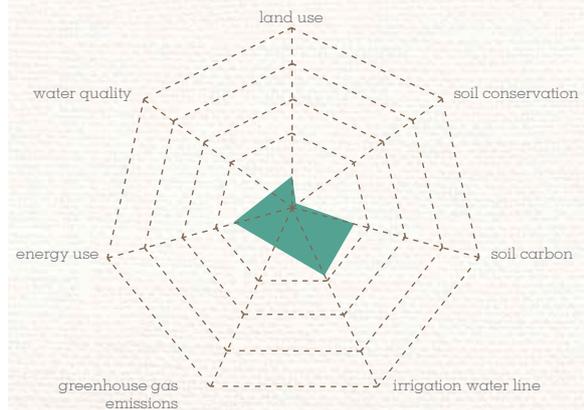
Jay Hardwick explains conservation practices on his farm.

### FIELDPRINT® CALCULATOR RESULTS TO EVALUATE CHANGES IN THE ENVIRONMENTAL IMPACT WITH CONSERVATION MEASURES ON A LOUISIANA COTTON FARM

#### Before conservation measures



#### After conservation measures





## Case Studies U.S.

### COTTON GROWER CASE STUDY **Lahey Farm, Tom Lahey, Moscow, Kansas**

Tom Lahey is an industry leader in resource optimisation, farming a mix of dryland cotton, and pivot irrigated corn, cotton and wheat. With only 17 inches of rainfall, in a good year, timing and water are critical for success.



Lahey harvests a healthy crop thanks to his water sharing system.

Lahey developed an innovative water “sharing” system that allows corn and cotton to succeed even in dry years. Corn’s heavy water use occurs early in the summer, while cotton’s slow vegetative growth delays its water use until after corn’s water needs are met. Where several pivots are fed from a common water source, Lahey utilises this complementary water requirement by planting corn and cotton on connected pivots and gradually switching their water distribution from corn to cotton during the growing season. The shared system allows Lahey to optimise Kansas’ fixed annual water allotment to grow a healthy corn crop in low rainfall years and still grow some cotton on rainwater.

- Although water is the motivation to mix cotton with corn, Lahey considers cotton and grain an excellent rotation crop for many other reasons.
- Rotating broad leaf crops with grains suppresses soil diseases and nematodes.
- Grain stubble protects the cotton, the soil and the surface moisture from blowing away. Lahey preserves crop residue with strip till, keeping diesel use and soil disturbances to a minimum.
- Cotton’s deep tap root uses residual moisture and nitrogen in the subsoil from corn, often requiring zero nitrogen to be applied.
- In low rainfall years, fewer, well-spaced seeds are planted to optimise the soil water reservoir for both corn and cotton.

### COTTON GROWER CASE STUDY **Bowles Farm, Cannon Michael, Dos Palos, California**

Cannon Michael, Bowles Farm, wrestles with one of irrigated agricultures’ oldest challenges—salinity. Fortunately, several innovations combine to keep this farm productive and fertile: Landsat satellite imaging, timely salt leaching with portable sprinklers, and the highly salt tolerant plant—cotton.



Landsat imagery of Bowles Farm.

Landsat imagery, from United States Geological Survey (USGS), can detect the salt restricted plant growth and is a cost-effective option for viewing vegetation differences in a format easily read by field equipment. The images enable Michael to more effectively apply plant growth regulators and other inputs to the cotton crop as needed, reducing the farm’s impact on the environment and increasing profitability.

Michael uses a season-long, best-practice approach to managing salinity including monitoring through soil sampling, adding compost and gypsum to the soil and amendments to the irrigation water as needed, installing tile lines to remove drainage water per California regulations, and by using a combination of drip irrigation and sprinklers for water management. When indicated by soil monitoring, sprinklers are used during the wet, foggy winter to leach soils because evaporation is low. Sprinkler irrigation moves through the soil as unsaturated flow and is the most efficient way to leach salts. Unsaturated flow moves slowly allowing time to equilibrate with the salty water flushing out the salts with the least amount of applied water.

The third pillar in Michael’s salt management program is cotton. Once past the sensitive seedling phase, the cotton plant has one of the highest tolerances for salts. Although vegetative growth is restricted by salt in the soil or water, cotton fibre and seed production are less impacted, making cotton the ideal crop to grow in salty soils.

## RESEARCH CASE STUDY Cotton Genome Sequencing

Breeding for nematode resistance has been ongoing, and in the past several years, research has advanced significantly to provide the cotton industry with newly released varieties resistant to root-knot nematodes (RKN), all of which are adapted to U.S. cotton belt environments.

During the past decade, discovery of molecular markers linked to RKN alleles at several United States Department of Agriculture (USDA) and U.S. university labs has allowed breeders to more effectively select for resistance. This significant advancement reduces the need for nematicides, thereby reducing impacts on the environment while also lowering production input cost. In addition, valuable knowledge can be gleaned from the Upland cotton genome sequence to develop tools that will allow cotton breeders to make further tangible improvements in disease tolerance, fibre quality and lint yield.

Root-knot nematode-resistant seed varieties using molecular markers were commercially available to the cotton industry in 2014. Increased adoption of the RKN-resistant technology is expected in 2015, leading to continual improvements in responsible cotton production.

Improvements in agriculture, such as producing more lint using less pesticides, often occur as a result of scientific advances that precede the improvements by five to ten years.



Knowledge gained from sequencing the Upland cotton genome, will enable researchers to identify and deploy genes to improve yield, fiber quality and stress tolerance.

## RESEARCH CASE STUDY Energy Use in Cotton Gins

A significant opportunity exists to reduce the environmental impact of the cotton gin and improve gin and grower profitability by reducing energy use, as energy use historically has not been a primary consideration in gin design and operation.

Extensive monitoring of selected gins began in 2010 and continues today with the monitoring of every motor in the gin continuously during the season. Data collected provides more robust, specific data for energy use by process over time. Data can help to identify improved management strategies and new technologies to reduce energy use. Additional findings of the 2014 monitoring research include measuring fuel used for drying and moisture restoration, as well as demonstrating that fuel use decreases with ginning rate at each gin.

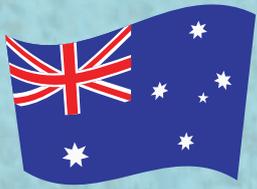
Because maximising a gin's capacity is crucial to reducing energy use, researchers have developed a seed cotton mass flow rate sensing system suitable for use in gins. Following prototyping, an improved system for measuring seed cotton mass flow rate in commercial-scale gins was developed and tested in 2014.

Research is ongoing to develop a more accurate system for measuring seed cotton moisture content. A more accurate measurement of moisture content would result in more optimum levels of seed cotton drying, reducing energy use and improving fibre quality.

Post-harvest electricity and fuel account for 25% of the energy footprint of cotton production, according to the Cotton Life Cycle Assessment, conducted in 2010. Electricity and fuel at the gin also account for 25% of a cotton gin's variable costs, the second largest cost component after seasonal labour.



Meters are installed in a cotton gin to monitor energy use.



## Country Report Australia

Cotton is grown in Australia from Emerald in the north of Queensland to Swan Hill in far Northern Victoria. Throughout these regions about 1,200 cotton families grow some of the finest quality cottons in the world, using fewer resources than ever before. Each of these families provide jobs for around seven people and are critical to local businesses, schools and the social fabric of their communities.

In Australia, cotton is planted in September/October and harvested in March/April with the vast majority grown under irrigation. The 2012-13 cotton season provided good news for Australia's cotton farming families. A near record crop of 4.1 million bales of cotton was grown on 421,610 hectares of land, boasting world record yields for both irrigated and dryland production. In this season, Australia also became the first cotton producing country to achieve yields above 10 bales/hectare for irrigated cotton and five bales/hectare for dryland cotton.

A key to the cotton industry's success in improving efficiency, sustainability and profitability lies in the success of its research, development and extension (RD&E) program, which has created a dynamic culture of innovation. Over the past 10–15 years the research effort has helped cotton growers reduce their insecticide use by 95%, increase their water use efficiency by 40% and achieve the highest yields in the world, at almost three times the world average.

Australian cotton growers have become resource efficient, reducing their environmental footprint. The best cotton producers now achieve more than two bales of cotton per megalitre of water—almost double the industry average of just a decade ago, and 30% less land is required to produce the crop compared to 15 years ago.

In 2014, the Australian cotton industry launched its first Australian Grown Cotton Sustainability Report—tracking the industry's social, economic and environmental footprint.

The report, a joint effort between Cotton Australia and the Cotton Research and Development Corporation (CRDC), provides a snapshot of how the industry is performing against 45 sustainability indicators that will be used to measure future performance—from crop yield and quality, water use and riparian land management, to employment, health and social capital.

The report summarised a number of industry-wide objectives, including that the Australian cotton industry:

- Is dedicated to becoming the producer and supplier of the most environmentally and socially responsible cotton in the world.
- Aims to be a global leader in sustainable agriculture by investing in research and development and reporting against recognised sustainability indicators.
- Is committed to delivering independent, evidence-based assessments of its sustainability and environmental performance and communicating this with a common voice.
- Utilises its best management practice program (*myBMP*) as a pivotal platform to maintain the cotton industry's social licence to operate.



North Bourke Ginning Company receives recognition for *myBMP* accreditation.

“Over the past 10–15 years the research effort has helped cotton growers reduce their insecticide use by 95%, increase their water use efficiency by 40% and achieve the highest yields in the world, at almost three times the world average.”

ACHIEVEMENTS IN AUSTRALIAN COTTON RESEARCH,  
DEVELOPMENT AND EXTENSION 2008-2013 REPORT



CSIRO Plant Breeder, Dr Warwick Stiller, is part of a team of Australian scientists contributing to Australia's cotton R&D program.



## Case Studies Australia

### COTTON GROWER CASE STUDY “Yambocully,” Nigel Corish, Goondiwindi, Queensland



Award winning Australian cotton grower Nigel Corish (right) and his agronomist Jim O'Connor have worked together to double water use efficiency and minimise impacts.

“Yambocully” is a 4,800 hectare property just outside of Goondiwindi on the Queensland–NSW border. Owned by the Corish Family Partnership and managed by Nigel Corish, the farm consists of 900 hectares of irrigated country and 1400ha of dryland cultivation including around 700ha of cotton.

It’s fair to say that “Yambocully” is a premium example of an all-round cotton farming enterprise that won the Australian Cotton Grower of the Year Award in 2012, using industry best practices across the entire operation to achieve incredibly high yielding crops and profitability, year after year.

“Yambocully” participates in the industry’s best management practices program to full certification, applying its principles across the farm to maximise worker safety, reduce inputs and protect the natural environment.

Since Nigel took the reins in 2007 at just 24 years of age, yields have increased every year and water use efficiency has doubled since 2005. A full Electromagnetic Survey (EM) was conducted a few years ago, and the entire farm operation is based on scientific data and many years of trials to test new ways of doing things—this approach has resulted in a farm that is constantly evolving and innovating.

### COTTON GROWER CASE STUDY John and Ros Cameron, “Kintyre,” Bongeen, Queensland



John “Cowboy” Cameron holistically manages his dryland cotton property to maximise water use efficiency and soil health.

“Kintyre,” located 20km north west of Pittsworth on Queensland’s Darling Downs, is an immaculate dryland family farm run by John Cameron, a first generation farmer. Every square inch of the property has been poked, prodded and tested to get the most out of the production system. John applies a strict and aggressive year-in-year-out wheat and cotton rotation that works from both a financial and soil health perspective.

Standing stubble is another main feature of the system, for both soil health and water management reasons. Being located on a flood plain means that soils can be easily lost, even after just one serious storm event. “The stubble has proven time and again that it can keep our soils in place—without it, we’d have gullies up to four metres deep snaking all over the paddocks,” John said.

Soil health is paramount at “Kintyre” and has been since a light-bulb moment in the early 1990s when John decided to spend \$150 on a soil test rather than \$30,000 on fertilisers that he wasn’t sure the soils needed. What followed was five years of no fertiliser costs and a practice that has held, and been improved upon to this day. Soil tests are conducted at regular intervals across the farm, and nutrients added only when and if they’re needed.

## RESEARCH CASE STUDY IrriSAT Irrigation Scheduling Tool

The careful scheduling of irrigations under the 'measure to manage' philosophy has long been an important method in Australian cotton's quest for continued water use efficiency. IrriSAT is a weather-based irrigation scheduling tool that uses remote sensing to provide site-specific crop water management information across large scales at relatively low cost.

The crop water use information is mapped across paddocks, farms and regions at various time scales including a seven-day forecast. This is used to increase water use efficiency and maximise productivity through improved irrigation scheduling.

The technology can be applied across a large area allowing crop productivity to be benchmarked within and between regions. During the 2014/15 Australian cotton season researchers will be concentrating on the benchmarking aspects of IrriSAT, running intense field trials to further refine and improve the technology and sharing the findings with cotton growers via a number of IrriSAT master classes.



Irrigation scheduling is a key to Australia's advances in water use efficiency on-farm.

## RESEARCH CASE STUDY Measuring Energy Use on Australian Cotton Farms

Understanding and measuring energy use on Australian cotton farms is an important aspect to the industry's commitment to reducing greenhouse gas (GHG) emissions. The Cotton Research and Development Corporation is investing in research to help understand where energy is used on cotton farms, identify areas for improving efficiency and reducing costs.

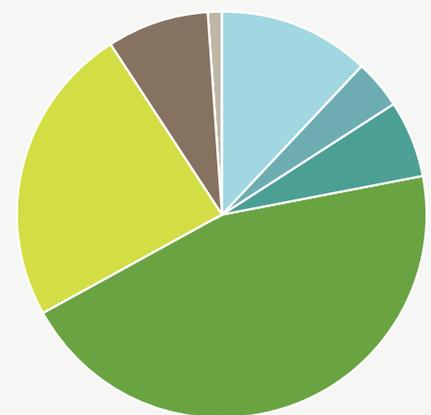
This project produced the first Australian farm-focused energy assessment tool for cropping, the web-based 'EnergyCalc,' and led to CRDC investing in further on-farm studies to develop improved local data on energy use, including new monitoring equipment and a protocol for growers to assess energy use.

With studies having shown that up to 75% of energy consumed on irrigated cotton farms is through water pump stations, the National Centre for Engineering in Agriculture (NCEA) is undertaking on-farm energy assessments to help cotton growers identify inefficiencies in this area and cope with rising energy costs while also reducing GHG emissions.

The on-farm assessments calculate energy use, efficiency measures, potential cost savings and also provide industry benchmarking data. The data collected will enable the development of best practices and tailored information for cotton growers to use to improve energy efficiency and reduce costs.

### AVERAGE DISTRIBUTION OF ENERGY USE FOR IRRIGATED COTTON PRODUCTION

The average distribution of energy required to produce a bale of cotton based on data gathered on a number of representative cotton farms between 2008 and 2012.



**45%**  
Irrigation

Preparation 12%  
Establishment 4%  
In season 6%  
Harvest 24%  
Post harvest 8%  
General 1%

# The Path to Continuous Improvement

Cotton LEADS™ founding organisations and partners are committed to the continual improvement of cotton production and textile manufacturing to address the global issues that we face as an industry.

Industry-wide investments in technology, research and innovation will underpin these improvements, together with a willingness to share information and collaborate across the cotton-producing regions of the world.

Below is a summary of commitments to continual improvements in Australia and the U.S. for the coming years.

## 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, optimized 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.

# The Year Ahead for the Cotton LEADS™ Program

The first 15 months of the Cotton LEADS™ program firmly focused on recruitment of partners and establishing the program throughout the global textile supply chain.

While recruitment will remain a key focus in 2015, attention will also be given to ensuring high levels of awareness of continuous improvement plans in both Australia and the U.S. and further engagement with partners. This could include more information on how to source cotton grown from responsibly-produced sources, investment in projects to improve cotton's environmental footprint in other areas of the supply chain, and the sharing of best practice information with other cotton-producing countries. The partnership between Australian and U.S. cotton industries will continue to grow, with a number of joint research projects also planned.

## Cotton Life Cycle Inventory and Assessment

Work is set to begin on the most comprehensive Cotton Life Cycle Inventory and Assessment to date. Led by the U.S. cotton industry with support from Australia's Cotton Research and Development Corporation, the study will monitor progress since the previous Life Cycle Assessment conducted in 2010. Results will guide decisions and identify opportunities for continuous improvement in cotton production and textile manufacturing.

The Life Cycle Inventory (LCI) will provide a comprehensive inventory from five years of cotton production in the U.S., China, Australia and India, and fabric production for knits and wovens from China, India, Turkey, Latin America, and potentially the U.S. and Southeast Asia. Cotton LEADS™ manufacturing partners will be participating in the data collection for fabric production. The associated Life Cycle Assessment (LCA) will be a cradle-to-grave examination of a knit golf shirt, a t-shirt and a woven pant, including garment creation, consumer product use and maintenance, transportation and product end-of-life. Environmental impact categories examined include, but are not limited to: energy demand, global warming potential and water.

## Joint Research, Development and Extension

National research organisations of the Australian and U.S. cotton industries continue to maximise investments through collaborative research. New projects for 2015 have been identified for further discussion such as:

- **Bale contamination:** Australia and the U.S. utilise the same type of equipment for harvesting and ginning, thus providing the opportunity to create innovations that further eliminate the possibility of contamination in cotton bales.
- **Weed resistance:** Managing resistant weeds is a challenge in both countries. Greater collaboration allows accelerated research to address this problem by doubling the research effort in one year with opposite growing seasons.
- **Cotton bollworm:** An insect pest that feeds on cotton and many other crops recently became established in Brazil and may appear in the U.S. Since Australian entomologists have extensive experience with this pest, their assistance will benefit all countries with this invasive pest.
- **Cottonseed oil quality:** Australian scientists have developed a cotton that produces "olive oil" from the cotton seed. This trait would pair well with the gossypol-free cotton seed from the U.S.

## Best Practice Roundtable

The Cotton LEADS™ program will promote awareness and adoption of best practices more broadly throughout cotton-producing countries in 2015, and will host a roundtable conference in 2015.

The roundtable will facilitate the sharing of best practice ideas and research among leading scientists and experts from global cotton industries and organisations to identify areas of greatest need, further improve responsible cotton production and map collaborative opportunities for the future.

## Partner Engagement Events

Following the success of a number of partner engagement events in 2014, the Cotton LEADS™ program will host a number of additional opportunities including:

- 19 January 2015  
Shanghai  
Workshop and luncheon
- 20 January 2015  
Hong Kong  
Workshop and reception
- April 2015  
Partner engagement events in the U.S., Mexico and Peru



Fourth generation Australian cotton grower Fleur Anderson shares her story with Cotton LEADS™ partners at an event in Shanghai.



Dr. Paxton Payton USDA/ARS, Dr. Onoriode Coast and Dr. Rose Brodrick from CSIRO Agriculture Flagship, and Dr. James Mahan USDA/ARS collaborate to improve water efficiency.

“Many of these projects would not have been possible without the Cotton LEADS™ program. We have initiated research on fibre elongation, a new area for both Australia and the United States.”

**VIKKI MARTIN**  
Director, Quality Research  
and Product Evaluation,  
Cotton Incorporated

## RESEARCH SPOTLIGHT Joint R&D

Collaborative research by CSIRO and USDA – Agriculture Research Service (ARS) successfully implemented a canopy temperature-based irrigation scheduling system developed in Lubbock into the Australian cotton system. These efforts expanded to include responses of cotton to water deficits and temperature stress in terms of yield and quality.

In the 2014/15 season, the protocol is being refined and data is being collected on 50 Australian farms. Initial results suggest that water savings of up to 25% may be achieved. Based on the irrigation protocol and equipment developed in Lubbock, CSIRO has designed and is testing an infrared thermometer system for agricultural use in Australia. Collaboratively, researchers are working on a new thermal imaging system in Australia this growing season and a review of thermometry in agricultural water management.

Experiments have been initiated examining the interaction between elevated CO<sub>2</sub>, high temperature and water deficits with the Hawkesbury Institute for the Environment in Sydney.

Field experiments will begin this summer (2015) in Lubbock to extend previous findings in greenhouse studies conducted in Sydney in 2014. These research efforts will likely result in water savings in Australia, and new insights into managing stress in deficit irrigation production in the U.S.

# Founding Organisations



## 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 1,200 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.

# Supporting Organisations



## Australian Cotton Shippers Association

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.



## 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 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

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.

# Cotton LEADS™ Partners

The following are signed Cotton LEADS™ partners as of 31 December 2014. The Cotton LEADS™ program would like to sincerely thank these companies for their support.

## #

1888 Mills, LLC

## A

Advance Denim Co., Ltd.  
AEON Topvalu (China) Co., Ltd.  
AEON TOPVALU CO., LTD.  
Alps Industries Limited  
Ambika Cotton Mills Limited  
American & Efird, LLC  
American Cotton Growers  
Anita's Textiles Ltd.  
Arun Textiles Pvt Limited  
Arvind Ltd  
Aztex Trading, S.A. de C.V.  
Azul Textil S.A.

## B

Badsha Textiles Ltd.  
Barnhardt Manufacturing  
Batuhan Pazarlama  
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

Caliphil Enterprise Co., Ltd.  
Cargill Cotton  
Carolina Cotton Works  
Carolinas Cotton Growers Cooperative  
Casablanca International Ltd.  
Central Marketing Group  
Central Textiles (H.K.) Ltd.  
Chia Her Industrial Co., Ltd  
Chiem Patana Textiles Co., Ltd.  
Chonbang Co., Ltd.  
Chun Au Knitting Factory Limited  
Cia. Industrial Nuevo Mundo S.A.  
Compañía Industrial Romosa SAC  
Cone Denim (Jia Xing) Ltd.  
Contempora Fabrics, Inc.  
Cotton Homey Co., Ltd.  
Cotswold Industries Inc.  
Creditex S.A.A.

## D

Datsun Weaving Factory Ltd.  
Delicacy Industrial Co., Ltd.  
Denim North America  
Dongguan Kefang Textile Co., Ltd.  
Dong-Il Corporation

## E

Edwin Co. Ltd.  
Esquel Group  
EVISU Group Limited  
Exclusive Bettwasche Gebr. Graser GmbH & Co. KG

## F

Federation Sanhe (Fujian) Co., Ltd.  
Ford Glory Limited  
Foshan City Shunde Caihui 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

Gerber Childrenswear LLC  
Getzner Textil AG  
Global Dyeing  
GoldDaio (Suzhou Industrial Park) Hygiene Products Co., Ltd.  
Grupo Industrial Miro  
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 Miidii Apparel Co., Ltd.  
Guangzhou Zengcheng Guangying Garment Co., Ltd.  
Gunze Limited

## H

H.W. Textiles Co., Ltd.  
Hamrick Mills

Handsome Textile Ltd.

Hangzhou Lianchenghuazhuo Industrial Co., Ltd.  
Hanoi Textile and Garment Joint Stock Corporation  
Hansae Co., Ltd.  
Hermann Buhler AG  
Hermin Textile Co., Ltd.  
Hirdaramani Group  
Hoa Tho Textile Garment Joint Stock Corporation  
Huafang Co. Ltd.  
Huaфу Top Dyed Melange Yarn Co., Ltd.  
Hue Textile Garment J.S.C

## I

Ibena Shanghai Technical Textiles Co., Ltd.  
Ilshin Spinning Co., Ltd.  
IMAP Export S.p.A.  
Imperial Group Guatemala  
Indera Mills  
Indigo Trade Mexico, S.A. de C.V.  
Industrias Apparel

## J

Jasonwood Jeans Corp., Ltd.  
Jegen Textilien AG  
Jiangmen Daxing Knitting Co., Ltd.  
Jiangsu A-Z Group Co. Ltd.  
Jiangsu Taida Textile Co., Ltd.  
Jiangsu White Rabbit Textiles Group Co., Ltd.  
Jiangyin City Shenli Knitting Co., Ltd.  
Jihua 3509 Textile Co., Ltd.  
Jihua 3542 Textile Co., Ltd.  
JNBY Finery Co., Ltd.  
Joe One Co., Ltd.

## K

K.Cotton & Gauze Co., Ltd.  
Kahee Co., Ltd.  
Kaihara Corporation  
Kamal Yarn Ltd.  
Kangwal Textile Co., Ltd.  
Kaynak Tekstil  
K-Boxing Men's Wear (Shanghai) Co., Ltd.  
Keer Group  
Kimpex Tekstil  
King America Textile Group  
Kyungbang Limited

<b>L</b>	PT. Natatex Prima	Textil del Valle S.A.
La Colonial Fabrica De Hilos S.A.	PT. Panca Bintang Tunggal Sejahtera	Textil Oceano, SAC
Linyi Aotai Textile Co., Ltd.	PT. Primayudha Mandirijaya	Textiles Brito
Linz Textil AG	PT. Sri Rejeki Isman, Tbk.	Textiles San Andrés (Hilasal)
Liztex	PT. Tyfountex Indonesia	Textufil S.A.
Luckytex (Thailand) Public Company Limited	PT. World Yamatex Spinning Mills	Thai Alliance Textile Co., Ltd.
Luthai Textile Co., Ltd.		Thai Industries Development Co., Ltd.
<b>M</b>	<b>Q</b>	Thai Textile Industry Public Co., Ltd.
Malek Spinning Mills Limited	Qingdao Textiles Group Fiber Technology Co., Ltd.	Thanh Cong Group
Manufacturas Kaltex, S.A. de C.V.		Thiagarajar Mills P Ltd
Marusan Industry Co. Ltd.	<b>R</b>	TJ Beall Company
Matin Spinning Mills, Ltd.	Ramco Group Textile Division	Tony Wear Co., Ltd.
Menderes Tekstil	Renfro Corporation	Top Star Textile Limited
Menekse Tekstil	Rhin Textil, SAC	TopiTop
Mou Fung Limited		Topson Group (Intl) Holdings Co., Ltd.
Mount Vernon Mills, Inc.	<b>S</b>	Topy Top S.A.
<b>N</b>	S.R. Spinning Co., Ltd.	TS Factory
N9&PG Co., Ltd.	SA Aanandan Spinning Mills (P) Ltd	Turbo Yarn, S.A. de C.V.
Nahar Spinning Mills Limited	Sae-A Trading Co., Ltd.	Tuscarora Yarns, Inc.
Nanjing Synergy Textiles Ltd.	Saitex International Vietnam Ltd.	<b>U</b>
Nantong Dongdi Textiles Co., Ltd.	Samil Spinning Co., Ltd.	UNY Co. Ltd.
Nantong Yiyi Interlining Co., Ltd.	San Yang Textile Co., Ltd	U.S. Cotton México, S. de R.L. de C.V.
Nesa Tekstil	Shahi Exports Pvt. Ltd. (Knits Division)	<b>V</b>
New Project	Shandong Huale New Materials Science And Technology Co., Ltd.	VANCL Chengpin (Beijing) Technology Ltd.
New Wide Group	Shandong Ruyi Technology Group Co., Ltd.	Vardhman Textiles Limited
Nice Dyeing Factory Ltd.	Shangdong Dai Yin Textile Group Share Co., Ltd.	Velener Textil GmbH
Nien Hsing Textile Co., Ltd	Shanghai Goodbaby Garment Co., Ltd.	Victory City Co., Ltd.
Ningbo Peacebird Men's Wear Co., Ltd.	Shanghai Imagine Home Textiles Co., Ltd.	Viet Hong Textile J.V.C
Ningbo Veken Cotton Textile Co., Ltd.	Shanghai Konglong Textile Ornaments Co., Ltd.	Vincenzo Zucchi S.p.A.
Noi Solutions LLC	Shanghai Lion City Textile Co., Ltd.	Viyellatex Spinning Ltd.
<b>O</b>	Shanghai MetersBonwe Fashion & Accessories Co., Ltd	<b>W</b>
OH POMP! Technofitted Jeans	Shanghai Yihua Garment Co., Ltd.	Wah Fung Knitters Ltd.
Operadora LOB, S.A. de C.V.	Shenzhen Baliso Industrial Co., Ltd.	Weiqiao Textile Co. Limited
Otto Stadtländer GmbH	Shenzhen PurCotton Technology Co., Ltd.	Welspun India Limited
<b>P</b>	Shijiazhuang Changshan Ming Home Fashion Textile Co. Ltd.	Win Hanverky Textile Ltd.
Pacific Textiles Ltd.	Shijiazhuang Changshan Textile Co., Ltd.	Winner Medical (Hong Kong) Limited
Pahartali Textile & Hosiery Mills	Sky Winner Investment Ltd. - Teelocker	Winnitex Ltd.
Panther Textiles Holding Co., Ltd.	Springs Creative Product Group	Wuxi Far Eastern Textile Ltd.
Peru Pima, S.A.	Square Yarns Ltd.	<b>X</b>
Phong Phu Corporation	Staple Cotton Cooperative Association	Xiamen Xiafang Textile Co., Ltd.
Pickett Hosiery Mills, Inc.	Sunvim Group Co., Ltd.	<b>Y</b>
Prosperity Textile (HK) Ltd.	Supima	Yixing Lucky Textiles Group
PT. Apac Inti Corpora	Sur Color Star, S.A.	Yuen Shing Group
PT. Argo Pantas Tbk	Swift Spinning, Inc.	<b>Z</b>
PT. Bhineka Karya Manunggal	<b>T</b>	Zagis, S.A. de C.V.
PT. Bitratex Industries	Tah Tong Textile Co., Ltd.	Zagis USA, LLC
PT. Daya Manunggal	Tai Yuen Textile Co., Ltd.	Zermatex, S.A. de C.V.
PT. Embee Plumbon Textiles Indonesia	Target Corporation	Zhejiang Saintyear Textile Co., Ltd.
PT. Grand Textile Industry	Texhong Textile Group	Zibo Yinshilai Textile Co., Ltd.
Pt. Indo TaiChen Textile Industry	Tex-Knit (Hong Kong) Co., Ltd.	
PT. Lucky Abadi Textile Factory	Tex-Ray Industrial Co., Ltd	
PT. Lucky Print Abadi		



[www.cottonleads.org](http://www.cottonleads.org)