### Australian Cotton History

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1788</td>
<td>The First Fleet brings cottonseed to Australia</td>
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<tr>
<td>1830</td>
<td>First shipment of cotton exported to England, consisting of three bags</td>
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<tr>
<td>1857</td>
<td>Small quantities of dryland cotton grown in Queensland</td>
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<tr>
<td>1861-65</td>
<td>American Civil War causes American cotton production to fall. Australia attempts to fill the gap</td>
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<tr>
<td>1870s</td>
<td>Australian cotton production peaks then falls as world prices decline</td>
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<tr>
<td>1926</td>
<td>The Queensland Cotton Marketing Board is established. Government subsidy introduced to promote production in central Queensland</td>
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<tr>
<td>1934</td>
<td>Cotton production reaches 17,000 bales</td>
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<tr>
<td>1954</td>
<td>Cotton industry almost non-existent</td>
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<tr>
<td>1958</td>
<td>Keepit Dam is completed on the Namoi River in NSW, providing irrigation water to the Namoi Valley</td>
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<tr>
<td>1960</td>
<td>Limited irrigated cotton production commences in south-west Queensland</td>
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<tr>
<td>1961</td>
<td>Commercial crop planted at Wee Waa, using water from Keepit Dam</td>
</tr>
<tr>
<td>1966</td>
<td>Cotton established in the Macquarie Valley following completion of the Burrendong Dam. Cotton production also begins at Bourke</td>
</tr>
<tr>
<td>1968</td>
<td>Emerald Irrigation Area produces first exportable surplus</td>
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<tr>
<td>1971</td>
<td>Raw Cotton Bounty removed at the request of the cotton industry. Cotton production reaches 87,000 bales</td>
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<tr>
<td>1973</td>
<td>Cotton production on the Ord River Scheme ceases, mainly due to insect resistance to pesticides</td>
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<tr>
<td>1975</td>
<td>Cotton production reaches 110,000 bales</td>
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<tr>
<td>1976</td>
<td>Cotton established in Gwydir Valley at Moree using water from the newly constructed Copeton Dam</td>
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<tr>
<td>1977</td>
<td>The construction of the Pindari and Glenlyon Dams allows cotton to be grown in the Macintyre Valley in Southern Queensland</td>
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<tr>
<td>1980</td>
<td>Cotton production reaches 435,000 bales</td>
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<tr>
<td>1985</td>
<td>Cotton production reaches 1.1 million bales</td>
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<tr>
<td>Year</td>
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<tr>
<td>2010/11</td>
<td>Record crop of 4.1 million bales, industry in resurgence after almost a decade of drought.</td>
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<tr>
<td>2010</td>
<td>Cotton industry self-funds First Environmental Audit, leading to introduction of Best Management Practices (BMP)</td>
</tr>
<tr>
<td>2012</td>
<td>3rd Environmental Assessment of industry finds significant improvements in natural resource management since 2003</td>
</tr>
<tr>
<td>2008/09</td>
<td>A new path is set for Cotton Australia as it merges with a key research partner, the Australian Cotton Growers Research Association (ACGRA).</td>
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<tr>
<td>2009/10</td>
<td>myBMP re-launched as an electronic, internet-based program, significant rains across cotton areas commences in August 2010</td>
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<tr>
<td>2005/06</td>
<td>95% of Australia’s cotton growers plant transgenic varieties, accounting for 80 per cent of total cotton crop</td>
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<tr>
<td>2005</td>
<td>Australian crop sets new world record yield, leading to a 2.9 million bale crop</td>
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<tr>
<td>2003</td>
<td>Transgenic Bollgard II® variety introduced to Australia, replacing Ingard®</td>
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<tr>
<td>2003</td>
<td>Cotton industry undertakes Second Environmental Audit</td>
</tr>
<tr>
<td>2002</td>
<td>Roundup Ready® cotton introduced to Australia</td>
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<tr>
<td>2002-04</td>
<td>Worst drought in 100 years results in 60 per cent reduction in crop size</td>
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<tr>
<td>2001</td>
<td>Crop reaches record high of 3.4 million bales</td>
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<tr>
<td>2001</td>
<td>World cotton price reaches lowest level in nearly 30 years</td>
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<tr>
<td>2001</td>
<td>Cotton production reaches 2.7 million bales</td>
</tr>
<tr>
<td>1996</td>
<td>The first transgenic cotton variety (Ingard®) introduced to Australia</td>
</tr>
<tr>
<td>1995</td>
<td>Drought causes harvest to fall to 1.5 million bales</td>
</tr>
<tr>
<td>1992</td>
<td>World record yields in Australia lead to record 2.2 million bale crop</td>
</tr>
<tr>
<td>1990</td>
<td>2 Row Pickers were introduced in the 1970s</td>
</tr>
<tr>
<td>1990</td>
<td>Cotton industry self-funds First Environmental Audit, leading to introduction of Best Management Practices (BMP)</td>
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</table>
Biodiversity refers to the variety of life forms found in an environment including animals, plants, bacteria, fungi and micro-organisms.

Cotton growers have improved soil, riparian and native vegetation management which is contributing to improved biodiversity and delivering important ecosystem services. 

(Source: Cotton Industry’s Third Environmental Assessment, 2012)

PLANTS

- **Around 40% of cotton farm area is dedicated to native vegetation.** *(Source: 2011 Cotton Grower Survey, CRDC and Cotton CRC)*
- **63% of farms have a riparian zone ranging between 2 and 15 km in length (on average 7 km).** *(Source: 2011 Cotton Grower Survey, CRDC and Cotton CRC)*
- **70% of cotton growers have river frontage and 75% of growers are actively managing their riparian zones.** *(Source: 2011 Cotton Grower Survey, CRDC and Cotton CRC)*
- Healthy, in tact native vegetation provides important buffer zones, harbours beneficial insects and nature’s pest controllers (birds and bats), reduces soil erosion and helps keep waterways healthy.
- **Connecting remnant vegetation and replanting native species can help improve biodiversity by extending habitat and providing natural corridors for animals to move along.**
- Well managed native pastures are not only excellent for cattle feed and are relatively drought tolerant, but help improve biodiversity such as bird life on cotton farms.
- **Native vegetation provides windbreaks that reduce soil erosion and act as a buffer to the application of sprays such as herbicides.**
- **Leaving standing and fallen dead timber, rocks and understorey shrubs provides habitats for native plants and animals.**

Photo by: Georgie Krieg

63% of cotton farms have a riparian zone averaging 7km in length

Fact Sheet

Biodiversity

Brought to you by Cotton Australia
Sowing small areas of local native grasses as a nursery for seed collection allows restoration if necessary, on other areas of the farm.

**TACTICS USED BY GROWERS TO MANAGE RIPARIAN AREAS INCLUDE:**

- Fencing and selectively grazing
- No grazing at all
- Control of weeds and pests
- Provision of alternative water points for stock
- Maintain filter, buffer strips
- Planted native trees and other vegetation. (Source: The Australian Cotton Water Story, 2012)

**ANIMALS**

- Bats, birds, ants, wasps and other predatory insects are a cotton growers natural workforce against pests that attack cotton.
- Cotton growers encourage beneficial insects and predator pests into cotton crops as part of Integrated Pest Management systems. This reduces the need for chemicals and encourages natural pest eradication.

- Native animals living in healthy native vegetation help keep the right balance of pests and predators.
- Nearly one third of all Australian bird species are found in cotton growing regions.
- A research project in the Namoi Valley found 138 species of birds on cotton farms. (Source: Weaving a Future, Seven Years of Cooperative Research Report, 2012)
- A bird study of 19 water storages on nine cotton farms in the Gwidir Valley recorded 42,495 birds representing 45 different species, including many of conservation significance. In a study of cotton farms in the Namoi Valley of NSW, 138 species of birds were recorded.
- Cotton growers participate in feral pest control programs to protect native plants and animals as well flora and fauna monitoring such as recording animal tracks, diggings, footprints, scat, chewed bark, nests, spider webs and bird calls.

**SOILS**

- Soil that is full of nutrients and organic matter and that can store moisture grow better, higher yielding crops, contribute to water use efficiency and break down residual herbicides faster.
- Many cotton growers are using minimum or no till farming systems (where the soil is not ploughed, and stubble is retained and planted into) which has seen dramatic improvements in soil health, retaining moisture and nutrients, and a reduction in diesel fuel usage (hence carbon emissions).
- Cotton is grown in rotation with other crops such as wheat, chickpeas and sunflowers (legumes) to increase nutrient level in soils.
- It is common practice for paddocks to be left to rest or remain ‘fallow,’ allowing a natural build-up of nutrients in the soil.
- Many cotton farmers use organic fertilisers such as chicken and feed lot manures, and some are experimenting with bio-solids, or human waste.

**Native animals living in healthy native vegetation help keep the right balance of pests and predators.**
Cotton is a natural fibre that grows on a plant.

The cotton plant is a leafy, green shrub related to the Hibiscus. Cotton is a natural fibre that grows on a plant.

The cotton plant briefly produces cream and pink flowers that once pollinated are replaced by fruit, better known as cotton bolls.

Cotton is grown commercially as an annual shrub and reaches about 1.2 metres in height. Its leaves are broad and heart shaped with coarse veins and 3-5 lobes. The plant has many branches, with one main central stem.

The cotton plant’s taproot reaches a depth of 1.5 metres.

The plant also produces seeds that are contained in small capsules surrounded by a downy fibre hidden in the cotton bolls.

Australian flora contains 17 native Gossypium species that are all members of a distinct group found exclusively in Australia. They are distant relatives of cultivated cottons. (Source: Fryxell 1979b; Fryxell 1992; Seelanan et al. 1999; Brubaker et al. 1999a; Brubaker et al. 1999b).

There are up to 52 species of cotton in the Gossypium genus. (Source: The Biology of Gossypium hirsutum L. and Gossypium barbadense L. (cotton), February 2008). The most commercially grown cotton variety is Gossypium hirsutum, first developed by the Mayan civilisation in Mexico.

The cotton plant is a leafy, green shrub related to the Hibiscus.
Each cotton boll usually contains 27-45 seeds. Attached to each seed is between 10,000 – 20,000 tiny fibres about 28mm in length.

Cotton fibre is made from cellulose, has a thin coating of wax and is thin and hollow like a straw.

Cotton plants prefer hot summers with low humidity and long hours of sunshine.

Australia’s cotton growing season lasts approximately six months, starting in September/October/November (planting) and ending in March/April/May (picking) – depending on the region.

About 100 species of insects attack cotton plants, and if not controlled can cause serious damage. The main pests in Australia are the Helicoverpa caterpillar, aphids, thrips, mirids and white fly.

Cotton can be affected by a range of diseases that have the potential to devastate the industry. The six most serious ones are bacterial blight, Texas root rot, cotton leaf curl disease, blue disease and exotic strains of Fusarium wilt and Verticillium wilt. (Source: Innovative Disease Management, Karen A. Kirkby, 2012)

A number of environmental factors can affect the growth of cotton, particularly in the early stages, including heat shock, cold shock, sand blasting, hail damage and water logging.

All parts of the cotton plant are used. Cotton fibre is processed into yarn and fabric, the seeds can be crushed for oil or animal feed, the remaining plant is mulched and even the linters are used to make products like cotton balls.

More than 75 countries grow cotton. (Source: ICAC, 2012)

Cotton is grown between 45 degrees north and 35 degrees south of the equator. (Source: ICAC, 2012)

In 2009 cotton accounted for 31.7% of worldwide fibre production. (Source: ICAC, 2011)

Photo by: Josh Smith. Each cotton boll usually contains 27-45 seeds.
<table>
<thead>
<tr>
<th>Date</th>
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<tbody>
<tr>
<td>5000 B.C.</td>
<td>Cotton fibre and cloth fragments found in Mexico date from this period</td>
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<tr>
<td>3000 B.C.</td>
<td>Cotton first cultivated as a fabric in the Indus River Valley [present-day Pakistan]</td>
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<tr>
<td>2500 B.C.</td>
<td>Chinese, Egyptian and South American civilisations begin weaving cotton fabrics</td>
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<tr>
<td>2500 B.C.</td>
<td>Early farming societies in South and North America domesticate and breed two local species of cotton: Gossypium hirsutum and Gossypium barbadense</td>
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<tr>
<td>300 B.C.</td>
<td>Alexander the Great’s army brings cotton goods into Europe following conquest of the Persian Empire. However, cotton cloth remains expensive and its use is limited</td>
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<tr>
<td>100 A.D.</td>
<td>Arab traders bring two cotton fabrics, muslin and calico, to Italy and Spain</td>
</tr>
<tr>
<td>800s</td>
<td>The Moors introduce cotton cultivation to Spain</td>
</tr>
<tr>
<td>1492</td>
<td>Christopher Columbus finds the modern world’s most popular current cotton variety, Gossypium hirsutum, in the Bahamas</td>
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<tr>
<td>1500s</td>
<td>Denim fabric is initially produced in Nimes, France. Denim derives its name from ‘serge de Nimes’ (‘fabric of Nimes’)</td>
</tr>
<tr>
<td>1500s</td>
<td>Sailors from Italian port city, Genoa, begin to wear denim trousers. The word ‘jeans’ is derived from ‘Genes’, the French name for Genoa</td>
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<tr>
<td>1530s</td>
<td>Naturally coloured cotton fabrics are among the first items collected from the Americas and more technically sophisticated than fabric woven by European looms at the time</td>
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<tr>
<td>1600s</td>
<td>The East India Company brings rare cotton fabrics to Europe from India</td>
</tr>
<tr>
<td>1621</td>
<td>Cotton first produced in parts of present-day USA</td>
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<tr>
<td>1641</td>
<td>First cotton spinning factory opens in Manchester, UK, marking the true beginning of Europe’s cotton industry</td>
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<tr>
<td>1700s</td>
<td>The world cotton industry develops dramatically as Britain acquires colonies suitable for cotton growing whilst at the same time textile machinery improvements allow stronger yarn to be spun</td>
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<tr>
<td>1700s</td>
<td>Cotton replaces flax and wool as Europeans most popular fabric</td>
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<tr>
<td>Year</td>
<td>Event</td>
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<tr>
<td>1760s</td>
<td>Britain overtakes India as world’s largest cotton processor as a result of the Industrial Revolution</td>
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<td>1764-67</td>
<td>The spinning jenny (1764) and Arkwright’s spinning frame (1767) are invented, enabling cheap mass production of cotton cloth</td>
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<tr>
<td>1793</td>
<td>American Eli Whitney patents the cotton gin, separating cotton 50 times faster than traditional hand methods. As a result of this and the advent of cheaper industrial dyes, Gossypium hirsutum, a white cotton species, replaces coloured varieties as the most popular cotton variety</td>
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<tr>
<td>Early 1800s</td>
<td>Southern US states become the world’s largest exporter of cotton to thriving British textile mills</td>
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<tr>
<td>1920s</td>
<td>The USA accounts for more than half of the world’s cotton fibre</td>
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<tr>
<td>1939–45</td>
<td>During WWII, naturally green and brown cottons are again produced commercially to counter the lack of dyes available</td>
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<tr>
<td>1940s</td>
<td>Denim’s popularity becomes more widespread as its image shifts from durable clothing for blue-collar workers towards everyday apparel for the general public and youth in particular</td>
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<tr>
<td>1950/51</td>
<td>World cotton demand and production levels each reach seven million tonnes</td>
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<tr>
<td>Early 1980s</td>
<td>China overtakes the USA as the world’s largest cotton producer</td>
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<tr>
<td>1980s</td>
<td>Most native, coloured cotton varieties grown in Africa, Asia, Central and South America are replaced by all-white, commercial varieties</td>
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<tr>
<td>1996</td>
<td>Transgenic cotton varieties are first introduced. They will be widely adopted by the world cotton industry before the end of the 20th century</td>
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<tr>
<td>2003</td>
<td>The first transgenic cotton varieties to have two independently acting Bt genes are successfully introduced in Australia and the USA</td>
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<tr>
<td>2004/05</td>
<td>World cotton demand and production reach record highs of 23 and 26 million tonnes respectively</td>
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<tr>
<td>2006/07</td>
<td>World cotton average yields reach a record 747 kilograms per hectare, due in large part to increased use of biotechnology</td>
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<tr>
<td>2008</td>
<td>Structure of world in trade changing due to financial stress of Global Financial Crisis, volatility in the futures market and reduced demand</td>
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<tr>
<td>2009/10</td>
<td>30 million hectares of cotton planted</td>
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<tr>
<td>2011</td>
<td>World cotton prices peaked at their highest recorded levels ever. The Bremen CFI Index, one of the three most important price indices for cotton trade, stood at 246.15 cents/lb on 8th March.</td>
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</tbody>
</table>
Australia is the fourth largest exporter of cotton in the world, behind USA, India and Uzbekistan. Australia’s cotton is sold into a world market, competing against around 75 other cotton producing nations for its share of global cotton trade.

For the last two seasons, the Australian cotton industry has generated in excess of $2.5 billion in export revenue, making it one of Australia’s largest rural export earners and helping to underpin the viability of over 100 regional communities.

The total international trade in cotton is estimated to be $12 billion. Africa’s share of the cotton trade has doubled since 1980. (Source: Cotton Incorporated, 2011)

Australia is the fourth largest exporter of cotton in the world (behind USA, India and Uzbekistan).

In 2009/10 Australia’s cotton exports increased by approximately 76% to 460,000 tonnes, compared to the previous year. (Source: ICAC, 2011)

In 2009/10 China, Indonesia, Thailand, Bangladesh, Korea and Japan were the main markets for Australian cotton. (Source: ICAC, 2011)

Australia exports cotton seed to Japan (crushed and cattle feed), Korea (crushed), China (crushed) and the USA (dairy feed) depending on parity price and the value of the Australian dollar.

Australia’s growers produce very high quality cotton with low contamination that is in demand on the world market and commands a premium price.

The price that a grower receives for each bale of cotton produced is set by the world market. This price is dependent on a number of factors including the state of the world economy, agricultural politics, fashion trends, synthetic fibre price, weather, natural disasters and cotton’s own supply and demand.
For the last two seasons, the Australian cotton industry has generated in excess of $2.5 billion in export revenue.

Cotton growers “sell” their cotton to one of a number of independent Australian merchants who then sell it into the world’s markets, aiming to get the best price possible. It’s a very competitive and transparent market.

The long-term average price for Australian cotton (21 years, 1991 – 2011) is $460 per bale. (Source: Rabobank, Cotton Conference Presentation 2012)

In recent times (2010/11) the cotton price has been very volatile with prices ranging from $450 per bale up to $1000 a bale in Australia.

In 2011, world cotton prices peaked at their highest recorded levels ever. The Bremen CFI Index, one of the three most important price indices for cotton trade, stood at 246.15 cents/lb on 8th March. This was a previously unreach level and almost two and a half times higher than at the beginning of the 2010/11 season. (Source: ICAC 2011)

There is a forward market for cotton in Australia where growers can sell their cotton at a fixed price, up to three years ahead. (Source: Australian Cotton Shippers Association, Cotton Conference Presentation 2012)

Australian cotton growers have an excellent reputation for good business practice in the world market, for a number of reasons:

• They honour their sales contracts regardless of price movements and merchants honour their purchase contracts, regardless of price movements
• Production reliability is high, crop abandonment is extremely low and yields are very high

(Source: Australian Cotton Shippers Association, Cotton Conference Presentation 2012)
Cotton is an annual, summer crop. It prefers hot summers with low humidity and a maximum amount of sunshine.

In general, cotton grows quicker as the average temperature rises and the longer and hotter the season, the greater the yield.

The growing season from planting to picking lasts approximately six months.

**AUGUST/SEPTEMBER – SOIL PREPARATION**
- Soil prepared for planting, weeds removed, nutrients added if necessary.
- Soil moisture levels checked, pre-watering if necessary.

**SEPTEMBER/OCTOBER/NOVEMBER – PLANTING**
- Soil temperature checked.
- Cottonseed planted when soil is warm enough for satisfactory seed germination and crop establishment (i.e. soil temperature reaches 14°C at a depth of 10cm for at least three days).
- Cotton seeds sprout 4-5 weeks after planting.

**NOVEMBER/FEBRUARY – GROWING SEASON**
- Flower buds develop a few weeks after the plant starts to grow, then flowers appear a few weeks later. The flowers then fall off leaving a ripening seed pod that becomes the cotton boll (the fruit).
- Ongoing checks for pests, soil moisture level tests and weed removal.
- On irrigated cotton farms the initial irrigation (watering) is usually followed by a further four to five irrigations, at two to three week intervals, from mid-December to late-February. This differs depending on the region and on natural rainfall levels.
Approximately four months of growing is needed for the cotton bolls to ripen and split open.

Cotton growers use a range of natural and soft chemical options to control the pests that attack cotton (called Integrated Pest Management, or IPM).

MARCH/APRIL/MAY – DEFOLIATION, PICKING AND TRANSPORTATION TO GINS

- Crop checked by agronomists to make sure it is ready to pick.
- Large mechanical cotton pickers are used to pick the crop.
- Growers usually choose to pick the cotton crop once most bolls have opened and fully matured. It is extremely important that cotton is picked dry or discoloration may occur and reduce quality.

Cotton is packed onto trucks and sent to the ‘gin’ where it is ginned – a process separating lint (raw cotton fibre), cottonseed and trash.

The cotton lint is tightly pressed into bales, each weighing 227kg – these are then sent to ports for shipping to overseas markets.

MAY-AUGUST (OFF-SEASON)

- Classing and marketing activities undertaken.
- Growers plant winter crops and/or graze sheep and cattle.
- Growers make improvements on-farm for next season.
- Farm maintenance.

Growers usually choose to pick the cotton crop once most bolls have opened and fully matured.

www.cottonaustralia.com.au
In 2012, cotton provided employment for 8,000 people across northern NSW and southern QLD alone. (Source: Stubbs Report, 2012)

Australia’s cotton growers produce yields two and a half times the global average and have produced the world’s highest cotton yields for 20 years running. In 2009-10 Australia recorded cotton lint yields of 1.857 tonnes of cotton per hectare. The next highest yielding countries were Israel (1.667 t/ha), Brazil (1.439 t/ha) and Turkey (1.333 t/ha).

Plant breeding has been responsible for at least 50% of the yield increases seen in Australia, with 50% attributed to better water management. (Source: Australian Cotton Water Story 2012)

The average area of cotton grown is 467 hectares.

A recent survey showed that less than half the area of a cotton farm (40%) is cultivated.

Cotton growers are very experienced operators, with over 75% having 15 years experience or more.

Around 40% of cotton farm area is dedicated to native vegetation.

In 2012, cotton provided employment for 8,000 people across northern NSW and southern QLD alone. (Source: Stubbs Report, 2012)

The cotton industry employs 15 times as many people as grazing and five times as many people as dryland cropping. (Source: Stubbs Report, 2012)

Cotton is one of Australia’s largest rural export earners and helps underpin the viability of more than 50 rural communities.

In 2011-12 Australian cotton crop was a record of over 5 million bales.
In Queensland, cotton is grown mostly in the south in the Darling Downs, St George, Dirranbandi and Macintyre Valley regions. The remainder is grown near Emerald, Theodore and Biloela in Central Queensland.

Australia is a relatively minor producer on the world scale, but is the world’s fourth largest cotton exporter.

Australia uses 100% local seed. (Source, ICAC, 2011)

In an average year, Australia’s cotton growers produce enough cotton to clothe 500 million people.

CSIRO’s cotton plant breeding program had improved yield, HVI quality and are showing superior textile performance attributes. (Source: Cotton Conference Paper, Michael Bange and Robert Long, 2012)

Over 99% of Australia’s raw cotton is exported. Over 75% of Australia’s cotton is sold to China, making it our biggest customer.

The top 20% of growers achieved yields of 11.2 bales/hectare in 2011. (Source: Boyce Report, 2011). In Australia, average ye in 2009/10 under irrigat conditions was 9.68 bales compared to 5.2 bales/h under rain fed condition.

The Australian cotton industry has grown from 17,000 hectares planted 1966 to 600,000 hectares in 2011, an annual growt rate of 6.7%. (Source: Stubl Report, 2012)

The Australian cotton industry has increased average production from 7.3 bales/hectare to 8.7 bales/hectare in the past five years – growing more cotton with the same amount of land.

Cotton farms occupy less than 5% of the catchment areas in which they operate. (Source: Australian Cotton Water Story 2012)

Cotton is a major contributor to agriculture’s share of gross regional product in all cotton regions – 75% in Narrabri, 50% in Warren and a third in the Darling Downs. (Source: Centre for Agricultural and Regional Economics (CARE), Australian Water Story 2012)

The major production area in NSW stretches south from the Macintyre River on the Queensland border and covers the Gwydir, Namoi and Macquarie valleys. In NSW cotton is also grown along the Barwon and Darling rivers in the west and the Lachlan and Murrumbidgee rivers in the south.

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In an average year, Australia’s cotton growers produce enough cotton to clothe 500 million people.

Australia has an enviable reputation on the world market as a reliable supplier of very high quality cotton, and can command a premium price for this reason. A recent study found new varieties from
Cotton grows in a number of colours, including brown and green!

The word ‘cotton’ is derived from ‘qutun’ or ‘kutun’, an Arabic word used to describe any fine textile.

In an average year, Australia’s cotton growers produce enough cotton to clothe 500 million people.

Around 70 countries in the world grow cotton.

Cotton and its by-products are used in the production of a huge range of products including bank notes, margarine, rubber and medical supplies.

There are 43 species of cotton in the world and some cotton grows on trees.

Australia and Egypt produce the highest quality cottons in the world.

The fibre from one 227kg cotton bale can produce 215 pairs of jeans, 250 single bed sheets, 1,200 t-shirts, 2,100 pairs of boxer shorts, 3,000 nappies, 4,300 pairs of socks or 680,000 cotton balls.

Cotton can absorb up to 27 times its own weight in water.

The cotton plant requires about 180 – 200 days from planting to full maturity ready for harvest.

Cotton is a unique crop in that it is both a food and a fibre.

China is the world’s largest cotton importer and is also the biggest producer.

Global cottonseed production can potentially provide the protein requirements for half a billion people per year and many billions of other animals. (Source: Animal Production and the Future Use of Cottonseed, Professor Emeritus, University of New England, 2012)

Chambray is a type of cotton popularly used in the manufacture of blue work shirts, and is where we get the term “blue-collar”.

Cotton dates from at least 7,000 years ago making it one of the world’s oldest known fibres.

Archaeologists found 5,000 year old cotton fabric at Mohenjo Daro, an ancient town in the Indus River Valley of West Pakistan.

Greek and Roman civilisations used cotton for awnings and sails as well as clothing.

The Aztec civilisation used naturally coloured brown cotton as a principal form of payment.

Denim fabric was initially produced in Nimes, France. Denim derives its name from ‘serge de Nimes’ (‘fabric of Nimes’).

In the 16th Century, sailors from the Italian port city, Genoa, began to wear denim.

Naturally coloured cotton varieties in South America have come in shades of red, yellow, beige, chocolate, pink, purple, green, striped like a tiger and even spotted like a leopard.

Ancient Peruvians made fishing nets and lines from darker shades of cotton to be less visible to fish.

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Approximately 75 countries in the world grow cotton. (Source: ICAC 2012)

Cotton is primarily grown between 45°N and 32°S. (Source: ICAC 2012)

30 million hectares of cotton was sown worldwide in 2009/10. [Source: ICAC 2011]

In 2009 cotton accounted for 31.7% of worldwide fibre production. [Source: ICAC 2011]

Cotton’s share of the world fibre market is falling. Between 2005 and 2009 cotton’s share in fibre production worldwide fell from 35.7% to 31.7%. (Source: ICAC, 2011)

WORLD COTTON SUPPLY AND DISTRIBUTION

<table>
<thead>
<tr>
<th></th>
<th>2010/11</th>
<th>2011/12</th>
<th>2012/13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>24.87</td>
<td>26.79</td>
<td>24.91</td>
</tr>
<tr>
<td>Consumption</td>
<td>24.46</td>
<td>23.87</td>
<td>24.69</td>
</tr>
</tbody>
</table>

(Source: ICAC 2012)

World’s Top 10 Cotton Producers in 2011

<table>
<thead>
<tr>
<th>Country</th>
<th>Million Bales</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>33.0 million</td>
</tr>
<tr>
<td>India</td>
<td>27.0 million</td>
</tr>
<tr>
<td>United States</td>
<td>18.0 million</td>
</tr>
<tr>
<td>Pakistan</td>
<td>10.3 million</td>
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<tr>
<td>Brazil</td>
<td>9.3 million</td>
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<tr>
<td>Uzbekistan</td>
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<tr>
<td>Australia</td>
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<tr>
<td>Turkey</td>
<td>2.8 million</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>1.6 million</td>
</tr>
<tr>
<td>Greece</td>
<td>1.4 million</td>
</tr>
</tbody>
</table>

China is the world’s largest cotton producer AND the world’s largest consumer of fibre, with a share of around 25% of global cotton production in 2009/10. (Source: Bremen Cotton Exchange 2010)

In 2010 developing countries such as China and India accounted for a 51% share of end use cotton consumption. (Source: ICAC 2011)

In 2010/11 the world’s main cotton exporters were the USA, India, Uzbekistan and Australia. (Source: ICAC, 2011)

In 2010/11 the major importers of cotton were China, Bangladesh and Turkey. (Source: ICAC, 2011)

In 2008/09 average world cotton yield reached 770 kilograms per hectare, down 23 kilograms from 2007/08. (Source: Bremen Cotton Exchange 2010)

Australia’s cotton growers produce yields two and a half times the global average. In 2009-10 Australia recorded cotton lint yields of 1.857 tonnes of cotton per hectare.

In 2010 organic cotton produced worldwide amounted to a little over 1% of total cotton grown. (Source: ICAC 2011)

China is the world’s largest producer AND consumer of cotton.
The Australian cotton industry is recognised internationally as a leader in sustainable cotton production and has been used as a model for change by other Australian agriculture industries.

For over a decade, the cotton industry’s flagship environmental program, BMP (Best Management Practices) has radically changed the way cotton is grown in Australia.

myBMP is a web based program that aims to achieve true sustainability through improved farm efficiency and productivity along with protecting the environment and its natural resources.

myBMP allows growers and industry to access the latest technical data, information and research, find solutions to challenges and provide a wide variety of tools to help growers operate at maximum efficiency.

There are many benefits to the cotton industry’s commitment to sustainability through myBMP – these include safer farm workplaces, healthier natural environments, reduced input costs, better run farm businesses and improved community health.

myBMP assists cotton growers to keep pesticide use to a minimum, control weeds and diseases, maximise water use efficiency, improve soil health, protect and retain native animals and vegetation.

Cotton farmers record, monitor and are audited in 11 key areas of the farm operations:

- **Biosecurity**: the avoidance, management and control of pests and diseases
- **Biotechnology**: for transgenic cotton varieties
- **Energy and Greenhouse Gases**: efficient use of energy inputs like fuel and fertilisers
- **Fibre Quality**: for growing the best quality cotton possible
- **Human Resources**: managing staff and contractors
- **Integrated Pest Management**: for weeds, pests and diseases
- **Natural Assets**: managing vegetative and riparian assets
- **Pesticide Management**: pesticide storage and use
- **Petrochemical Storage and Handling**: petrochemical storage and use
- **Soil Health**: ensuring healthy soils for the long term
- **Water Management**: water quality, efficiency of storage and distribution, dryland and irrigated farming practices.

Each module includes the best available science around that topic, as well as the industry’s best practice guidelines for management.

Practical examples of myBMP include using natural techniques (like pupae busting) and softer chemicals to control pests, tail water recycling, crop rotations and stubble retention to improve soil health and retain soil moisture and irrigation scheduling and monitoring tools to maximise water efficiency.
PROCESSING

- Once picked cotton is pressed into large rectangular, truck-sized blocks called modules or into large round bales. This happens on the farm.

- Cotton round bales or modules are then transported to a cotton gin (short for en-gin) for the first stage of processing.

- Cotton gins are factories that separate cottonseed and trash from the lint (raw cotton fibre).

- Gins in Australia are located in regional areas where the cotton is grown.

Ginning is done in a series of stages using large mechanical saws that “strip” the cotton lint from the seeds and blowers to remove as much trash as possible.

- The white fluffy lint is then pressed into cotton bales using a bale press, and covered with bale covers made from cotton to minimise contamination.

- A cotton gin can produce up to 60 cotton bales an hour.

- A cotton bale weighs 227kg.

- Cottonseed represents 55% of ginned cotton’s weight.

- Cotton fibre represents 35-40% of ginned cotton’s weight.

- Trash represents the remaining 10% of ginned cotton’s weight and is made up of mostly leaves and sticks.

- The trash is sometimes used in products that clean up oil spills and also in ethanol manufacturing.

MARKETING

- Australia enjoys an open, sophisticated and highly competitive marketing system whereby growers forward sell their crops directly to marketing companies.

- Australian marketing companies include Namoi Cotton, Cargill, Auscott, Queensland Cotton, Twynam Agricultural Group, Louis Dreyfus Commodities, Ecom Commodities and Plexus Cotton Ltd.

- These companies then “on sell” the cotton into overseas markets, and pay the grower.
The cotton bales are warehoused, and once they’re sold and ready to be shipped are loaded into large shipping containers.

**EXPORTING**
- Once the cotton bales are ginned and pressed they are loaded on to trucks and trains and sent to port for shipping, mostly to overseas markets.
- The main ports for Australian cotton are in Brisbane and Sydney.
- The cotton bales are warehoused, and once they’re sold and ready to be shipped are loaded into large shipping containers.
- The main customers for Australian cotton are spinning mills located in south east Asia – China is the largest buyer of Australia’s cotton.

**CLASSING**
- Following the ginning process, samples of cotton are collected from each bale for classing.
- Cotton classing sorts the fibre into different quality based grades. The better the fibre quality, the higher the grade and the more the grower is paid for the cotton.
- There are many factors in cotton classing that determine the grade including colour, uniformity, staple length, fibre strength, micronaire, neps [or knottness], stickiness and trash content.

**SPINNING AND WEAVING**
- Turning cotton fibre into fabric involves several distinct manufacturing processes including combing, carding, spinning, blending and dyeing.
- Cotton fibre is spun into yarn before being woven or knitted into fabric.
- This fabric can then be sewn into all sorts of cotton products including homewares and fashion.
THE PROPERTIES OF COTTON

- Cotton is a non-allergenic natural fibre that doesn’t irritate sensitive skin.
- Cotton’s softness makes it a preferred fabric for underwear and other garments worn close to the skin.
- Cotton’s adaptability allows it to blend easily with most other fibres including synthetics such as polyester and lycra and natural fibres like wool.
- Cotton is one of the easiest fabrics to dye, because it’s white in colour and very absorbant.
- Cotton has a high absorbency rate and holds up to 27 times its own weight in water.
- Cotton becomes stronger when wet.

- Cotton’s strength and absorbency make it an ideal fabric for medical and personal hygiene products such as bandages and swabs.
- Cotton breathes easily as a result of its unique fibre structure. This attribute makes cotton more comfortable to wear than artificial fibres unable to provide ventilation.
- Cotton keeps the body cool in summer and warm in winter because it is a good conductor of heat.
- Cotton is often used in the manufacture of curtains, tents and tarpaulins as it is not easily damaged by sunlight.
- Unlike synthetic fibres, cotton is a natural product and contains no chemicals.
- Cotton is very versatile – it can be blended, coated, finished, is dry cleanable, machine washable and easy to print on.

COTTON PRODUCTS

- Almost all parts of the cotton plant are used in some way including the lint, cottonseed, linters, stalks and seed hulls.
- The fibre from one 227kg cotton bale can produce 215 pairs of jeans, 250 single bed sheets, 1,200 t-shirts, 2,100 pairs of boxer shorts, 3,000 nappies, 4,300 pairs of socks or 680,000 cotton balls.

PRODUCTS MADE FROM COTTON LINT/FIBRE

- Cotton lint is spun then woven or knitted into fabrics such as velvet, coruroy, chambray, velour, jersey and flannel.
- About 60% of the world’s total cotton harvest is used to make clothing, with the rest used in home furnishings and industrial products.
Well known cotton products include denim jeans, socks, towels, t-shirts, bed sheets and underwear.

More unusual uses of cotton fibre include tents, car tire cord, fishnets and book binding.

PRODUCTS MADE FROM COTTON SEED

Over half the weight of unprocessed cotton (seed cotton) is made up of seed, a valuable by-product of fibre production.

One tonne of cottonseed yields approximately 200 kg of oil, 500 kg of cottonseed meal and 300 kg of hulls. (source: Animal Production and the Future Use of Cottonseed, Professor Emeritus, University of New England, 2012)

Global cottonseed production can potentially provide the protein requirements for half a billion people per year and many billions of other animals. (source: Animal Production and the Future Use of Cottonseed, Professor Emeritus, University of New England, 2012)

The most common uses of cottonseed are oil for cooking and feed for livestock. Cottonseed is pressed to make cottonseed oil. Cottonseed can be made into a meal and is a popular feed for cattle and livestock as it’s a great source of energy.

Cottonseed oil can also be used in a range of industrial products such as soap, margarine, emulsifiers, cosmetics, pharmaceuticals, rubber, paint, water proofing and candles.

Cottonseed oil is cholesterol free, high in poly-unsaturated fats and contains high levels of anti oxidents (vitamin E) that contribute to its long shelf life.

PRODUCTS MADE FROM COTTON LINTERS

Linters are used in the manufacture of paper (such as archival paper and bank notes) and as a raw material in the manufacture of cellulose plastics.

Linters are commonly used for medical supplies such as bandages, cotton buds, cotton balls and x-rays.

Cotton linters are fine, very short fibres that remain on the cottonseed after ginning. They are curly fibres typically less than 3mm long.
The Australian cotton industry, in a partnership with the Australian Government, has been a long-term investor in research that has delivered significant benefits to growers, rural communities and Australia.

Australian cotton growers pay a compulsory research levy of $2.25 per bale of cotton they produce which is matched by the Australian Government.

This research investment has resulted in the Australian cotton industry being recognised as world leaders in the adoption of technology, innovation, environmental management and the production of premium quality cotton.

The Australian cotton industry has identified the connections between improved productivity, natural resource management and addressing climate change. For example, research and development is actively seeking ways to further improve water, fertiliser and energy use efficiency at the same time as reducing greenhouse emissions.

The Cotton Research and Development Corporation (CRDC) invested over $13.3 million in research projects in 2011/12 and expects to invest $16.2 million in 2012/13 across four main research programs: farming systems, biosecurity, value chain and human capacity. The Corporation has increased its R&D investments by 100% over the two years since the end of the drought.

The research effort also supports the development of sustainable production practices, the stewardship of agricultural chemicals and biotechnology and the industry’s environmental program, myBMP.

The Commonwealth Scientific & Industrial Research Organisation’s (CSIRO’s) cotton breeding program has played a major role in ensuring Australian cotton growers remain world leaders in cotton yield and quality. New varieties are researched and tested to increase yield, use less water, reduce the need for chemicals and be resistant to diseases.

The cotton R&D effort is largely driven by cotton growers. Cotton Australia provides advice to the CRDC on research projects funded by the Cotton R&D levy so that outcomes are relevant and practical at farm and industry level.

Over the life of the Cotton, Catchment, Communities Cooperative Research Centre, 428 research and extension projects involving over 1000 people were managed. (Source: Weaving a Future, Seven Years of Cooperative Research Report, 2012)

The cotton industry’s R&D programs aim to increase crop yields, improve fibre quality, improve irrigation and water use efficiency, promote productivity and innovation, provide research information on salinity, river health, and groundwater and enhance biodiversity. More recently are efforts to better understand the requirements of our international markets and to attract and retain a skilled workforce.

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Australia’s cotton growers lead the world in water use efficiency. Underpinned by an enormous research effort and the innovations of individual growers, a set of common on-farm practices for saving water have emerged.

A recent survey of cotton growers shows a significant commitment to improved irrigation systems in the last five years. (Source: 2011 Cotton Grower Survey, CRDC)

Practical approaches to water use efficiency on the farm include:

- Zero and minimum till farming to help retain soil moisture.
- In-field capacitance probes to monitor and transmit soil moisture data from the field to a central computer to help schedule irrigations.
- Irrigation scheduling to ensure irrigation is only done as and when it is needed.
- Thermal imaging and electromagnetic surveys to identify ‘leaky’ dams, pipes and channels so they can be repaired.
- Using new efficient methods of irrigating such as overhead lateral move sprinklers, bank-less channels, siphon-less channels and drip irrigation.
- Growing cotton varieties that are suited to regional conditions and use less water. For example, Bollgard II® has a shorter season and therefore requires less water.
Mobile electromagnetic meters for easy and rapid assessment of soils for their suitability for irrigation construction.

Holding water on farm for shorter time periods to reduce evaporation.

Laser-levelling to ensure uniform, well drained fields using GPS guidance equipment.

Tail water recycling systems so that water is reused.

Reducing evaporation by shortening row lengths.

Positioning dams closer to cotton fields to reduce evaporation losses.

Deeper water storages and head ditches with smaller surface areas to reduce evaporation.

Avoiding water storage on farm by only purchasing water as it is needed.

Smaller water storage cells to reduce evaporation.

Not putting water directly into dry storages which soak up water.

Infield monitoring using probes to detect soil moisture levels.

Creating a ‘water budget’ to monitor water use.

Lining storages and channels with clay or non-porous materials to avoid seepage.

Covering water storages to reduce evaporation.

Mulching and stubble retention to help retain soil moisture, reducing the need for irrigations.

Permanent wheel beds to reduce soil compaction and increase water infiltration.

Avoiding water logging and over-watering.

Laser leveling fields to avoid water logging.

Software packages such as HydroLOGIC (www.csiro.au/hydrologic) and Water Track (www.watertrack.com.au).

Doubling the size of siphons.

Slowing the rates of water application to ensure water soaks into the root zone where it’s needed most, rather than running off.

Installing monolayers for evaporation mitigation on farm dams.

Mulching and stubble retention to help retain soil moisture, reducing the need for irrigations.

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Cotton uses about the same amount of water as other summer crops.

Australia’s cotton industry is considered the most water-efficient in the world, producing “more crop per drop” than any other nation at two and a half times the world’s average yields.

Appropriate varieties, a massive research effort, use of the latest technologies and cutting edge on-farm practices all combine to produce Australian cotton fibre that is farmed with less water per hectare than ever before.

The Australian cotton industry has achieved a 40% increase in water productivity over the last decade. (Source: The Australian Cotton Water Story, 2012)

Australia’s cotton growers have improved their water use efficiency by 3-4% per year since 2003. (Source: Third Australian Cotton Industry Environmental Assessment, September 2012)

Australian cotton growers have almost doubled their Irrigation Water Use Index from 1.1 in 2000-01 to 1.9 bales per megalitres in 2009-10. (Source: The Australian Cotton Water Story, 2012)

In 2011-12 about 20% of the cotton crop was rain-grown, the rest irrigated.

Cotton uses about the same amount of water as other summer crops, is drought and heat tolerant and uses less water than rice, maize, soybeans and many vegetable crops.

Cotton’s average irrigation requirement is 5.2 megalitres per hectare (5.2 ML/ha), compared to rice (10.1ML/ha), nurseries, cut flowers and turf (4.2 ML/ha) and fruit and nut trees. (4 ML/ha) (Source: ABS Water Use on Australian Farms 2010-11)

Pasture for grazing accounted for the greatest amount of irrigated land (538,000 hectares) in Australia in 2010–11, with the volume of irrigation water applied representing 27% of the national total. (Source: ABS Water Use on Australian Farms 2010-11)
Cotton growing accounted for nearly 40% of total water extracted in the Murray-Darling Basin in 2009-10. (Source: ABS Water Use on Australian Farms 2010-11)

Cotton is the lifeblood of many regional communities, employing 8,000 Australians in Northern NSW and Southern QLD alone.

Each gigalitre of water used for cotton production results in 1.3 direct jobs and generates $500,000 in gross value agricultural production. (Source: Stubbs Report, 2012)

Cotton is an ideal crop for Australia’s extremely variable climate where in some years water is plentiful and other years suffer from drought. Cotton is an ideal crop because it is only planted when there’s water available. For example, the 2007-08 cotton crop was the smallest in 30 years due to a lack of available water.

Cotton is an efficient plant, with the latest industry data showing approximately 63% of all water is used by the crop.

Irrigation water for agriculture is used on the highest value crops. Farmers choose to “spend” their water entitlements on the crops that deliver the best return per unit of water, in many areas that crop is cotton.

Cotton growers have significantly improved their irrigation systems and practices in the last five years (Source: 2011 Cotton Grower Survey, CRDC)

- 96% had made improvements to their furrow irrigation systems
- 70% of irrigators used either a capacitance probe or neutron probe for irrigation scheduling, nearly 1 in 10 used both
- 62% of groundwater irrigators regularly monitor water quality
- 20% had redesigned fields
- 20% had reduced storage & distribution losses.

Most cotton growers have what are termed “low security” water licences, which means they only get to access their share of the water once the needs of towns, stock and domestic use and the environment are met. This means the percentage of water that cotton growers can access varies greatly from year to year depending on availability.

Cotton growers can only access water from rivers under a strict set of government rules, when it is available. When there’s no water, there’s no cotton.

Cotton growers are using a range of techniques to constantly improve water use efficiency including in-field moisture monitoring, reducing evaporation, scheduling irrigations, improved soil health and new irrigation techniques such as overhead sprinklers and drip irrigation.

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more facts than ever!

Cotton growers have significantly improved their irrigation systems and practices in the last five years.