

## 2. History of Cotton Fibre Use

There are four distinct species of cotton. Two of these, *Gossypium arboreum* and *Gossypium herbaceum* are called Old World cottons as they originated in Africa and the Sub continent. They have been used by man for thousands of years for clothing but are now only grown in very limited areas of India, Pakistan and China – they have good drought tolerance but low yield and fibre quality. The other two species, *Gossypium barbadense* and *Gossypium hirsutum* are called New World cottons and originated in Central America. *Gossypium hirsutum* (called Upland) represents more than 90% of world's cotton production as it is most productive and has suitable fibre properties for modern textile production. *G. barbadense* cottons have a number of names – Pima, Egyptian, Peruvian, Sea Island, etc. These cottons have very good fibre properties demanding a significant price premium from spinners for manufacture of fine garments. They have lower yield and narrower climatic requirements – requiring specific management. In Australia, Pima production has been limited to western NSW locations such as Bourke, Hillston and Tandou. Expansion may be possible to the east with better disease resistance.

The industrial revolution in England during the eighteenth and nineteenth centuries encouraged cropping and export of cotton from the US and other colonies. Cotton, at the beginning of this period, was relatively expensive and cost the equivalent of about US\$100/lb in 2003 prices. By the end of the period, early in the 20<sup>th</sup> century, the price had reduced to US\$10/lb and over the last century to today it is now much less than US\$1/lb. The reductions in the cost of fibre reflect the improvements made in agricultural production, mechanisation of harvesting and ginning, particularly after the Second World War, and the rise of man-made fibres (MMF). Running parallel with the developments in agricultural production were comparable improvements in textile machinery production, which have improved by a factor of 100 from the start of the 20<sup>th</sup> century to today.

Queensland had been identified as a possible production area of cotton for English cotton spinning mills from the time of Cook's mapping of eastern Australian in 1770. Cotton was brought to Australia with the First Fleet in 1788 with seed sourced by Governor Phillip from Rio de Janeiro. These plants were most likely *Gossypium barbadense* tree cottons and were better suited to Queensland than to NSW coastal regions. The US Civil War provided an opportunity to provide cotton into England and there was a small cotton industry in Queensland from 1862 to 1871, with a peak of 5,200 (227 kg) bales produced in 1871 from about 10,000 ha.

In 1884, a Dr David Thomatis moved to Cairns and established a tree cotton plantation. Thomatis Creek to the north of Cairns is named after him. The cotton cultivar he developed and now also a Cairns suburb name, *Caravonica*, was named after his wife and/or home town in Italy. There are still volunteers of that cotton growing in the district.



*Gossypium hirsutum*



*Gossypium barbadense*



*Gossypium arboreum*

Photos: Warwick Stiller (CSIRO)

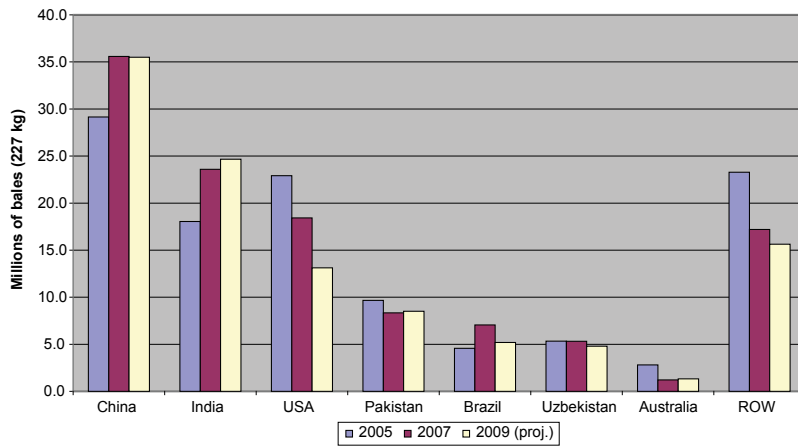
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A small cotton industry existed in Queensland through the 1920s and 1930s but it was not until better crop mechanisation and new irrigation dams were developed that the modern cotton industry was established in the early 1960s, firstly in the Namoi Valley and then followed by a number of other regions. Production peaked in 1999 at about 535,000 ha. At that time Australia was the third largest cotton exporter in the world, mainly into Asia (Indonesia, Japan, Korea and Thailand). Drought in recent years has limited irrigation supplies and hence crop area and production has fallen. It is interesting that the start of the modern cotton industry was encouraged by a Federal Government subsidy to reduce costs of imports for local spinning mills. Now Australia has virtually no cotton spinning and so nearly 100% of today's production is exported to markets largely in South East Asia. In this market, continually improved fibre properties are key. In recent years China has become the biggest customer of Australian cotton.

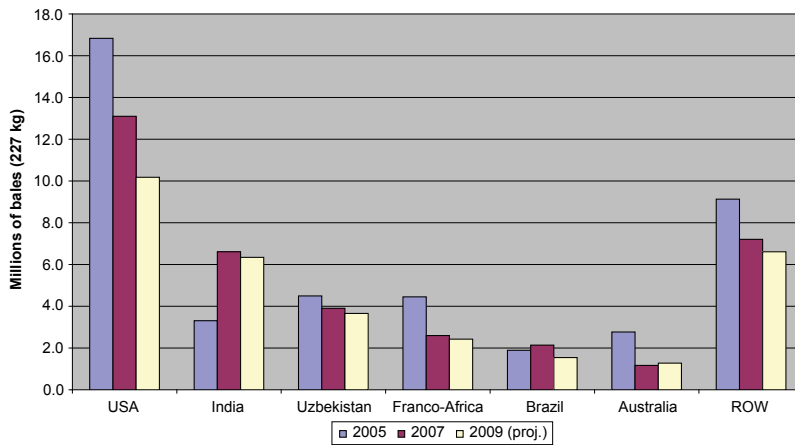
Upland cotton varieties (*G. hirsutum*) have staple lengths typically ranging from 1.00 to 1.125 inches (see Table 2.1 for fibre length conversion). Fibre lengths of Upland cotton have increased over the last 20 to 30 years with new Upland varieties extending this range currently to 1.25 inches. Pima (*G. barbadense*) long staple (LS) and extra-long staple (ELS) type cotton which represents around eight percent of the world's production, are longer and finer than Upland cotton. The staple length of *G. barbadense* cottons typically ranges from 1.25 to nearly 2.00 inches. Fibre from *G. arboreum* and *G. herbaceum* is produced in small quantities (< 2%), and typically have very short, coarse fibre with staple lengths ranging only to 1.00 inch.

Today cotton is grown in more than 100 countries on about 2.5% of the world's arable land, making it one of the most significant crops in terms of land use after food grains and soybeans. Figure 2.1 shows production in 2005 through to the projected production in 2009 from the main cotton producing countries. China (Mainland), India, USA and Pakistan, account for the bulk of world production; more than 75% in 2008/09. China, India and Pakistan are net importers of cotton, consuming all their production and requiring imports from the main exporting nations; USA, Brazil, Uzbekistan, Franco-Africa and Australia. Whilst Australia is a relatively small producer it is important as one of the major exporters of medium to high grade cotton (see Figure 2.2).

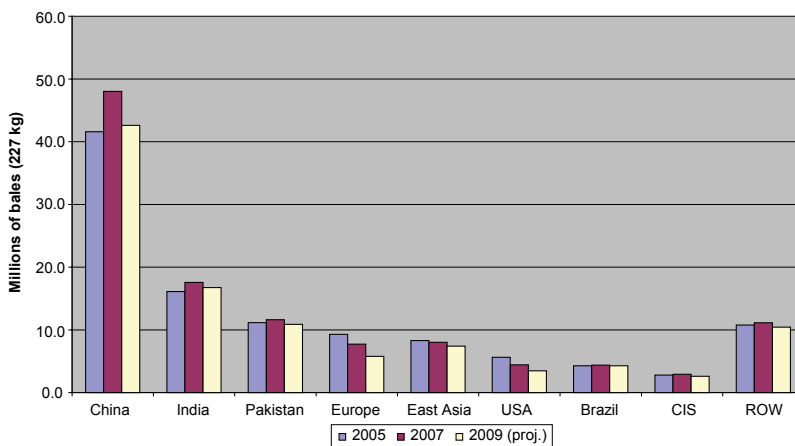
Mill consumption of cotton is likewise spread across the world. In the last decade significant production capacity has moved from Europe and USA to China, India and Pakistan. Figure 2.3 shows recent moves in cotton consumption from 2005 through to the projected consumption in 2009.



**Figure 2.1:** Cotton production in 2005, 2007 and projected for 2009 of the main cotton producing countries. ROW = rest of world. (Adapted from International Cotton Advisory Committee (ICAC) 2009).



**Figure 2.2:** Major cotton exporters in 2005, 2007 and projected for 2009 for the main cotton exporting countries. (Adapted from ICAC 2009).



**Figure 2.3:** Cotton mill consumption in 2005, 2007 and projected for 2009 of the main cotton consuming countries. Europe includes the EU, Central European countries and Turkey. East Asia includes all Asian nations in that region except China. (Adapted from ICAC 2009).

**Table 2.1:** Conversion of fibre length measurements.

<b>Imperial</b>		<b>Metric</b>
<b>Decimal inches</b>	<b>32nds inch</b>	<b>(mm)</b>
1.000	32	25.40
1.031	33	26.19
1.063	34	26.99
1.094	35	27.78
1.125	36	28.58
1.156	37	29.37
1.188	38	30.16
1.219	39	30.96
1.250	40	31.75
1.406	45	35.72

### Further Reading

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