Discover Natural Fibres Initiative

COTTON :
Review of the World Situation

International Cotton Advisory Committee

Volume 68 - Number 2
November-December 2014

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ICAC

SUPPLY AND DISTRIBUTION OF COTTON

December 1, 2014

Seasons begin on August 1

	2009/10	2010/11	2011/12	2012/13 Est.	2013/14 Est.	2014/15 Proj.
	Million Metric Tons					
BEGINNING STOCKS						
WORLD TOTAL	**11.800**	**8.612**	**9.510**	**14.515**	**16.939**	**19.57**
CHINA	3.585	2.688	2.087	6.181	9.607	12.07
USA	1.380	0.642	0.566	0.729	0.848	0.59
PRODUCTION						
WORLD TOTAL	**22.334**	**25.425**	**27.820**	**26.665**	**26.241**	**26.24**
CHINA	6.925	6.400	7.400	7.300	6.929	6.49
INDIA	5.185	5.865	6.239	6.205	6.770	6.77
USA	2.654	3.942	3.391	3.770	2.811	3.57
PAKISTAN	2.158	1.948	2.311	2.002	2.076	2.10
BRAZIL	1.194	1.960	1.877	1.310	1.705	1.48
UZBEKISTAN	0.850	0.910	0.880	1.000	0.940	0.94
OTHERS	3.369	4.401	5.722	5.078	5.011	4.88
CONSUMPTION						
WORLD TOTAL	**25.529**	**24.478**	**22.730**	**23.735**	**23.497**	**24.40**
CHINA	10.192	9.580	8.635	8.290	7.531	7.96
INDIA	4.300	4.470	4.231	4.817	5.042	5.27
PAKISTAN	2.402	2.100	2.217	2.416	2.271	2.31
EAST ASIA & AUSTRALIA	1.892	1.801	1.685	2.110	2.277	2.33
EUROPE & TURKEY	1.600	1.549	1.495	1.555	1.605	1.67
BRAZIL	1.024	0.958	0.897	0.910	0.879	0.85
USA	0.773	0.849	0.718	0.751	0.803	0.83
CIS	0.604	0.577	0.550	0.561	0.586	0.60
OTHERS	2.743	2.592	2.302	2.325	2.503	2.59
EXPORTS						
WORLD TOTAL	**7.799**	**7.725**	**9.847**	**10.169**	**8.868**	**7.85**
USA	2.621	3.130	2.526	2.902	2.268	2.42
INDIA	1.420	1.085	2.159	1.685	2.014	1.23
AUSTRALIA	0.460	0.545	1.010	1.305	1.037	0.66
BRAZIL	0.433	0.435	1.043	0.938	0.485	0.57
CFA ZONE	0.000	0.476	0.597	0.828	0.926	0.95
UZBEKISTAN	0.820	0.600	0.550	0.653	0.650	0.63
IMPORTS						
WORLD TOTAL	**7.928**	**7.716**	**9.749**	**9.662**	**8.753**	**7.85**
CHINA	2.374	2.609	5.342	4.426	3.075	1.98
EAST ASIA & AUSTRALIA	1.989	1.825	1.998	2.352	2.345	2.44
EUROPE & TURKEY	1.170	0.972	0.724	0.833	1.081	0.96
BANGLADESH	0.887	0.843	0.680	0.631	0.987	1.00
CIS	0.209	0.132	0.098	0.062	0.067	0.07
TRADE IMBALANCE 1/	**0.129**	**-0.008**	**-0.098**	**-0.507**	**-0.114**	**0.00**
STOCKS ADJUSTMENT 2/	**-0.122**	**-0.041**	**0.013**	**0.000**	**0.000**	**0.00**
ENDING STOCKS						
WORLD TOTAL	**8.612**	**9.510**	**14.515**	**16.939**	**19.568**	**21.41**
CHINA	2.688	2.087	6.181	9.607	12.074	12.58
USA	0.642	0.566	0.729	0.848	0.590	0.92
ENDING STOCKS/MILL USE (%)						
WORLD-LESS-CHINA 3/	**39**	**50**	**59**	**47**	**47**	**54**
CHINA 4/	**26**	**22**	**72**	**116**	**160**	**158**
COTLOOK A INDEX 5/	**78**	**164**	**100**	**88**	**91**	

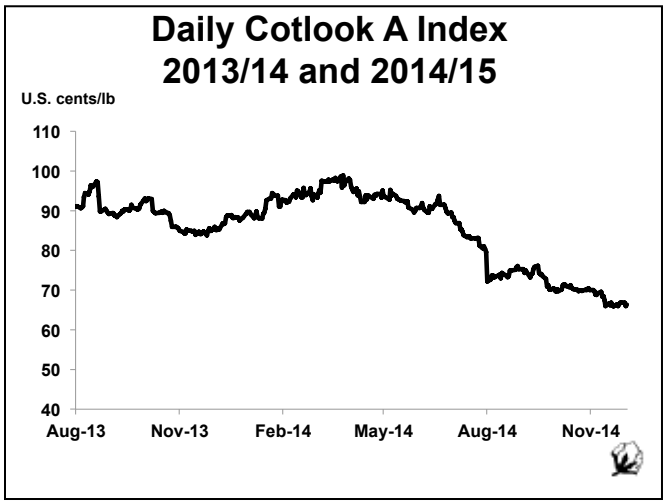
1/ The inclusion of linters and waste, changes in weight during transit, differences in reporting periods and measurement error account for differences between world imports and exports.
2/ Difference between calculated stocks and actual; amounts for forward seasons are anticipated.
3/ World-less-China's ending stocks divided by World-less-China's mill use, multiplied by 100.
4/ China's ending stocks divided by China's mill use, multiplied by 100.
5/ U.S. cents per pound.

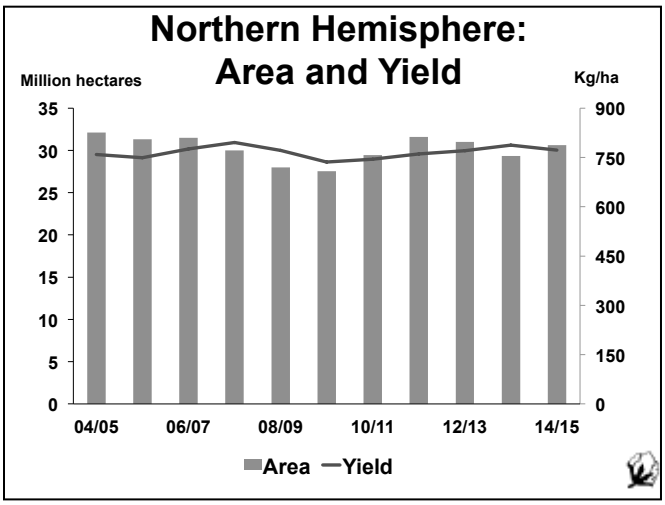
SUMMARY OF THE OUTLOOK FOR COTTON

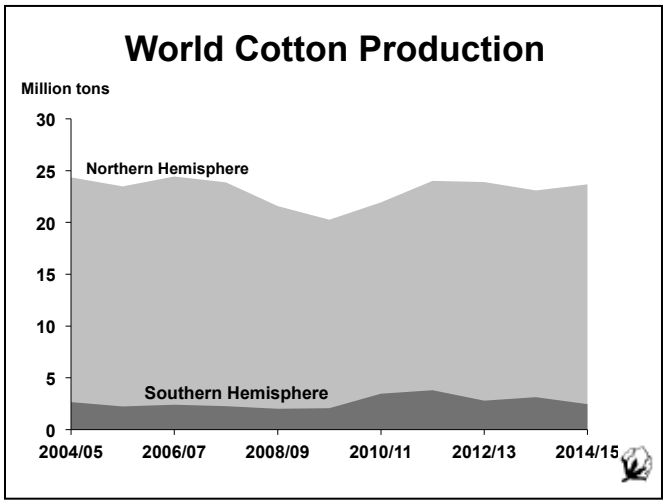
Cotton Production Falls in South Hemisphere

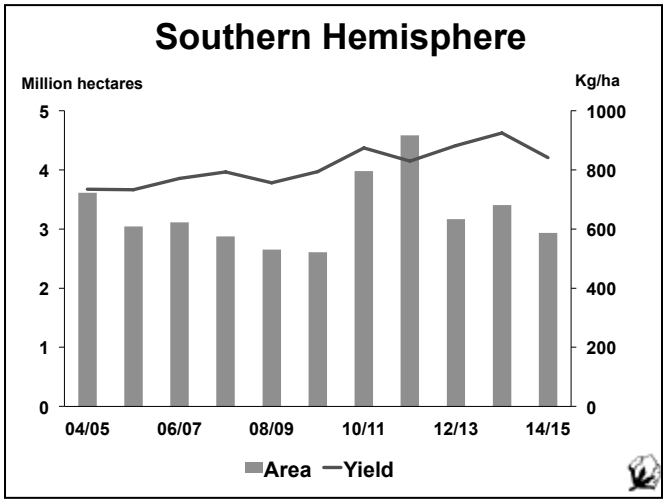
In 2014/15, world production is expected to remain stable at 26.2 million tons despite a 3% increase in area to 33.5 million hectares. India, which saw a 5% increase in area will likely see production remain around 6.8 million tons due to the fall in average yield. While area in China fell 9% to 4.3 million hectares, production is forecast down by only 6% to 6.5 million tons as better weather this season improved the average yield by 3% to 1,518 kg/ha. However, the 400,000 ton decrease in China's production will likely be more than offset by the United States where production is projected up 27% to 3.6 million tons. Production in Pakistan is stable at 2.1 million tons in 2014/15 with better yields offsetting the decrease in area, but may be revised down as some growers are finishing cotton harvest early to plant wheat. These four producers account for 80% of the production in the North Hemisphere, which is projected up 2% to 23 million tons with lower yields offsetting the 4% gain in area to 30.6 million hectares.

In contrast, area in the Southern Hemisphere is projected down 12% to 3 million hectares, the lowest level in five seasons, due to low world prices both at planting time and during the end of marketing for last season's crop. Assuming an average yield of 853 kg/ha for the region, production is anticipated to fall 18% to 2.6 million tons, which accounts for around 10% of expected world production in 2014/15. Brazilian farmers are less enthusiastic to plant cotton this season as many find that even with government support, current prices do not cover productions costs. Area in Brazil is forecast to fall 13% to









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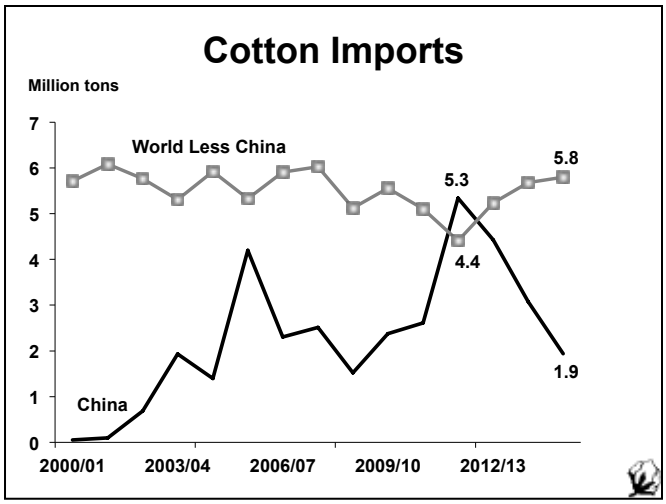


975,000 hectares, and assuming an average yield of around 1,522 kg/ha, production is projected down 13% to 1.5 million tons. However, Brazil would remain the largest producer in the Southern Hemisphere and fifth largest producer in the world. The ongoing drought in Australia has dried up the soil and reduced irrigation supplies, and area is forecast to fall 28% to 282,000 hectares. Insufficient water will likely hurt yield this season and production could decrease by 35% to 580,000 tons, the lowest volume since 2009/10. For Southern and Eastern Africa, which contains countries that are either partially or entirely in the South Hemisphere, area is projected down 7% to 1.4 million hectares. However, unlike last season, rains have been more plentiful at sowing and yield is likely to improve 6% to an average of 237 kg/ha, resulting in 329,000 tons of lint for the region, down 2% from 2013/14.

After declining 1% in 2013/14, world consumption is expected to recover by 3.8% to 24.4 million tons. The top five consumers of cotton in 2014/15 are likely to be China, India, Pakistan, Turkey and Bangladesh. Lower domestic prices and government incentives are helping the spinning industry in China to recover with consumption forecast to increase to nearly 8 million tons. However, this would still be less than the annual volume of consumption observed between 2004/05 and 2012/13, when annual consumption averaged around 9.5 million tons. India's consumption is projected at 5.3 million tons, which is the third consecutive season of growth, but at a slower rate than the previous two seasons as yarn demand from China is falling. In Pakistan, consumption is forecast to rise 2% to 2.3 million tons after a 6% reduction in 2013/14 due to insufficient electricity. While electricity supplies still remain a problem in Pakistan, the government's new textile policy introduces a variety of incentives including duty drawbacks on local taxes to strengthen the textile value chain. Consumption in Turkey is projected up 4% to 1.5 million tons in 2014/15 while consumption in Bangladesh is up 1% to 954,000 tons.

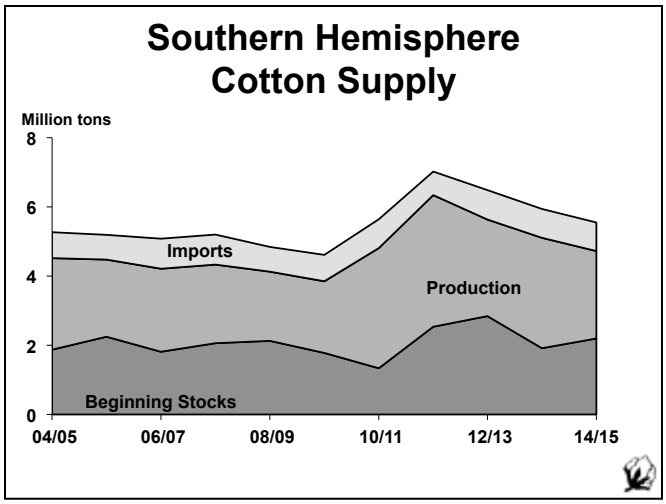
World cotton trade is forecast down nearly 1 million tons to 7.9 million tons, which is the third consecutive season in which world imports have fallen. This is in line with the fall in China's imports from over 5.3 million tons in 2011/12 to less than 2 million tons in 2014/15. As China's imports have fallen, imports outside of China have grown. However, the rate of growth has declined. In 2012/13, imports outside of China increased by 19% to 5.2 million tons while in 2014/15, imports outside of China are projected to expand 4% to 5.9 million tons, reflecting the growth in consumption outside of China. Bangladesh, Turkey, Vietnam and Indonesia are expected to be the largest importers outside of China in 2014/15.

SOUTHERN HEMISPHERE COTTON PRODUCTION IN 2014/15

By Rebecca Pandolph, ICAC.

Cotton plantings for the Southern Hemisphere in 2014/15 season started in September 2014 and will continue through the start of 2015. The sowing season usually lags a few months behind the Northern Hemisphere so that markets have a much better sense of the size of the world cotton crop by the time sowing starts in the Southern Hemisphere. This allows producers in this part of the world to adjust plantings to changes in the market. While area in the Northern Hemisphere is responsive to world cotton prices during the previous season, area in the Southern Hemisphere tends to be more responsive to prices at the end of the last season, when the crop is marketed, and the start of the current season. Prices plummeted in the last two months of 2013/14 from 90 cents/lb to 80 cents/lb. In the first few months of 2014/15, international prices have continued to fall and are now less than 70 cents/lb. This season follows a very similar trend to prices in 2012/13, when prices fell from 100 cents/lb in spring 2012 to 83 cents/lb at the end of the season, and area fell 31% to 3.2 million hectares. While current prices are above the long-term average price for cotton, rising productions costs around the world make lower prices less viable for many growers. In the last ten years, the world average net cost to produce one kilogram of cotton lint has increased by 83% to US$1.5/kg (US$0.68/lb), which increase has been mainly caused by rising costs of inputs, labor for weeding and harvesting, and ginning.

Although international prices can have a significant impact, the opportunity cost to grow competing crops and government policy also influence farmers' planting decisions. Given the



low prices, growers in the Southern Hemisphere are expected to plant less cotton this season, and area for the region is forecast to recede 12% to just over three million hectares. After reaching a record yield of 920 kg/ha in 2013/14, yield is likely to decline by 7% to 858 kg/ha, but will remain above the 10-year average of 808 kg/ha.

Production Trends for the Largest Producers

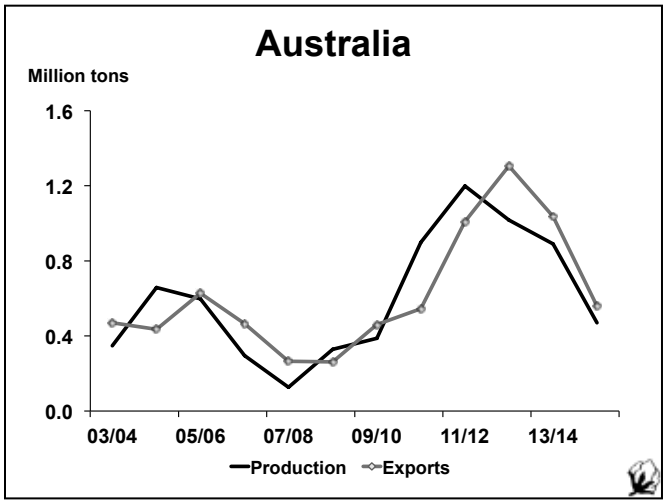
Australia

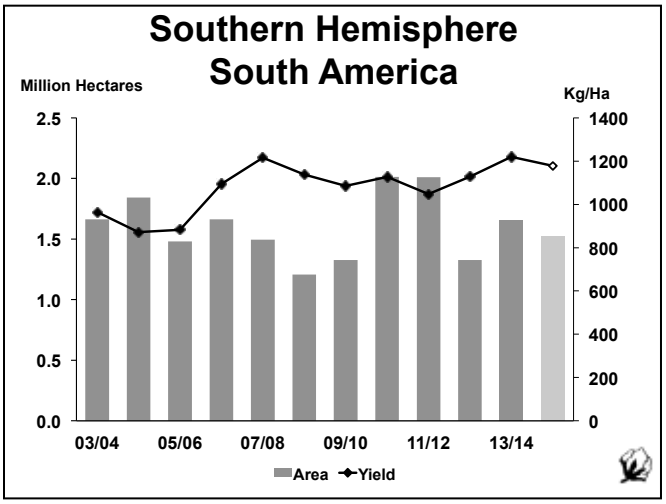
Cotton is planted on the eastern side of Australia and sowing generally lasts from September through November. High average yields help farmers in Australia remain profitable even when prices fall. Instead, water availability tends to have a more significant impact on cotton area. Many growers in Australia rely on a mix of irrigation and rain to grow cotton. However, rainfall over the last few months in which sowing occurred has not been plentiful, leaving topsoil dry and irrigation dams with low water levels. From late 2006 until 2011, Australia's cotton belt suffered from drought conditions, and area, impacted by both drought and low world prices in autumn 2007, reached a record low of 63,000 hectares in 2007/08. Drought conditions ended in 2012, and Australia achieved record average yield of 2,270kg/ha in 2012/13, producing just over one million tons despite a 26% reduction in area from the previous season. In 2013/14, area under cotton was limited to irrigated land, due to dry weather and low soil moisture, and accordingly contracted by 11% from 2012/13 to 392,000 hectares. However, rainfall later in the season boosted irrigation levels, and yields again reached 2,270kg/ha, resulting in 890,000 tons of production.

At the start of the 2014/15 planting season, irrigation storage levels in public dams were at 36% of capacity. The small volume of rainfall in the previous two months has done little to replenish soil moisture and irrigation levels, so many growers chose to not plant cotton. Some let fields lie fallow, while others switched to crops like sorghum, which require less water. However, new technologies and cotton varieties developed in recent years have allowed Australian growers to expand cotton production to new areas. In 2013/14, a trial crop was grown in northern Victoria, a state in the southeast corner of Australia where cotton has not been grown for more than 50 years. In 2014/15, area in this state is likely to expand given the availability of irrigated water, but will not offset the reduction in other states. Overall, the cultivated area in Australia is expected to contract 46% to 210,000 hectares, the lowest in five seasons. The average yield is forecast to fall 1% to 2,238 kg/ha, resulting in a 47% drop in production to 470,000 tons in 2014/15. Exports in 2014/15 are anticipated to reach 560,000 tons, leaving Australia with 93,000 tons in stock at the end of the season, the lowest level since 1982/83.

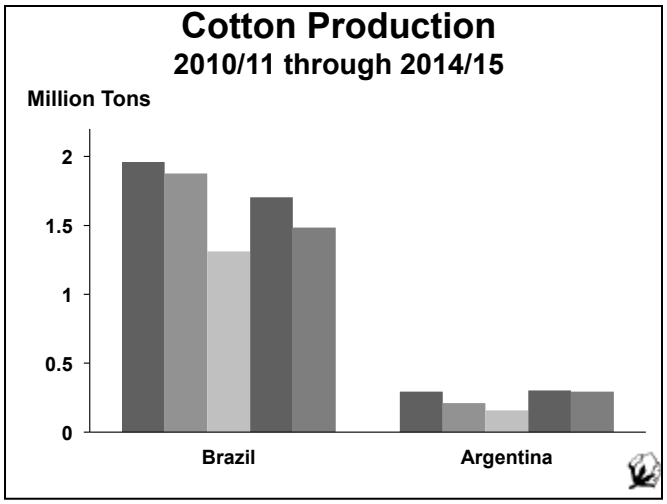
South America

Most production in South America occurs in the Southern Hemisphere except for Venezuela and parts of Brazil and Colombia. Production reached a record of 2.3 million tons on an area of over two million hectares in 2010/11 when many growers in South America with a later planting date than





the Northern Hemisphere were able to plant more cotton in response to the spike in prices. Production fell to 2.1 million tons in the next season due to lower yields, while area remained stable. Due to the relatively low prices at planting time in the Southern Hemisphere in 2012, area fell 34% to 1.3 million hectares before recovering 28% in 2013/14 to 1.7 million hectares as prices rebounded. Production in 2012/13 is estimated at 1.5 million tons, down 29% from the previous year as better yields that season lessened the impact of reduced plantings. In 2013/14, improved yields again boosted production, which is estimated at just under 2 million tons. However, as many countries are likely to reduce plantings due to the low prices in recent months, area for the region is forecast to decline 9% to 1.5 million hectares, and production is projected down 112% at 1.7 million tons.



Brazil

Brazil is split between the Northern and Southern Hemispheres, with around 96% of production occurring in the Southern Hemisphere. Area in Southern Hemisphere Brazil reached 1.1 million hectares in 2013/14, and production reached 1.7 million tons, up 30% from the previous season. In early February 2014, the Brazilian government, for the first time since 2003, raised the minimum price for cotton by 23% to 54.90 Brazilian reais per 15 kg (US$0.70/lb). In September and October, the Brazilian government held auctions under the PEPRO (Equalization Price Paid to Producers) program, which provides a payment to farmers that sell their cotton within a set time period equal to the difference between the price private sector buyers are willing to pay and the minimum support price. While the minimum price provides some support to farmers, many find that it is still below the cost of production and thus, is unlikely to create enthusiasm for growing cotton in 2014/15. An outbreak of *helicoverpa* bollworm last season raised costs considerably and many farmers suffered crop losses, increasing the riskiness of cotton cultivation. Additionally, both international and domestic prices have dropped substantially, and Brazil's area in the Southern Hemisphere is forecast to decline by 13% to 940,000 hectares. The average yield in Brazil has risen in the last few seasons and reached 1,535kg/ha last season, which is the highest yield for rainfed cotton in the world. Assuming a similar yield for this season, production loss will be limited to the contraction in area, decreasing by 13% to 1.4 million tons.

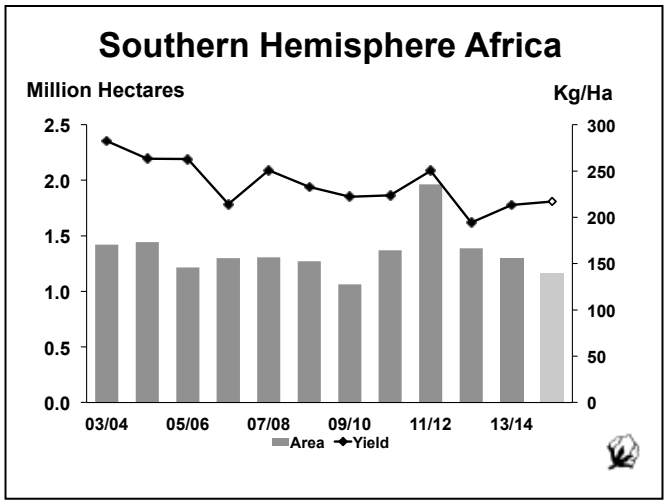
Even though domestic prices have fallen, demand from local spinning mills has not picked up due to high energy and labor costs and instead, more of the crop is expected to be exported this season. The weakening of the Brazilian real against the dollar will also help to boost exports, which are expected to rise 17% to 570,000 tons in 2014/15.

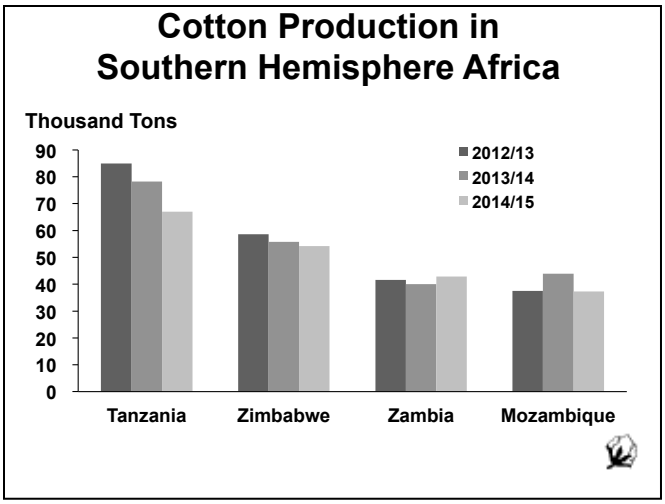
Argentina

While consumption has grown in Argentina, its production volume is sufficient to make the country a net exporter of cotton in most years. However, this also makes the Argentinian crop more sensitive to international prices. Furthermore, the majority of cotton in Argentina is grown in the rainfed upland provinces, including Chaco and Formosa. In 2013/14, water stress and high temperatures caused a 8% loss to area sown and harvested area only reached 506,000 hectares. Despite the low prices of cotton in the last two months, prices for soybeans, a competing crop have fallen faster, and area under cultivation in Argentina is forecast up by 3% to 520,000 hectares. Yields have improved in the last few seasons, averaging around 500kg/ha as many farmers have switched to planting cotton with greater density. However in 2014/15, pest pressure and a potential outbreak of cotton blue disease may lower the average yield by 5% to 567 kg/ha from 597 kg/ha in 2013/14. Total production is projected down 5% to 300,000 tons, while exports are expected to remain stable at 60,000 tons.

Southern Hemisphere Africa

Aside from a few seasons in the mid-1990s when area fell below 1 million hectares, area in Southern Hemisphere Africa has ranged between one and two million hectares, averaging around 1.3 million hectares. Yields in the region have remained low, averaging 240kg/ha over the last 20 years as most of the region's farmers do not use irrigation and securing an adequate quantity of quality inputs remains difficult. While there can be significant variation from season to season, overall production for Southern Hemisphere Africa has been relatively stable given that neither area nor yield has changed much, averaging around 300,000 tons per season. Many growers may be less enthusiastic to plant cotton this season, particularly if they have the option to cultivate a more lucrative alternative crop. Area is likely to fall 10% to 1.2 million hectares. However, unlike last season, rainfall has been more plentiful so the average yield should improve 2% to 217 kg/ha, resulting in 253,000 tons of lint. Many countries in this region have implemented contract-farming systems, in which ginners and merchants supply inputs, such as seeds and fertilizers, to farmers as a loan that is supposed to be paid back at the end of the season through sales of cottonseed to the ginner that supplied the inputs. However, the implementation varies by country, which can also affect the price paid to producers. Additionally, while





these programs grant farmers greater access to inputs, the lack of sufficient extension services means that the use of inputs does not necessarily follow best practices, so the impact on yields may be limited.

Aside from Tanzania and South Africa, most of the producing countries in this region have little to no domestic consumption and instead, export the bulk of their crop. Despite large stocks carried over from previous seasons, exports for the region are expected to fall 5% to 220,000 tons due to weak world demand.

Tanzania

While producer prices have increased in the last two seasons, expansion of the cotton area has been limited due to the perception by farmers that the 2011 price volatility makes cotton a very risky crop. Furthermore, price fluctuations at the end of 2013/14 delayed the marketing of Tanzania's 2013/14 crop, thus strengthening this perception on the part of growers. The perceived risk and the recent difficulty with marketing their crop in an environment of falling international prices will likely discourage farmers from planting cotton in 2014/15, and area is forecast to drop 18% to 336,000 hectares. This season will be the third since Tanzania introduced contract farming in 2012/13. Contract farming arrangements have helped increase output as inputs are made more available to farmers and in turn, yield improves. The government has also indicated producer prices in the last three seasons, but many of the ginners voiced complaints that these prices were too high for ginners to remain profitable. In July 2014, the government announced that it would move to a more market-determined price mechanism. Instead of setting prices, the government has set money aside in a Cotton Price Stabilization Fund that would be used to help farmers repay loans should the price fall below 750 Tanzanian shillings/kg. While the additional support from the government is expected to improve yield by 2% this season, total production is projected down 14% to 67,000 tons.

Zimbabwe

In Zimbabwe, nearly all cotton growers obtain inputs through contracts with ginners and merchants that belong to the Cotton Ginners Association. Cargill, which has contracted with Zimbabwe farmers in previous seasons pulled out entirely from the local cotton sector at the start of the growing season due to operational difficulties that include lack of fulfillment of contracts by farmers. Additionally, China Cotton Africa, another contractor, is expected to reduce its level of financing this year. Nevertheless, there are ten other ginneries from which farmers can obtain inputs and the level of input funding agreed upon for 2014/15 increased from US$23 million to US$29 million. Greater availability of inputs as well as better rainfall during sowing should boost yields this season by 2% to 228 kg/ha. The average price paid to producers last season increased by 20% due to greater competition among the ginners and better regulation of the market. However, falling international prices for cotton will likely cause more farmers to switch to competing crops like tobacco this season, and area could decline by 5% to 238,000 hectares. Production in Zimbabwe is forecast to decrease by 3% to 54,000 tons as better yields offset some of the loss in area.

Zambia

Last season, maize, the main competitor of cotton in Zambia, achieved a bumper crop about 30% greater than the previous season, and oversupply has pushed prices of maize downwards. Further, due to the large size of the maize crop, the government has experienced difficulties in securing financing and payments to maize growers are late. While maize is likely to be less attractive this season, cotton prices have also fallen. Furthermore, in the last few marketing seasons, prices paid to farmers have started at a low level, but gained 20% by the end of the season. As the farmers with better yields and production practices tend to sell early, the current marketing practice has tended to reward the farmers with low quality seedcotton that market their cotton later in the season. This will limit the expansion of cotton area, which is forecast to fall slightly

by 1% to 287,000 hectares in 2014/15. Plentiful rainfall at sowing is expected to boost yields by 8% to 149kg/ha, but this is below the 10-year average of 196kg/ha. Production in 2014/15 is projected to expand 7% to 43,000 tons.

Mozambique

In 2013/14, Mozambique's cotton output recovered 17% to 44,000 tons due to expansion in area and improved yields. Mozambique is in the process of installing HVI testing facilities in several locations across the country, which should help improve the marketing of the cotton once they are running. However, in 2014/15, cotton faces stiff competition from soybeans and sesame, which have higher prices this season, particularly given the low yields that many cotton farmers derive from cotton. Additionally, the discovery of oil earlier this year and the continued development of the natural gas and coal industries are pulling some farmers out of the agricultural sector, including cotton, to work directly in these industries or on related infrastructure projects that may provide a more stable income than farming. Given the stiff competition and low prices for cotton at planting time, cotton area in Mozambique is forecast down 15% to 134,000 tons. Assuming yield remains stable at 280 kg/ha, lint output is projected down 15% to 37,000 tons.

EXTRA-FINE COTTON IN PERU

By Luis Alberto Sánchez Cordero, ICAC Intern

History of Peruvian Cotton

The use of cotton in Peru dates back to pre-Inca times, commencing with the domestication of wild plants of Gossypium Barbadense by pre-Inca cultures between 5000 and 4000 BC and later continuing with the development and spread of agricultural and textile techniques.

Agricultural and textile activity in the region continued to grow and evolve after 4000 BC. By the Inca period (1400 AD to 1532 AD), the cultivation and trade of cotton had become increasingly developed and the use of cotton in the production of textile products was highly extensive. In the colonial period (1532-1821), cotton products, such as seed and fiber, began to be exported from Peru to other countries in America and Europe. During Peru's early republican period (1821-1900) cotton activity continued to grow, due to the development of cotton plantations for export and the introduction of foreign varieties that began to replace native cottons.

The first half of the 20th century witnessed the following developments: the native long strand variety Tanguis was created (1910), the American variety of Pima - from which Peruvian Pima derives - was introduced (1922), and rural development policies were developed. These factors combined to contribute to a great boom in Peruvian cotton. In 1950 the sector's exports came to represent 35% of all Peruvian exports. In 1963 the largest area of cotton in recorded history was harvested (256,000 hectares). Since then, the Peruvian cotton market has been on a downward trend. In the 1970s laboratories dedicated to the genetic improvement of the crop were abandoned, the Peruvian cotton chamber was dissolved, and the marketing of cotton nationalized. As a result, the sector became increasingly disorganized, and by 1980 cotton exports represented only 1.8% of the nation's total exports. In recent years government policies have been introduced with the aim of reviving the cotton sector, such as the declaration of cotton as a product of national interest, and the development and early implementation of the Cotton Supply Chain Competitiveness Plan (2013).

Varieties of Cotton

Peru grows two major varieties of cotton, Tanguis and Pima, and two minor varieties, Del Cerro and Aspero. Of the major varieties, Tanguis is grown in the irrigated valleys of Peru's central and southern coast, and is used for yarns. Pima is an extra long staple (ELS) cotton that is grown in the northern region, mainly in Piura, and is used for higher quality textiles.

Accounting on average for approximately 75-80 percent of the total Peruvian cotton production, Tanguis is the most common variety.

Pima is the other major variety and accounts for 5-10% of cotton grown in the country. Pima was first created in the U.S in 1910 and later introduced into Peru in the 1920s. This commenced when the US Department of Agriculture (USDA) moved their American Egyptian ELS cotton breeding program to the Gilla River Pima Indian reservation. The Pima Indians aided the USDA in growing the cotton and carrying out the program. In 1910 the USDA was successful in developing their new crop, which was called Pima cotton in honor of the Pima people.

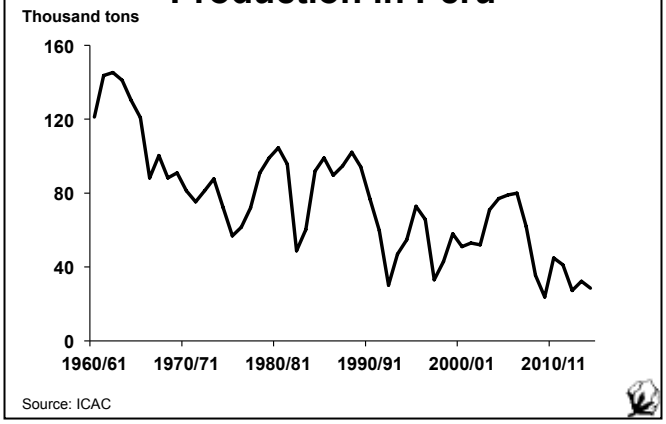
The long growing season for Tanguis, which is about nine months, is a major disadvantage for producers. In Peru, farmers generally plant two crops per year (the main crop and a small crop). A type of bean is used for the small crop and cotton is used for the main crop. The long growing period also increases pest incidence, such as the Pink Boll Weevil. Sometimes, the cost of pesticides in the Tanguis producing areas accounts for almost 50 percent of the total cost of production. Peruvian cotton producers also face other weaknesses, such as inefficiency caused by the extremely small size of the average producing unit, low yields due to poor agricultural practices and seed quality, lack of technical

assistance, lack of insertion in the formal economy and lack of credit. Tanguis cotton is likely to disappear in the near future, especially in the northern coast where more efficient ELS cottons, such as Hazera, are increasingly planted.

Production of Peruvian cotton

As mentioned previously the prosperity experienced during the Peruvian cotton boom did not last. After peaking at 164,000 tons in 1961, production has been declining over time, as can be seen in Figure 1 below. Production for the 2014/2015 season is projected at 37,000 tons. The area under cultivation has fallen drastically from its all-time high of 56,000 ha in 1963 to 39,000 ha in 2014/2015.

Figure 1: Annual Cotton Production in Peru



Production 2007- 2014

As illustrated in the table below, cotton production in Peru declined by 29.8 percent to 28,930 tons in 2013 from 41,233 tons in 2012. In 2011 Peruvian cotton production reached 44,923 tons, a significant recovery from its all-time low of 23,767 tons in CY 2010. Cotton production has fallen significantly from its most recent peak of 89,000 tons registered in CY 2006. Production declines have affected all varieties of cotton grown in Peru, although not at the same rate. For example, Aspero has experienced a 99% reduction, having decreased from 4,474 tons in 2007 to 20 tons in 2013. Pima production reached 553 tons in 2013, a 66.4% decrease from 1,645 tons in the previous year and a 95.2% decrease from the 11,444 tons produced in 2007. Tanguis has also has decreased but by much smaller percentage. Tanguis production was 24,245 tons in 2013, a decline of 19.2 percent from the preceding year and 46.2% from 2007.

The Fall of the Peruvian Cotton Market and its Causes

There are multiple factors attributing to the downward trend that the Peruvian cotton market has been experiencing over the decades. The most important factor that contributed to this reduction is the inefficiency of farmers, a result of the lack of genetic improvement of the crop in the last forty years, leading to the low yields. Abandonment of genetic preservation of cotton has led to a deterioration in the quality of fiber and resulted in poor yields. Other factors include:

- Crop producers' unwillingness to form associations. A typical cotton producer farms less than 5 hectares, which makes it very difficult and expensive to buy inputs and increase mechanization. The United Nation's Food and Agricultural Organization (FAO) estimates that over 90 percent of the Peru's cotton farmers manage less than 5 hectares of land in crop rotation transfer systems.
- The government has introduced some initiatives, such as credit lines and technical assistance for farmers that form associations, but the measures have not had a significant effect on traditional cotton producers.
- Yarn and textile dumping from India and China as well

Peruvian Cotton Production

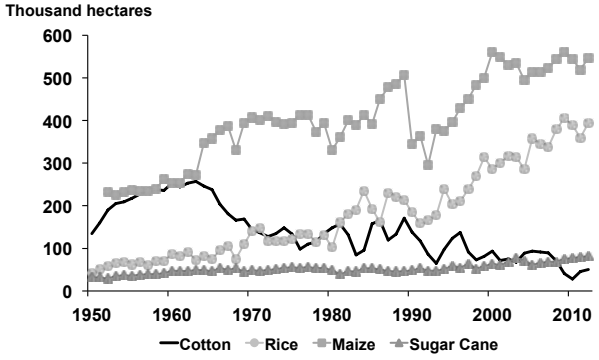
	2007	2008	2009	2010	2011	2012	2013
	Metric Tons						
Pima	11,444	5,606	2,175	1,345	4,422	1,645	553
Del cerro	5,632	4,605	1,930	451	1,065	1,149	286
Others	11,297	8,965	4,698	3,190	9,624	7,528	3,826
Total LS ELS	**28,373**	**19,176**	**8,803**	**4,986**	**15,111**	**10,322**	**4,665**
Tanguis	45,098	40,045	25,312	17,928	28,241	30,009	24,245
Aspero	4,474	2,230	1,450	853	1,571	902	20
Total SS MS	**49,572**	**42,275**	**26,762**	**18,781**	**29,812**	**30,911**	**24,265**
National total	**77,945**	**61,451**	**35,565**	**23,767**	**44,923**	**41,233**	**28,930**

Source: Peruvian Ministry of Agriculture

as more profitable opportunities in other crops have also played an important role in reducing Peruvian cotton output.

- The fragmentation of land holdings after the division of former cooperatives, with a consequent falls in profitability as a result of diseconomies of scale.
- Producers' loss of commercial credibility because of breaches of contract, causing textile factories to stop buying.
- The construction of the Poechos dam in the 1970s influenced the reduced production of Pima because the abundance of water encouraged the planting of rice at the expense of cotton. Rice is more profitable, though it requires more investment and salinizes soils.
- The shift from cotton to more profitable crops. Cotton is being replaced by competing crops, such as corn, rice, and sugar cane. The shift is well illustrated in graph below (Figure 2), which depicts the amount of hectares harvested of cotton, rice, corn and sugar cane. As one can see, the amount of cotton harvested over the past fifty years has been drastically reduced. Meanwhile, the amount of other crops on the graph has increased over the years: the amount of corn harvested has doubled, sugar cane production nearly tripled and the rice harvest is 8 times larger than it was in 1950.

Figure 2: Agricultural Output in Peru of Various Crops



Source: Peruvian Ministry of Agriculture

Intervention to Revive the Peruvian Cotton Sector

Currently more than 27,000 hectares of cotton is planted in Peru, generating more than 40,000 direct jobs.

Given the importance of the crop in the country's economy, in addition to the Peruvian government's declaration of cotton as a national interest, and Cotton Competiveness Plan, FAO has undertaken specific technical actions to help strengthen the sector. Currently the FAO continues to contribute to the development of the cotton industry of Peru through the project "Strengthening the Cotton Sector through South-South Cooperation" (GCP / RLA / 199 / BRA). This project of South-South trilateral cooperation was signed between the Government of Brazil, through the Brazilian Cooperation Agency of the Ministry of Foreign Affairs (ABC / MRE), the Brazilian Cotton Institute (IBA) and the Regional Office of FAO for Latin America and the Caribbean (FAO RLC) in late 2012.

The project represents a framework for South-South trilateral cooperation between FAO, the Government of Brazil and other countries on issues related to the cotton chain. This alliance seeks to help improve the competitiveness of the value chain of cotton in the Mercosur countries and partners, as well as seeking to overcome rural poverty, develop family agriculture, encourage technical training addressed to increase competitiveness and productivity rates of cotton, combined with activities related to sustainable rural agricultural extension and development.

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ICAC Database

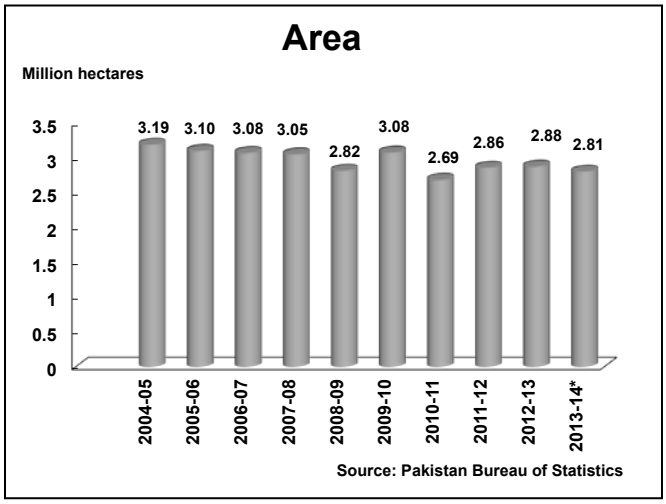
IMPACT OF INTERNATIONAL PRICES ON DOMESTIC PRICES IN PAKISTAN

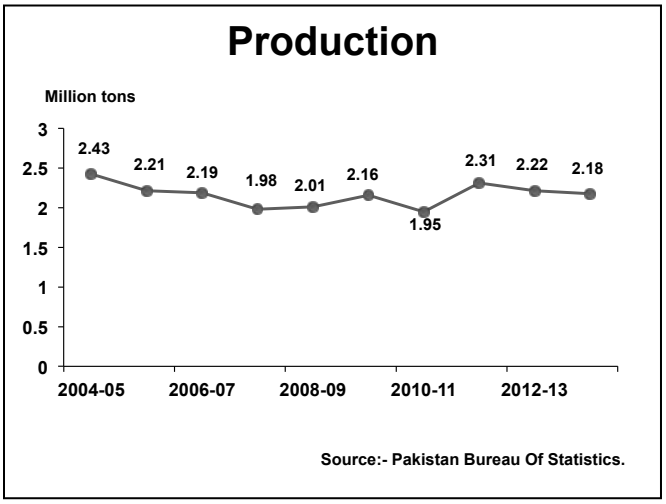
By Dr. Muhammad Ali Talpur[1] and Mr. Gul Hassan Sakhani[2]

Cotton is one of Pakistan's traded agricultural commodities and a very important pillar of its economy. It contributes about 1.4% to Pakistan's gross domestic product and 6.7% of total value addition in agriculture. Cotton has been sown on an area of around 3 million hectares in the last few years. It accounts for around 15% of the cultivable area in Pakistan and is grown by more than 1.6 million farmers. Punjab is the main cotton producing region that accounts for 80% of total cotton area and 73% of total cotton production. Sindh represents about 20% of cotton area and about 26% of production. The cotton area in Pakistan during the last 10 years witnessed an unstable position owing to some competing crops and lower rates of cotton prices that discouraged the growers from putting more area under cotton crop. The graph given below indicates that area in 2004/05 was placed at 3.193 million hectares, which in the following four consecutive seasons decreased until reaching 2.819 million hectares in 2008/09. From 2011/12, cotton area gained ground and placed at 2.879 million hectares in 2012/13. This was due to reasonable prices that growers received in these years.

Cotton production in the early years of the 2000s persisted at high volumes, and in 2004/05, production reached the highest volume ever recorded at 2.425 million tons. This was due to more area cultivated under cotton and favorable weather conditions at sowing time. Germination remained admirable and attacks of whitefly and Cotton Leaf Curl Virus (CLCV) were negligible. Production adopted a declining trend in 2005/06, 2006/07 and 2007/08 when it was placed at 2.213 million tons, 2.186 million tons and 1.981 million tons, respectively. In these years, one of the reasons for the decline was that area under cotton contracted. Other factors were a shortage of canal water and excessive rains. But in next two years, production strengthened to some extent. Cotton production touched its lowest level at 1.948 million tons in 2010/11. During this season heavy rains and flooding caused severe damage to the cotton crop, particularly in the main cotton areas of Sindh and Punjab. Damaged area in Punjab reached about 12,161 hectares, whereas in Sindh, the growers suffered a heavy loss of 494,133 hectares in which about 75% of the crop was damaged. Despite the huge loss, farmers showed enthusiasm in 2011/12 and planted cotton on more area as compared to 2010/11. They achieved production at record level of 2.311 million tons, but still less than the 2.425 million tons registered in 2004/05. During next two seasons, production was again affected by heavy rains in the cotton belt of Punjab, high temperatures during the month of June affecting germination and mild attacks of thrips, whitefly and CLCV. Production in 2012/13 and 2013/14, recorded at 2.215 million tons and 2.176 million tons respectively, fell despite the increase in area.

Pakistan is the fourth largest producer of cotton and third largest consumer in the world. Cotton is consumed by more than 450 textile mills in Pakistan. Cotton farming is the major source of raw material for the textile sector and millions of





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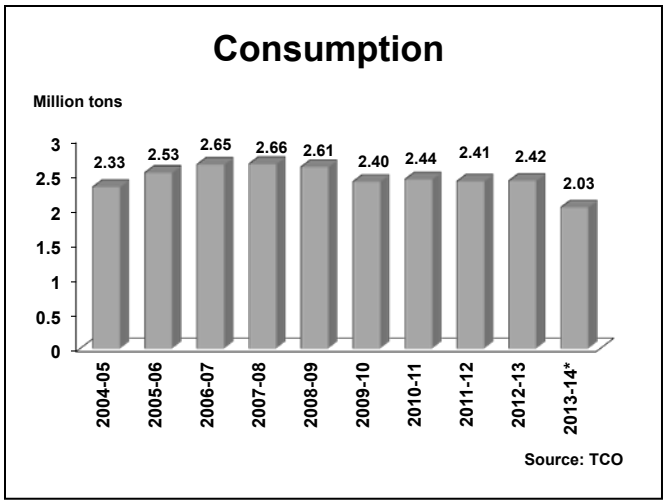
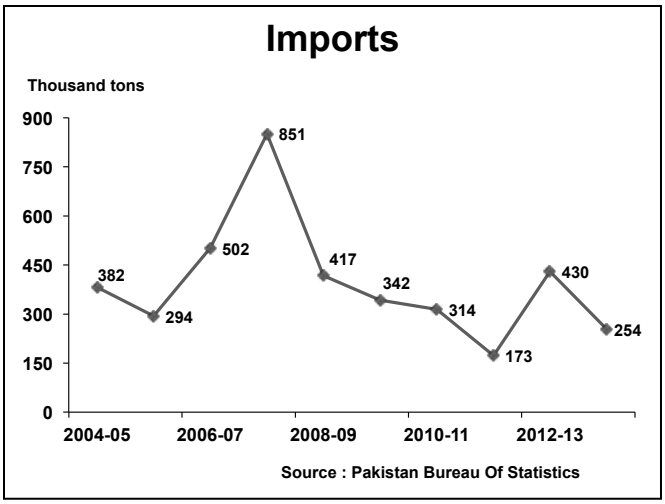
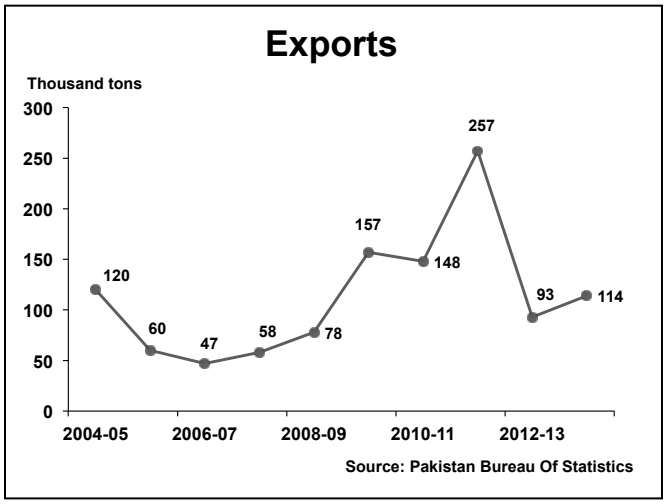




skilled and unskilled workers are involved in this sector. Cotton consumption in Pakistan ranged between 2.327 million tons in 2004/05 to 2.657 million tons *in* 2007/08. The consumption in later years never crossed the figure mentioned in 2007/08. The consumption during last 5 years remained lower as compared to 2005/06 through 2008/09.

For any country, trade plays a vital role in the growth of the national economy. The foreign exchange earned from the export of cotton and its value-added products contribute around 60% of earnings from total exports. The exports of cotton during 2004/05 stood at 120,000 tons, but in the following years adopted a downward trend and did not maintain the position observed in 2004/05. But in 2009/10, export volume broke the record of 2004/05 and registered at 157,000 tons. Exports again slumped in following year, but regained momentum in 2011/12 when exports were recorded at 257,000 tons, the highest volume of the decade.

On the other hand, the import of cotton into Pakistan from 2004/05 to 2013/14 shows fluctuation. The highest level of imports in this decade were noted at 851,000 metric tons in 2007/08 season. The record before this was in 2006/07 when imports reached 502,000 metric tons. In the remaining years, it did not cross the above-mentioned level of imports and attained 254,000 tons in 2013/14.



International Prices

"A" Index Prices

The prices of Cotton Outlook's A Index in 2004/05 averaged around 53.52 cents per pound, which posted gains over the next 3 years, reaching 72.94 cents per pound in 2007/08, showing an increase of 20.6% from 2006/07. The domestic prices of raw cotton in Pakistan during these years indicates a co-relation with the A Index, noted at 62.62 cents per pound in 2007/08, which is an increase of 21.8% from 2006/07. But in 2008-09, both the A Index and Pakistani domestic prices of raw cotton averaged around the same level of 61.18 cents per pound and 62.52 cents per pound, respectively. Pakistani domestic prices declined slightly by 0.2% while the A Index declined by 16.1%. A similar co-relation was witnessed in 2011/12 when the A Index declined by 38.4% and Pakistani raw cotton prices by 38.8% compared to the previous year. Also, the A Index witnessed an increase of 3.8% and domestic raw cotton prices, 3.7% in 2013/14.

New York Cotton Future Prices

The New York cotton futures market witnessed firmness from 2004/05 to 2010/11 except in 2008/09. Similarly domestic prices of raw cotton in Pakistan showed an increasing trend. However, the New York prices declined by 23.1%, but domestic prices only showed a nominal decrease of 0.2%. In 2010/11, New York futures and raw cotton prices touched peak level at 142.02 cents and 127.75 cents per pound, respectively, indicating an increase of 94.1% and 79.0%, respectively. A similar co-relation of prices is found in 2011/12 and in 2013/14. In 2011/12, New York futures declined by 36.1% and raw cotton prices by 38.8%. In 2013/14, approximately the same ratio of increase was recorded: 5.9% for New York futures and 3.7% for domestic raw cotton prices.

IMPACT OF COTLOOK A INDEX ON DOMESTIC PRICES IN PAKISTAN

(Cents/lb)

Year	"A" Index	Percentage change over previous year	Domestic Cotton Prices in Pakistan	Percentage change over previous year
2004-05	53.52	-	46.15	-
2005-06	57.07	6.6	49.86	8
2006-07	60.49	6	51.42	3.1
2007-08	72.94	20.6	62.62	21.8
2008-09	61.18	-16.1	62.52	-0.2
2009-10	78.52	28.3	71.35	14.1
2010-11	160.83	104.8	127.72	79
2011-12	99.03	-38.4	78.19	-38.8
2012-13	87.93	-11.2	76.6	-2
2013-14	91.23	3.8	79.43	3.7

IMPACT OF NEW YORK FUTURES PRICES ON DOMESTIC PRICES IN PAKISTAN

(Cents/lb)

Year	New York Cotton Future	Percentage change over previous year	Domestic Cotton Prices in Pakistan	Percentage change over previous year
2004-05	-	-	46.15	-
2005-06	-	-	49.86	8
2006-07	52.99	-	51.42	3.1
2007-08	67.68	27.72	62.62	21.8
2008-09	52.07	-23.1	62.52	-0.2
2009-10	73.16	40.5	71.35	14.1
2010-11	142.02	94.1	127.75	79
2011-12	90.77	-36.1	78.19	-38.8
2012-13	79.77	-12.1	76.6	-2
2013-14	84.45	5.9	79.43	3.7

COTTON YIELDS IN INDIA AND PROSPECTS FOR IMPROVEMENTS

By Dr. Rafiq Chaudhry and Rebecca Pandolph, ICAC

India is the largest cotton producer in the world in terms of area planted to cotton and, is likely to become the largest producer in terms of lint production in 2014/15. However, cotton yields in India rank in eighth place among the top ten cotton producing countries in the world. Cotton yields in India reached only 72% of the world average in 2013/14. This article discusses the factors responsible for low yields and prospects for improving yields in India with particular reference to commercial cotton hybrids and their role in improving yields.

The Production Scenario

In 2013/14, cotton was planted on 11.7 million hectares or 6.7% of the arable land in India. The top ten cotton producing states in descending order are Gujarat, Maharashtra, Andhra Pradesh, Karnataka, Haryana, Madhya Pradesh, Punjab, Rajasthan, Tamil Nadu and Orissa. The three important regions with cultivated species are shwon in the table next page.

Average cropping intensity varies by region depending on the pressure to produce food/alternate crops. In 2013/14, with an average cropping intensity of 134% at the national level, cotton was under higher pressure in the North zone to be grown within a shorter period because of pressure to grow other crops such as rice. It is estimated that 6.4 million farmers in India planted cotton in 2013/14. The national average cotton area per farmer is around 1.5 hectare. Nearly a quarter of cotton producers plant cotton on less than one hectare and almost half of the cotton producers plant on less than two hectares. In 2013/14, 65% of the cotton area in India was grown without assured irrigation (dryland). Scarcity of irrigation water is a major issue for Indian cotton, and can negatively impact yield. Rice, which has almost double the delta of water, fortunately does not compete with cotton throughout the cotton belt. Rice is grown in the north, northeastern, south and southern eastern border states in India. Major rice growing states are Utter

Cotton Growing Zones in India

Zone/States	Species Grown	Major Rotations	Major Competing Crops	Special Features
North (Punjab, Haryana, Rajasthan)	Intraspecies hybrids of *G. hirsutum* = 97%, *G. arboreum* = 3%	Soils are alluvial in nature. Most often cotton follows wheat	Rice, cluster beans, sugarcane to some extent	All irrigated, leaf curl virus threat, high temperatures resulting in sterility, shortage of water.
Central (Maharashtra, Gujarat, Madhya Pradesh)	Mostly Intraspecies hybrid of G. hirsutum, first hybrids grown	Soils are black soils or vertisols. Most cotton is mono cropping, highly dependent on rain, wheat, maize and legumes are grown as a rotation crops.	Green gram, sorghum, pigeon pea, vegetables	Major cotton zone, limited irrigation potential, ideal temperatures, chances for drought and flooding.
South (Andhra Pradesh, Karnataka, Tamil Nadu)	Intraspecies hybrids, *G. hirsutum* = 96%, other species also grown	Vertisols or red soils. Mostly cotton is a mono crop, vegetables, maize and legumes are rotated with cotton to some extent	Maize, sunflower, beans and chilies	Irrigated area fit for *G. barbadense* and intraspecific hybrids, extensive use of insecticides/chemicals

Changes in Area Under Different Species in India (% Area)

Species	Years			
	1947/48	1995/96	2000/01	2010/11
G. hirsutum	8	24	33	5
G. hirsutum hybrids	-	32	40	86
G. barbadense	-	6	3	1
G. arboreum	64	25	15	3
G. herbaceum	28	13	10	5

Pradesh, West Bengal, Odessa, Chhattisgarh and Bihar where little or no area is used for cotton cultivation. Nevertheless, in addition to Punjab in the north, farmers have a choice to shift between cotton and rice in the south and southeastern states, particularly Tamil Nadu, Andhra Pradesh, and further to the north in Orissa, with some overlapping area in the West Bengal.

India is famous for growing all cultivated species of cotton. No other country has ever planted all four species on a commercial scale. The indigenous diploid species *G. arboreum* and *G. herbaceum* were planted on a combined 38% of cotton area in 1995/96 but have since slowly disappeared. The emergence of biotech cotton is considered to be one of the factors responsible for a reduced emphasis on producing diploid cottons, in addition to less focused research on diploid cotton and the inability to achieve similar gains in production and yield as with upland cotton.

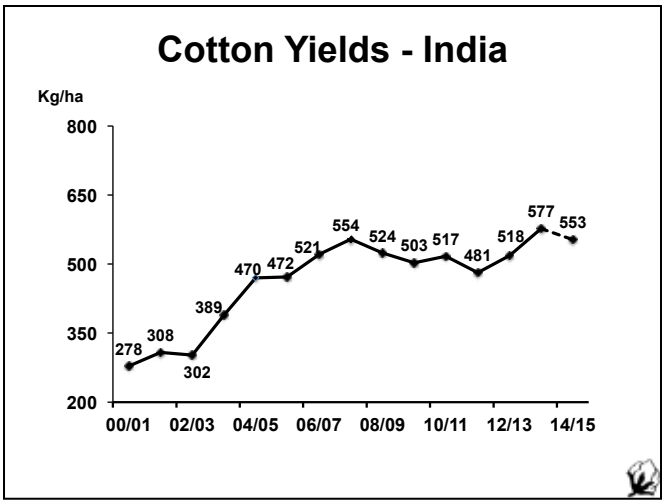
The Story of Commercial Cotton Hybrids

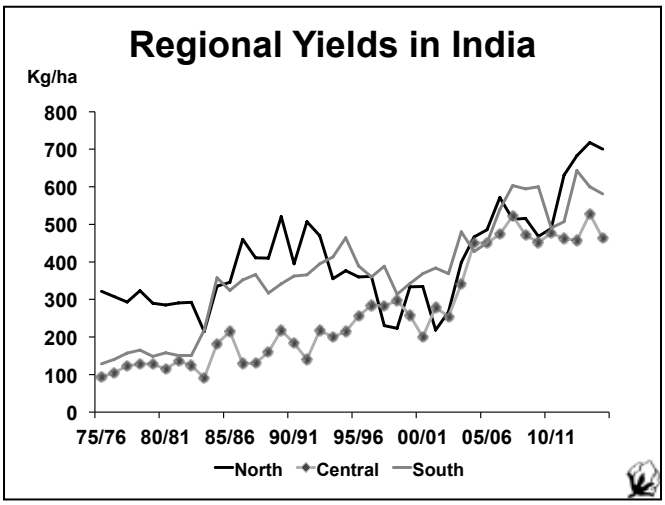
India is a pioneer is utilizing hybrid vigor in cotton on a commercial scale. Commercial cotton hybrid work started much earlier but the first commercial hybrid considered to be successful in India was an intra *hirsutum* hybrid released in the early 1970s. Since then, cultivation of hybrid cotton steadily increased and reached almost 1/3 of the cotton area by 1995/96. Currently, straight varieties of all species are planted on less than 10% of the cotton area. The first successful commercial cotton hybrid H4 had a bushy structure requiring a very small number of plants per hectare, perfectly suiting the sparsely planted cotton production system of the time. Cotton yields showed little increase during the 1970s but improved significantly during the 1980s as sowing of hybrid cotton became more popular. Although, improvements in agronomic practices continued simultaneously, most credit for higher yields was inappropriately attributed to commercial cotton hybrids. Gains in yields were so dominant that insecticides and their uses and the transfer of technology did not receive the attention they deserved. Both oversights were realized later and considerable improvements in yields occurred after the two weak links in technology were fixed.

One of the main issues with hybrids is that the production of planting seed is more expensive compared to varieties. Consequently, lower quantities of seed are used per unit area, which increases the risk that a smaller crop will be produced. Farmers receive planting seed from private companies as a packet that also includes the cost of biotech genes, and less than 2 kg of planting seed per hectare is used. Male sterility systems were introduced in the world after the widespread use of hybrid cotton in India. While cytoplasmic male sterility has worked well, suitable restorer genes have not been found. Moreover, the restorer genes developed elsewhere were found to be prone to varying performance under different climatic conditions. By then, the atmosphere for hybrid production was so favorable in India that the withdrawal of support for commercial cotton hybrids was inconceivable. The textile industry supported hybrids because they received uniform quality from pure hybrid seeds. The seed industry quickly gained market share and became a dominant player in the cotton industry.

Cotton Yields Stagnate

It is still arguable whether yield improvements during the 1980s were caused by the widespread use of hybrids or the expanded use of insecticides to control insects. Insecticides, irrespective of the fact that they have their own consequences, would have positively impacted cotton yields of both hybrids and varieties. Yields increased significantly in all other countries that adopted insecticides, as was the case in the 1980s. No hybrids were used in Pakistan but yields nearly doubled during the 1980s.





By the mid-1990s, cotton yields stabilized while resistance to insecticides emerged as a key factor. Despite the growing issue of insecticide resistance, the success story of commercial cotton hybrids in India had already emerged as a highlight of the cotton sector worldwide, taking away some attention from the exploitation of hybrid vigor. Cotton yields had reached a plateau, and certainly required a magic bullet. Insecticide resistance was already being tackled in other countries, but this issue is not easy to deal with in a small-scale farming system such as in India. Success stories of resistance management in Australia and the West African countries were hard to replicate in India. The basis for resistance had been researched and solutions were ready for introduction under Indian conditions, but their implementation would take time and require close coordination between the public and private sectors.

Biotech Cotton Arrives on Time

The insecticide resistance problem was the most convincing argument in favor of the adoption of commercial biotech cotton. The resistance management program worked sufficiently to contain insecticide use without any impact on yields. Adulteration of insecticides and inefficiencies in prey technologies were a common complaint worldwide. Under- and over-dosage of insecticides are inadvertent consequences of the resistance problem. The intricacies of insecticide use were minimally followed in India, as was the case in many other countries. Biotech cotton was a solution to all these problems. Commercial cotton hybrids were perfect way to avoid any counterfeiting of biotechnology as farmers had to revert to seed companies for hybrid planting seed. Biotech genes entered the market via hybrid technology, leaving no room for their misuse. But, at the same time, hybrid technology firmed its footing in the cotton sector in India. Technology costs were controlled through public regulation and local genes were introduced. The impact on yield was so huge that in five years the area under biotech cotton reached half of the cotton area in India. Liberal approval, in the form of an event approval process, flooded the market with biotech hybrids.

The North region, which had been dominant in terms of average yields for a long time and had not seen any benefit in growing commercial cotton hybrids, had to adopt hybrids because of biotech genes. Yields were higher compared to other areas because of irrigation facilities and, probably, better technical knowhow of cotton production. Bushy plants (hybrid or a variety) clearly tend to gain more vegetative growth under irrigated conditions compared to rainfed. This may be the reason why hybrids did not become popular in the Northern zone. The Asia-Pacific Association of Agricultural Research Institutes, operated from the FAO Regional Office for Asian and Pacific in Thailand, published *Hybrid Cotton in India – A Success Story* in 1995, which showed that no hybrid cotton was grown in the North zone while the Central and South zones planted hybrids on 36% and 61% of the area respectively. However, when biotech cotton was introduced in other zones, the North zone had to adopt hybrids in order to utilize biotech genes and eliminate insecticide applications as much as possible. The farmers may have given up the chance of over growth or this chance was reduced due to early formation of bolls. Once the plant is in reproductive growth, the plant is bound to devote more energy toward fruiting rather than continuing vegetative growth.

Concerns with Hybrids

Production technology has changed drastically since hybrids were adopted over 40 years ago and hybrids seem to have reached the end of their usefulness.

- Hybrids, being voluminous in stature, form bolls for a longer period of time, thus requiring protection for a longer period. The longer fruit formation period has a high risk of requiring more insecticides/chemicals.
- Fiber quality varies more in hybrids compared to varieties. Research shows that bolls located at various positions on the plant have differences in fiber quality parameters. While early-formed bolls have a higher micronaire and fiber maturity, bolls formed toward the end of the season have lower maturity and lower micronaire values. In hybrids, bolls are formed at various temperatures from the early boll

formation to the termination of fruit formation. Variability also occurs in varieties, but most bolls are formed close to the main stem and within a shorter period of time.

- Production of planting seed is key to the survival of commercial varieties. When hybrids were introduced in India, seed certification was not as advanced as it is now. Varietal mixing results in a mixed fiber quality, which is not appreciated by the spinning industry. Private companies are responsible for providing quality planting seed and now they can implement stricter seed certification laws/practices and produce pure quality seed for not only hybrids, but also varieties.
- The cost of producing hybrid planting seed is high compared to varieties. Emasculation and pollination are quite labor intensive. The high cost of planting seed for hybrids compels farmers to use the smallest possible quantity of planting seed, risking optimum plant stand.
- Hybrids are also more difficult to breed than varieties. Cotton is often considered to a cross-pollinated crop but out-crossing is limited. Out-crossing in cotton depends on the weather conditions, and under Indian conditions, out-crossing in upland varieties should not be more than 2% at the most. Isolation of parental lines/varieties to a distance of 50 meters eliminates the chances of out-crossing in most cotton growing areas in India. The development of inbred lines and in-breeding depression are detrimental to the commercialization of hybrids in cotton. What is required in hybrid cotton is the development of good parents with all the required characteristics, i.e. morphological, yield and quality parameters, to be expected in the F_1 hybrid. A cross between a high yielding and a low-yielding parent may not produce a high-yielding F_1 hybrid. The same is true for other characteristics and parameters. So, hybrid cotton becomes a two-step breeding process requiring more time and interdependent on each other.

  - Regular conventional breeding has to be undertaken and completed to have varieties/cultivars/lines with all the desirable features of a commercial variety. Varieties require one line but hybrids need two desirable lines.

  - The combining ability of the two parental lines must also be such that a desirable hybrid is developed that excels in yields with a performance that is at least equal to a commercial variety or already grown commercial cotton hybrid. It is known that two good varieties/lines may not perform as good combiners. So, additional work and time is needed to find good combiners and confirm their consistent performance.
- The technology at the time when hybrids were popularized focused on increasing the number of bolls per plant rather than bolls per unit area. Indigenous practices recommended that cotton be grown sparsely so that the plant could grow horizontally as well as vertically. The fruiting period was usually longer, with much lower stress than nowadays, in order to increase cropping intensity. A longer growing period and multiple picks were not undesirable. However, the need to improve cropping intensity has grown significantly due to population increases and the need to produce more food crops. Now, short duration and fewer pickings are desired.
- Many other aspects of production technology have also changed. Insect damage was not high and insecticide use was uncommon. Fertilizers had been adopted but not reached their peak, as is the case now. Hybrids performed better under stress conditions. Now fertilizer use has been optimized and plant protection has been transformed in such a way that conditions are conductive for varieties to grow as successfully as, if not better than, hybrids. Under current production practices, yields are not expected to drop if varieties are grown.
- India rightfully regards itself as the inception and successful utilization of commercial cotton hybrids in the world. However, commercial hybrids do not have any technical complexities that prevent them from being utilized in other countries. Many countries including Australia, China, Israel, Pakistan and USA tried commercial cotton hybrids. John H. Turner published the paper "Hybrid Cotton Breeding Program" in the March 1959 issue of the California Agriculture. Since then, many more technologies, including cytoplasmic male sterility, genetic male sterility, restorers, gametocides and chemical sterility were tried. In Uzbekistan a unique technique of avoiding emasculation by covering the style with a paper tube was tried. None of the techniques worked successfully. Yet, India continued to produce hybrid seed claiming that labor costs are affordable.
- However, labor costs are rising in India, particularly the cost of picking, due to the growth in India's economy as the growth in labor demand outpaces the supply. Machine picking is being explored as a less expensive method of picking. It is time to move on and save on planting seed costs.
- Commercial cotton hybrids were also seen as a source of employment (labor engaged in emasculation and pollination). On average, five labor days are required to produce a kilogram of hybrid seed and 2.5kg of hybrid seed are used to plant a hectare. Significant increases in planted area and the shift to hybrids has further increased the demand for manual labor. Yet, scarcity of labor is also becoming an issue as India's economy continues to grow and more workers move to the manufacturing and service sectors.
- The data on page 14 show that *G. arboreum* and *G. herbaceum* were planted on over 90% of the area in 1947/48 while *G. hirsutum* varieties, which was introduced and commercialized almost 50 years ago, were planted on only 8% of area. The reasons why diploid indigenous species were popular are that they were well adapted to the

fluctuating rainfall, poor growth conditions, no insecticides, no fertilizer and lack of technological innovations. As the means to overcome such constraints were developed and adopted, room for upland cotton automatically emerged. So, technology changes shifted the varietal pattern. Similarly, it is again time to look at technological changes in production practices and adapt to them.

Prospects for Yield Improvement

Hybrid vigor is already utilized, and biotech area has reached its peak in India. The other significant, but less acknowledged, contributor to recent increases in yields is the improvement in the transfer of technology. Technology transfer is a continuous and ongoing process. Cultivation of biotech cotton offloaded some of the pressure on cotton growers with respect to selection of insecticides, spray machinery and insecticide spraying, which had a considerable positive impact on yields.

The quality of seeds is also an important contributor to productivity and affects the usage and effectiveness of other inputs. India's breeding program is one of the most competitive in the world and cannot be more efficient, less ambitious or less creative. The more than fifty companies that have some share of the planting seed market in addition to public sector breeders provide more than enough competition for the development of the best breeding materials.

For many farmers in India, particularly those farming on two hectares or less, purchasing seeds and other inputs can be difficult. Many do not have access to credit through the formal finance sector, and instead borrow money at high rates from private lenders. Repayment can be difficult, particularly when prices are low. Furthermore, a tension exists between the high cost of inputs, such as fertilizers and herbicides, and their positive impact on yield, which may cause farmers to use less than optimal amounts. However, solutions to increase access to affordable financing are not readily available and take time to implement. This is particularly important given the rising costs of production.

Current production practices are conducive enough to produce hybrids with yields as high as hybrids can possibly produce. What is required is a decision to move to varieties without losing the ability to utilize biotech genes. Biotech gene technology and commercial cotton hybrids are so intertwined that it will not be easy to separate them and switch to straight varieties. The benefit is that this would not require any additional resources and research. The cost of planting seed would decrease and the rate of development of varieties should rise. Greater competition to release varieties will indirectly bring about improvement. However, a sudden shift is not advised, and at a minimum, performance studies could be initiated before a final recommendation is made. It is also possible that hybrids might still persist in some areas but not everywhere in the country. Kranthi (2012), in answering the question 'Are the yields stagnating in India and why?', stated that hybrids tend to be input-intensive, so they are not suitable for at least half of the cotton area in the India, which is under marginal soils in rainfed regions. He suggested that for rainfed regions, especially those with shallow-marginal soils and characterized by low input use, early maturing straight varieties are the best option. The main advantage with straight varieties is that farmers can reuse farm-saved seeds and take the liberty of early dry sowing, even before the onset of monsoon, without having to worry about the risks of poor germination and re-sowing. The recommendation appears sound and is in consonance with the thrust of this article, except that the use of certified seeds is recommended every year. If certified seed is not available in sufficient quantities, then it is recommended to go to the next generation, which, according to the ICAC, is 'registered seed'. The registered seed category is a seed produced from certified seed by a farmer under his own supervision. For more information on ICAC planting seed categories, refer to the September 2013 issue of *THE ICAC RECORDER*.

While yields have reached a plateau in many other countries, yields in India still have a huge potential for growth. Many other countries have reached the limits of their potential under current production practices, but not India. Recent experience showed that adoption of biotech cotton complemented by improvements in conveying the production technology message to growers more opportunities are there to utilize. Even if the yield for varieties is the same as hybrids, production costs will fall and save money for growers.

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2012/13 SUPPLY AND USE OF COTTON BY COUNTRY December 1, 2014

	AREA	YIELD	PROD	BEG STKS	IMPORTS	CONS	EXPORTS	END STKS	S/U *	S/MU **
	000 Ha	Kgs/Ha	000 Metric Tons						Ratio	Ratio
CANADA				0	1	1		0	0.03	0.03
CUBA	4	269	1	1	2	3		1	0.19	0.19
DOM. REP.					1	1		0	0.47	0.47
MEXICO	153	1,511	231	137	245	402	49	161	0.36	0.40
USA	3,793	994	3,770	729	2	751	2,902	848	0.23	1.13
N. America	**3,955**	**1,012**	**4,003**	**868**	**251**	**1,159**	**2,951**	**1,011**	**0.25**	**0.87**
EL SALVADOR				5	28	26		7	0.26	0.26
GUATEMALA				4	23	21		7	0.33	0.33
HONDURAS	0	316	0	0				0		
C. America	**2**	**510**	**1**	**9**	**52**	**48**	**0**	**14**	**0.29**	**0.29**
ARGENTINA	362	434	157	190	6	140	55	158	0.81	1.13
BOLIVIA	5	536	3	1	1	3		1	0.21	0.21
BRAZIL	894	1,465	1,310	1,332	14	910	938	809	0.44	0.89
CHILE				0	0	0		0	0.20	0.20
COLOMBIA	29	717	21	44	32	56	0	40	0.72	0.72
ECUADOR	1	440	1	2	11	12		1	0.09	0.09
PARAGUAY	70	370	26	10	1	8	19	10	0.37	1.24
PERU	31	880	27	26	59	92	1	20	0.21	0.21
URUGUAY				0	0	0		0	0.71	0.71
VENEZUELA	15	368	6	1	2	8		1	0.17	0.17
S. America	**1,408**	**1,101**	**1,550**	**1,606**	**126**	**1,230**	**1,012**	**1,040**	**0.46**	**0.85**
ALGERIA				1	3	3		1	0.19	0.19
EGYPT	143	765	109	97	34	120	70	51	0.27	0.42
MOROCCO				8	32	36		4	0.10	0.10
SUDAN	45	349	16	43		18	24	17	0.40	0.94
TUNISIA				3	13	13		3	0.21	0.21
N. Africa	**188**	**665**	**125**	**152**	**82**	**190**	**94**	**75**	**0.26**	**0.39**
BENIN	351	450	118	27		4	93	48	0.49	12.00
BURKINA FASO	586	423	248	67		4	247	64	0.25	15.95
CAMEROON	194	567	110	24		2	82	51	0.61	26.63
CENT. AFR. REP.	38	237	9	4			9	4	0.40	
CHAD	270	127	34	14		1	34	13	0.38	26.61
COTE D'IVOIRE	340	447	152	30	0	2	136	44	0.32	22.04
GUINEA	14	289	4	2			4	2	0.40	
MADAGASCAR				3				3		
MALI	548	345	189	70		3	171	85	0.49	28.35
NIGER	5	448	2	0		1	1	0	0.11	0.25
SENEGAL	33	420	14	3		1	14	2	0.12	2.24
TOGO	122	344	42	3			40	5	0.13	
F. Africa	**2,500**	**369**	**923**	**247**	**0**	**17**	**832**	**321**	**0.38**	**18.70**
ANGOLA	3	302	1	0		1	0	0	0.23	0.34
ETHIOPIA	129	261	30	11	3	40	1	3	0.08	0.09
GHANA	18	364	7	3	0	1	6	2	0.23	1.31
KENYA	39	170	7	1	0	7		1	0.16	0.16
MALAWI	180	192	35	24		3	34	22	0.59	7.20
MOZAMBIQUE	150	250	37	42			53	27	0.50	
NIGERIA	315	197	62	29	1	19	40	33	0.56	1.72
SOUTH AFRICA	7	777	5	5	17	17	7	3	0.11	0.15
TANZANIA	398	213	85	132		32	65	120	1.23	3.74
UGANDA	74	253	19	21		1	18	21	1.09	18.26
CONGO, DR				2	8	8		2	0.27	0.27
ZAMBIA	330	126	42	103			84	60	0.71	
ZIMBABWE	290	202	59	72		5	85	41	0.45	8.13
S. Africa	**1,959**	**201**	**393**	**450**	**51**	**159**	**396**	**339**	**0.61**	**2.13**
KAZAKHSTAN	133	677	90	13	0	15	45	43	0.72	2.92
KYRGYZSTAN	31	874	27	3	3	1	29	3	0.10	2.92
TAJIKISTAN	196	638	125	39		7	136	21	0.15	3.16
TURKMENISTAN	525	638	335	167		138	230	135	0.37	0.98
UZBEKISTAN	1,285	778	1,000	335	1	325	653	358	0.37	1.10
C. Asia	**2,170**	**727**	**1,577**	**557**	**4**	**485**	**1,093**	**560**	**0.35**	**1.15**

2012/13 SUPPLY & USE OF COTTON BY COUNTRY (cont'd) December 1, 2014

	AREA	YIELD	PROD	BEG STKS	IMPORTS	CONS	EXPORTS	END STKS	S/U *	S/MU **
	000 Ha	Kgs/Ha	000 Metric Tons						Ratio	Ratio
AUSTRIA				1	6	4	1	2	0.46	0.56
AZERBAIJAN	33	450	19	11		10	5	15	0.96	1.45
BELARUS				4	11	11		4	0.34	0.34
BELGIUM				2	13	4	6	5	0.50	1.25
BULGARIA	1	321	0	1	5	3	1	1	0.35	0.44
CZECH REP.				1	5	6	0	0	0.05	0.05
DENMARK					0					
ESTONIA										
FINLAND										
FRANCE				3	17	15	3	3	0.15	0.18
GERMANY				20	49	38	6	25	0.55	0.65
GREECE	279	930	248	57	3	21	237	50	0.19	2.36
HUNGARY				0	1	1		0	0.42	0.42
IRELAND				0	0	0		0	0.18	0.18
ITALY				10	54	43	5	16	0.33	0.37
LATVIA				0	1	1		0	0.10	0.10
LITHUANIA				0	0	0		0	0.38	0.38
MOLDOVA				1	2	2		1	0.34	0.34
NETHERLANDS				0	5	5		0	0.09	
NORWAY										
POLAND				0	7	7		0	0.04	0.04
PORTUGAL				4	32	28	1	8	0.26	0.27
ROMANIA				0	1	1		0	0.22	0.22
RUSSIA	1	519	1	17	43	50		11	0.23	0.23
SLOVAK REP.										
SPAIN	70	933	65	12	3	6	57	17	0.27	2.95
SWEDEN				0	0	0		0	0.10	0.10
SWITZERLAND				1	4	4	0	0	0.08	0.09
UKRAINE				1	2	2		0	0.09	0.09
UNITED KINGDOM				0	1	1		0	0.47	0.47
FORMER YUGOSLAVIA				1	6	6		1	0.22	0.22
Europe	**384**	**866**	**333**	**149**	**274**	**271**	**322**	**162**	**0.09**	**0.60**
Including EU-28	**350**	**896**	**313**	**112**	**204**	**184**	**317**	**130**	**0.26**	**0.70**
CHINA	4,975	1,467	7,300	6,181	4,426	8,290	10	9,607	1.16	1.16
TAIWAN				46	205	204		48	0.24	0.24
HONG KONG				11	86	26	38	32	0.50	1.23
Sub total	**4,975**	**1,467**	**7,300**	**6,238**	**4,717**	**8,519**	**49**	**9,687**	**1.13**	**1.14**
AUSTRALIA	442	2,138	1,002	639	0	8	1,305	328	0.25	41.25
INDONESIA	10	653	7	217	683	649	1	256	0.39	0.40
JAPAN				21	69	63		27	0.42	0.42
KOREA, D.R.				1	5	5		1	0.24	0.24
KOREA, REP.				51	286	272	1	64	0.24	0.24
MALAYSIA				41	151	15	160	17	0.10	1.14
PHILIPPINES	0	566	0	2	9	9		2	0.21	0.21
SINGAPORE				2	12		14	0	0.02	
THAILAND	2	516	1	83	329	360	1	52	0.14	0.15
VIETNAM	11	463	5	51	517	492		81	0.16	0.16
E. Asia	**485**	**2,109**	**1,023**	**1,110**	**2,061**	**1,880**	**1,482**	**831**	**0.25**	**0.44**
AFGHANISTAN	50	410	20	20		4	19	18	0.79	4.32
BANGLADESH	30	773	23	193	631	765		82	0.11	0.11
INDIA	11,980	518	6,205	1,891	258	4,817	1,685	1,853	0.28	0.38
MYANMAR	349	584	204	104		201		107	0.53	0.53
PAKISTAN	2,960	740	2,002	326	470	2,416	92	290	0.12	0.12
SRI LANKA				0	2	2		0	0.11	0.11
S. Asia	**15,372**	**550**	**8,457**	**2,536**	**1,361**	**8,208**	**1,795**	**2,352**	**0.24**	**0.29**
IRAN	110	509	56	24	49	91		38	0.42	0.42
IRAQ	20	360	7	1	5	13		1	0.09	0.09
ISRAEL	8	1,786	15	1			15	1	0.09	
SYRIA	137	1,100	150	128		88	7	184	1.95	2.11
TURKEY	488	1,527	745	435	618	1,360	119	319	0.22	0.23
Sub total	**802**	**1,233**	**989**	**595**	**683**	**1,576**	**142**	**550**	**0.99**	0.35
WORLD TOTAL	**34,179**	**780**	**26,665**	**14,515**	**9,662**	**23,735**	**10,169**	**16,939**	**0.71**	**0.71**

*/ Ending stocks divided by consumption plus exports.

**/ Ending stocks divided by consumption.

Subtotals and total include countries not shown.

2013/14 SUPPLY AND USE OF COTTON BY COUNTRY December 1, 2014

	AREA	YIELD	PROD	BEG STKS	IMPORTS	CONS	EXPORTS	END STKS	S/U *	S/MU **
	000 Ha	Kgs/Ha	000 Metric Tons						Ratio	Ratio
CANADA				0	1	1		0	0.10	0.10
CUBA	4	272	1	1	2	3		1	0.19	0.19
DOM. REP.					1	1		0	0.47	0.47
MEXICO	119	1,625	193	161	233	412	29	146	0.33	0.36
USA	3,053	921	2,811	848	3	803	2,268	590	0.19	0.73
N. America	**3,181**	**945**	**3,006**	**1,011**	**240**	**1,221**	**2,297**	**738**	**0.21**	**0.60**
EL SALVADOR				7	29	27		8	0.31	0.31
GUATEMALA				7	23	21		9	0.45	0.45
HONDURAS	0	319	0	0				0		
C. America	**2**	**515**	**1**	**14**	**52**	**49**	**0**	**18**	**0.37**	**0.37**
ARGENTINA	559	465	260	158	3	135	60	226	1.16	1.67
BOLIVIA	5	532	3	1	2	3	1	1	0.16	0.20
BRAZIL	1,122	1,520	1,705	809	32	879	485	1,181	0.87	1.34
CHILE				0		0		0	0.11	0.11
COLOMBIA	31	884	27	40	43	83	0	28	0.33	0.33
ECUADOR	1	436	1	1	14	14		2	0.12	0.12
PARAGUAY	25	432	11	10	0	8	5	9	0.68	1.06
PERU	39	835	32	20	58	92	1	17	0.18	0.19
URUGUAY				0	0	0		0	0.59	0.59
VENEZUELA	15	365	6	1	2	8		1	0.17	0.17
S. America	**1,797**	**1,137**	**2,044**	**1,040**	**154**	**1,222**	**552**	**1,464**	**0.82**	**1.20**
ALGERIA				1	3	3		1	0.19	0.19
EGYPT	122	821	100	51	15	72	47	47	0.40	0.65
MOROCCO				4	34	34		4	0.13	0.13
SUDAN	62	411	25	17		18	15	9	0.27	0.49
TUNISIA				3	13	13		3	0.21	0.21
N. Africa	**184**	**683**	**126**	**75**	**65**	**140**	**62**	**64**	**0.32**	**0.46**
BENIN	380	329	125	48		4	140	29	0.20	7.26
BURKINA FASO	644	419	270	64		4	270	60	0.22	14.95
CAMEROON	214	514	110	51		2	101	58	0.56	30.36
CENT. AFR. REP.	36	228	8	4			8	3	0.38	
CHAD	205	159	33	13		1	33	13	0.38	25.16
COTE D'IVOIRE	358	485	173	44		2	130	86	0.65	42.94
GUINEA	13	270	4	2			4	1	0.38	
MADAGASCAR				3				3		
MALI	481	387	186	85		3	199	69	0.34	23.16
NIGER	5	444	2	0		1	1	0	0.12	0.25
SENEGAL	32	378	12	2		1	9	4	0.44	5.47
TOGO	116	320	37	5			35	7	0.20	
F. Africa	**2,483**	**387**	**960**	**321**		**17**	**930**	**334**	**0.35**	**19.49**
ANGOLA	3	299	1	0		1	0	0	0.24	0.34
ETHIOPIA	123	311	38	3	6	44	1	3	0.06	0.07
GHANA	16	363	6	2	1	1	6	2	0.25	1.31
KENYA	35	185	6	1	0	7		1	0.17	0.17
MALAWI	162	268	43	22		3	36	26	0.68	8.75
MOZAMBIQUE	157	280	44	27			42	29	0.68	
NIGERIA	284	203	57	33	1	19	47	26	0.40	1.40
SOUTH AFRICA	7	1,148	9	3	19	22	5	3	0.11	0.14
TANZANIA	400	195	78	120		32	52	114	1.36	3.56
UGANDA	53	277	15	21		1	14	20	1.36	22.30
CONGO, DR				2	8	8		2	0.27	0.27
ZAMBIA	290	138	40	60			38	62	1.60	
ZIMBABWE	250	223	56	41		4	59	34	0.54	9.02
S. Africa	**1,803**	**221**	**398**	**339**	**57**	**164**	**302**	**327**	**0.70**	**1.99**
KAZAKHSTAN	140	530	74	43	0	11	61	45	0.63	4.08
KYRGYZSTAN	27	831	23	3	3	1	24	4	0.16	4.01
TAJIKISTAN	189	556	105	21		11	83	33	0.35	3.12
TURKMENISTAN	550	485	329	135		144	195	124	0.36	0.86
UZBEKISTAN	1,275	737	940	358	1	345	650	305	0.31	0.88
C. Asia	**2,181**	**674**	**1,471**	**560**	**4**	**511**	**1,013**	**511**	**0.33**	**1.00**

2013/14 SUPPLY & USE OF COTTON BY COUNTRY (cont'd) December 1, 2014

	AREA	YIELD	PROD	BEG STKS	IMPORTS	CONS	EXPORTS	END STKS	S/U *	S/MU **
	000 Ha	Kgs/Ha	000 Metric Tons						Ratio	Ratio
AUSTRIA				2	5	4	1	3	0.64	0.75
AZERBAIJAN	28	536	15	15		12	7	11	0.62	0.98
BELARUS				4	11	11		4	0.34	0.34
BELGIUM				5	10	4	6	5	0.51	1.29
BULGARIA	0	324	0	1	5	4	1	2	0.32	0.39
CZECH REP.				0	3	3	0	0	0.13	0.13
DENMARK										
ESTONIA										
FINLAND										
FRANCE				3	16	13	3	3	0.16	0.20
GERMANY				25	52	52	8	16	0.27	0.32
GREECE	249	1,190	296	50	1	20	280	47	0.16	2.36
HUNGARY				0	1	1		0	0.44	0.44
IRELAND				0	0	0		0	0.21	0.21
ITALY				16	50	41	4	21	0.46	0.51
LATVIA				0	1	1		0	0.10	0.10
LITHUANIA				0	0	0		0	0.38	0.38
MOLDOVA				1	2	2		1	0.34	0.34
NETHERLANDS				0	5	5		0	0.10	
NORWAY										
POLAND				0	7	7		0	0.05	0.05
PORTUGAL				8	34	33	0	8	0.25	0.25
ROMANIA				0	1	1		0	0.22	0.22
RUSSIA	1	519	1	11	48	48		12	0.26	0.26
SLOVAK REP.										
SPAIN	64	775	50	17	3	6	44	20	0.41	3.61
SWEDEN				0	0	0		0	0.10	0.10
SWITZERLAND				0	3	3	0	0	0.11	0.11
UKRAINE				0	3	2		0	0.19	0.19
UNITED KINGDOM				0	0	0		0	0.48	0.48
FORMER YUGOSLAVIA				1	6	6		1	0.23	0.23
Europe	**343**	**1,052**	**361**	**162**	**270**	**280**	**355**	**159**	**0.12**	**0.57**
Including EU-28	**313**	**1,104**	**346**	**130**	**195**	**195**	**348**	**128**	**0.24**	**0.66**
CHINA	4,700	1,474	6,929	9,607	3,075	7,531	6	12,074	1.60	1.60
TAIWAN				48	186	193		41	0.22	0.22
HONG KONG				32	39	10	28	33	0.88	3.34
Sub total	**4,700**	**1,474**	**6,929**	**9,687**	**3,300**	**7,734**	**34**	**12,148**	**1.56**	**1.57**
AUSTRALIA	392	2,270	890	328	0	8	1,037	174	0.17	22.99
INDONESIA	9	600	5	256	640	672	1	229	0.34	0.34
JAPAN				27	68	71		24	0.33	0.33
KOREA, D.R.				1	5	5		1	0.24	0.24
KOREA, REP.				64	280	272	1	72	0.26	0.26
MALAYSIA				17	77	15	46	33	0.54	2.21
PHILIPPINES	0	566	0	2	7	7		2	0.29	0.29
SINGAPORE				0	0		0	0	9.83	
THAILAND	2	516	1	52	352	353		52	0.15	0.15
VIETNAM	12	465	6	81	691	664		113	0.17	0.17
E. Asia	**435**	**2,092**	**910**	**831**	**2,120**	**2,074**	**1,085**	**703**	**0.22**	**0.34**
AFGHANISTAN	45	414	19	18		4	17	16	0.76	3.80
BANGLADESH	25	998	25	82	987	900		194	0.22	0.22
INDIA	11,650	581	6,770	1,853	147	5,042	2,014	1,714	0.24	0.34
MYANMAR	299	647	194	107		201		99	0.49	0.49
PAKISTAN	2,914	712	2,076	290	402	2,271	80	417	0.18	0.18
SRI LANKA				0	2	2		0	0.11	0.11
S. Asia	**14,936**	**608**	**9,085**	**2,352**	**1,538**	**8,423**	**2,111**	**2,441**	**0.23**	**0.29**
IRAN	91	713	65	38	61	131		33	0.25	0.25
IRAQ	19	360	7	1	6	13		1	0.09	0.09
ISRAEL	6	1,809	11	1			11	1	0.11	
SYRIA	103	976	100	184		100	2	182	1.79	1.82
TURKEY	451	1,686	760	319	876	1,400	115	440	0.29	0.31
Sub total	**709**	**1,352**	**958**	**550**	**954**	**1,669**	**129**	**664**	**0.81**	**0.40**
WORLD TOTAL	**32,735**	**802**	**26,241**	**16,939**	**8,753**	**23,497**	**8,868**	**19,568**	**0.83**	**0.83**

*/ Ending stocks divided by consumption plus exports.

**/ Ending stocks divided by consumption.

Subtotals and total include countries not shown.

2014/15 SUPPLY AND USE OF COTTON BY COUNTRY December 1, 2014

	AREA	YIELD	PROD	BEG STKS	IMPORTS	CONS	EXPORTS	END STKS	S/U *	S/MU **
	000 Ha	Kgs/Ha	000 Metric Tons						Ratio	Ratio
CANADA				0	1	1		0	0.10	0.10
CUBA	4	272	1	1	2	3		1	0.19	0.19
DOM. REP.					1	1		0	0.47	0.47
MEXICO	181	1,484	268	146	246	412	46	202	0.44	0.49
USA	3,999	893	3,570	590	2	827	2,420	915	0.28	1.11
N. America	**4,189**	**917**	**3,841**	**738**	**252**	**1,245**	**2,466**	**1,119**	**0.30**	**0.90**
EL SALVADOR				8	27	27		8	0.31	0.31
GUATEMALA				9	21	21		9	0.45	0.45
HONDURAS	0	319	0	0				0		
C. America	**2**	**515**	**1**	**18**	**48**	**49**	**0**	**18**	**0.37**	**0.37**
ARGENTINA	540	442	239	226	5	142	57	271	1.37	1.91
BOLIVIA	5	537	3	1	2	3	1	1	0.16	0.20
BRAZIL	975	1,522	1,484	1,181	28	850	568	1,275	0.90	1.50
CHILE				0	0	0		0	0.15	0.15
COLOMBIA	41	772	32	28	63	87	0	35	0.40	0.40
ECUADOR	1	440	1	2	14	14		2	0.12	0.12
PARAGUAY	26	436	11	9		8	6	6	0.38	0.69
PERU	36	792	29	17	67	87	1	25	0.28	0.28
URUGUAY				0	0	0		0	0.59	0.59
VENEZUELA	15	368	6	1	7	8		6	0.68	0.68
S. America	**1,640**	**1,100**	**1,803**	**1,464**	**186**	**1,200**	**633**	**1,619**	**0.88**	**1.35**
ALGERIA				1	3	3		1	0.19	0.19
EGYPT	158	806	127	47	78	92	60	100	0.66	1.09
MOROCCO				4	30	30		4	0.14	0.14
SUDAN	67	415	28	9		19	9	9	0.32	0.48
TUNISIA				3	13	13		3	0.21	0.21
N. Africa	**225**	**689**	**155**	**64**	**124**	**157**	**69**	**117**	**0.52**	**0.75**
BENIN	379	329	125	29		4	127	23	0.17	5.66
BURKINA FASO	644	428	275	60		4	217	115	0.52	28.65
CAMEROON	203	519	106	58		2	112	49	0.43	25.73
CENT. AFR. REP.	36	230	8	3			8	3	0.40	
CHAD	256	187	48	13		1	41	19	0.45	37.19
COTE D'IVOIRE	386	495	191	86		2	191	84	0.44	41.34
GUINEA	12	272	3	1			4	1	0.36	
MADAGASCAR				3				3		
MALI	570	379	216	69		3	212	71	0.33	23.60
NIGER	5	448	2	0		1	1	0	0.11	0.25
SENEGAL	31	382	12	4		1	11	4	0.34	5.25
TOGO	110	323	36	7			34	9	0.26	
F. Africa	**2,632**	**388**	**1,022**	**334**		**17**	**958**	**381**	**0.39**	**22.18**
ANGOLA	3	302	1	0		1	0	0	0.25	0.41
ETHIOPIA	129	314	40	3	15	45	1	12	0.26	0.27
GHANA	16	366	6	2	1	1	6	2	0.25	1.31
KENYA	38	185	7	1	0	7	0	1	0.19	0.20
MALAWI	134	271	36	26		3	38	22	0.53	7.23
MOZAMBIQUE	134	279	37	29			42	24	0.58	
NIGERIA	298	205	61	26	1	19	41	28	0.47	1.46
SOUTH AFRICA	8	1,154	9	3	20	23	5	3	0.11	0.14
TANZANIA	336	199	67	114		34	43	104	1.36	3.11
UGANDA	61	431	26	20		2	22	22	0.90	9.20
CONGO, DR				2	8	8		2	0.27	0.27
ZAMBIA	287	149	43	62			37	68	1.85	
ZIMBABWE	238	228	54	34		4	56	28	0.48	7.58
S. Africa	**1,705**	**231**	**393**	**327**	**66**	**171**	**293**	**323**	**0.69**	**1.88**
KAZAKHSTAN	129	556	65	45	0	11	54	45	0.70	4.00
KYRGYZSTAN	23	822	19	4	3	1	21	4	0.18	4.24
TAJIKISTAN	175	597	104	33		11	94	33	0.31	3.05
TURKMENISTAN	545	482	327	124		152	171	128	0.40	0.84
UZBEKISTAN	1,275	737	940	305	1	345	628	273	0.28	0.79
C. Asia	**2,147**	**3,195**	**1,455**	**511**	**4**	**519**	**968**	**483**	**1.87**	**0.93**

2014/15 SUPPLY & USE OF COTTON BY COUNTRY (cont'd) December 1, 2014

	AREA	YIELD	PROD	BEG STKS	IMPORTS	CONS	EXPORTS	END STKS	S/U *	S/MU **
	000 Ha	Kgs/Ha	000 Metric Tons						Ratio	Ratio
AUSTRIA				3	4	4	1	2	0.48	0.56
AZERBAIJAN	28	538	15	11		13	4	9	0.53	0.69
BELARUS				4	11	11		4	0.34	0.34
BELGIUM				5	10	4	6	5	0.51	1.33
BULGARIA	0	324	0	2	4	4	1	2	0.33	0.41
CZECH REP.				0	3	3	0	0	0.14	0.14
DENMARK								0		
ESTONIA										
FINLAND										
FRANCE				3	16	13	3	3	0.16	0.20
GERMANY				16	32	32	6	11	0.28	0.33
GREECE	275	997	274	47	1	19	219	84	0.35	4.41
HUNGARY				0	1	1		0	0.47	0.47
IRELAND				0	0	0		0	0.23	0.23
ITALY				21	48	39	4	25	0.58	0.64
LATVIA				0	1	1		0	0.10	0.10
LITHUANIA				0	0	0		0	0.38	0.38
MOLDOVA				1	2	2		1	0.34	0.34
NETHERLANDS				0	5	5		0	0.10	
NORWAY										
POLAND				0	7	7		0	0.05	0.05
PORTUGAL				8	31	31		8	0.27	0.27
ROMANIA				0	1	1		0	0.23	0.23
RUSSIA	1	521	1	12	49	49		13	0.26	0.26
SLOVAK REP.										
SPAIN	74	887	66	20	3	5	59	24	0.38	4.47
SWEDEN				0	0	0		0	0.11	0.11
SWITZERLAND				0	3	3	0	0	0.11	0.12
UKRAINE				0	2	2		0	0.19	0.19
UNITED KINGDOM				0	0	0		0	0.45	0.45
FORMER YUGOSLAVIA				1	6	6		1	0.23	0.23
Europe	**380**	**3,328**	**356**	**159**	**243**	**258**	**304**	**196**	**8.26**	**0.76**
Including EU-28	**349**	**973**	**340**	**128**	**168**	**169**	**300**	**166**	**0.35**	**0.98**
CHINA	4,275	1,518	6,490	12,074	1,976	7,960	4	12,576	1.58	1.58
TAIWAN				41	183	183		41	0.23	0.23
HONG KONG				33	4		28	9	0.32	
Sub total	**4,275**	**1,518**	**6,490**	**12,148**	**2,163**	**8,143**	**32**	**12,626**	**1.54**	**1.55**
AUSTRALIA	282	2,057	580	174	0	7	661	86	0.13	11.96
INDONESIA	9	603	5	229	631	679	1	186	0.27	0.27
JAPAN				24	71	71		24	0.33	0.33
KOREA, D.R.				1	5	5		1	0.24	0.24
KOREA, REP.				72	297	282		87	0.31	0.31
MALAYSIA				33	78	16	58	37	0.51	2.38
PHILIPPINES	0	569	0	2	7	7		2	0.30	0.30
SINGAPORE				0	0		0	0	0.20	
THAILAND	2	518	1	52	384	363		74	0.20	0.20
VIETNAM	12	465	6	113	781	714		185	0.26	0.26
E. Asia	**324**	**1,848**	**600**	**703**	**2,253**	**2,152**	**719**	**684**	**0.24**	**0.32**
AFGHANISTAN	45	414	19	16		4	16	14	0.66	3.15
BANGLADESH	25	998	25	194	998	954		263	0.28	0.28
INDIA	12,250	553	6,770	1,714	120	5,269	1,234	2,101	0.32	0.40
MYANMAR	299	650	195	99	11	201		104	0.52	0.52
PAKISTAN	2,805	750	2,103	417	520	2,308	33	699	0.30	0.30
SRI LANKA				0	2	2		0	0.11	0.11
S. Asia	**15,427**	**591**	**9,114**	**2,441**	**1,650**	**8,740**	**1,283**	**3,182**	**0.32**	**0.36**
IRAN	91	720	66	33	69	131		36	0.28	0.28
IRAQ	19	362	7	1	6	13		1	0.09	0.09
ISRAEL	7	1,786	13	1			13	1	0.10	
SYRIA	72	981	70	182		102	55	96	0.61	0.94
TURKEY	484	1,750	847	440	780	1,486	60	521	0.34	0.35
Sub total	**712**	**2,921**	**1,018**	**664**	**866**	**1,757**	**128**	**662**	**1.05**	**0.38**
WORLD TOTAL	**33,639**	**780**	**26,240**	**19,568**	**7,854**	**24,401**	**7,854**	**21,408**	**0.88**	**0.88**

*/ Ending stocks divided by consumption plus exports.

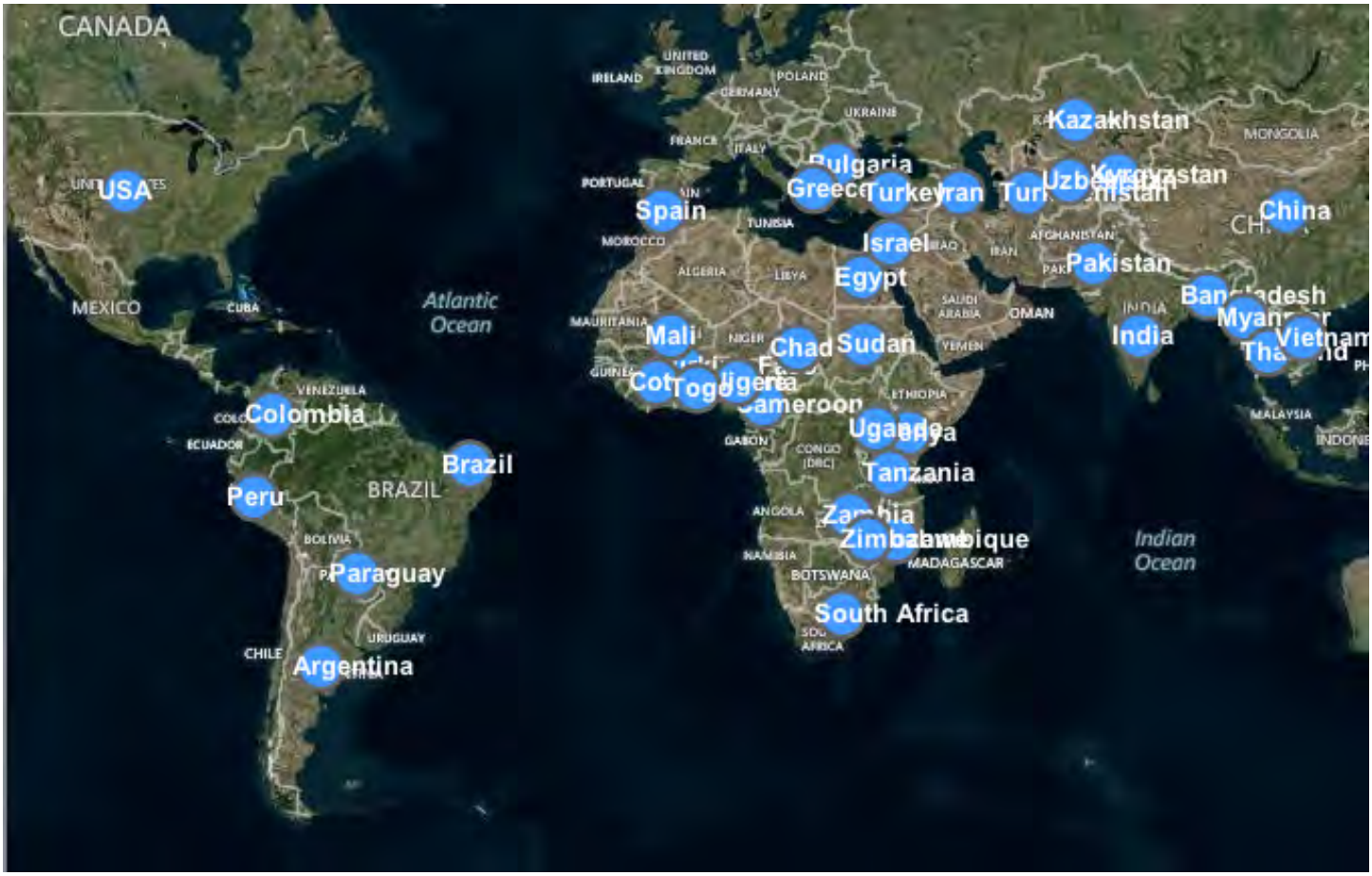
**/ Ending stocks divided by consumption.

Subtotals and total include countries not shown.

WORLD COTTON CALENDAR

A joint project of the ICAC and Cotton Incorporated

Now avalaible at http://worldcottoncalendar.icac.org/



The source of the information that comprises the World Cotton Calendar is a huge database maintained by the ICAC, containing data on all aspects of cotton production field operations, including ginning and picking, from 37 countries. The Calendar has information on varieties planted and area under each variety, early and mid season insects, narrow and broad leaf weeds, quantity of fertilizer applied and diseases. More importantly, the Calendar also includes up to five important cotton related activities per month. Access to the information is free and the Calendar will be updated on regular basis.

To access the data once you are on the page, zoom in on a country and then on a region (if cotton is produced in more than one region). Click on the blue dot until a clickable list of data titles appears. The blue dot shows that the data for a particular country/region is available and can be instantly accessed. Additional information is available in the publication Cotton Production Practices – November 2014, which can be ordered from the ICAC at:

https://www.icac.org/login?url=%2Fpubdetail.php%3Fid%3DP0000052