

Biotech Facts & Trends 2014

India

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In 2013

India has the largest hectareage of cotton and accounts for approximately one third of the total cotton area planted in the world.

Bt cotton was planted for the 12th year in India at 11 million hectares, 200,000 more than the 10.8 million hectares planted in 2012.

The 11 million hectares Bt cotton is 95% of the total 11.6 million hectares of Indian cotton, an increase of 2% from the 93% adoption rate in 2012.

A total of 7.3 million farmers farming on average ~1.5 hectares planted 200,000 hectares more Bt cotton than 2012.

Accumulatively, 45 million small farmers in India have benefited from planting Bt cotton repeatedly year-after-year during the 12-year period 2002 to 2013.

Commercialization of Bt cotton increased 220-fold in 2013 at 11 million hectares from 50,000 hectares in 2002.

India was estimated to have enhanced farm income from Bt cotton by US\$14.6 billion in the 11-year period 2002 to 2012, and US\$2.1 billion in 2012 alone (Brookes and Barfoot, 2013).



Approval of Events and Bt Cotton Hybrids

Of the 11 million hectares of Bt cotton hybrids, 35% was under irrigation and 65% rainfed.

The Genetic Engineering Appraisal Committee (GEAC) of the Ministry of Environment and Forest (MOEF) approved 6 events of Bt cotton incorporating single and double genes in the 12-year period from 2002 to 2013.

Out of the six approved events, four events were backcrossed with a large number of superior cotton genotypes and released for commercial plantings from 2002 to 2013.

In 2013, a total of four events were approved for incorporation in a total of 213 hybrids in addition to the 884 Bt cotton hybrids approved for sale in 2011, for a total of 1,095 Bt cotton hybrids (excluding one variety and a hybrid of event BNLA-601).

COUNTRY PROFILE

Population: **1,214.5 million**
GDP: **US\$1,727 billion**
GDP per Capita: **US\$1,410**
Agriculture as % GDP: **19%**
Agricultural GDP: **US\$328.3 billion**
% employed in agriculture: **51%**
Arable Land (AL): **174.5 million hectares**
Ratio of AL/Population*: **0.66**

*Ratio: % global arable land / % global population

Major crops:

- Sugarcane
- Rice, paddy
- Wheat
- Vegetables, Fresh
- Potato
- Cotton

Commercialized Biotech Crop: **Bt Cotton**

Total area under biotech crops and (%) increase in 2013:
11.0 Million Hectares (+2%)

Farm income gain from biotech, 2002-2012: **US\$14.6 billion**



Benefits Derived from Bt Cotton

The ICAR's Central Institute of Cotton Research (CICR) Vision 2030 document released in 2011 noted that the development of the first cotton hybrid was one of the most spectacular achievements that had greatly influenced the cotton industry in India (CICR, 2011).

Savings in insecticides between 2004 and 2010 coincided with the large scale adoption of Bt cotton. The sharpest decline in insecticide use was from US\$160 million in 2004 to US\$25 million in 2010 – an 85% decrease, equivalent to a saving of US\$135 million.

The quantity of insecticides used to control bollworm reduced by 96% from 5,748 metric tons of active ingredients in 2001 to 222 metric tons of active ingredients in 2011, when approximately 88% (10.6 million hectares) of the cotton area in 2011 was planted to Bt cotton.

With the steep increase in adoption of Bt cotton between 2002 and 2011, the average yield of cotton in India, which used to have one of the lowest yields in the world, increased from 308 kg per hectare in 2001-02 to 500 kg per hectare in 2011-12, before reaching the highest national cotton yield of 550 kg per hectare in 2013-14; cotton production increased from 13.6 million bales in 2002-03 to 37 million bales in 2013-14. Hence, the country was transformed from a net importer of raw cotton until 2002-03 to net exporter of cotton.



Future Prospects

Five new cotton events are under biosafety assessment, contained field trial and open field testing for new and stacked traits which will be considered for commercial approval in India between 2013 and 2015. Other traits include drought and salinity tolerance, disease resistance, sucking insect resistance, leaf curl virus resistance and other traits related to cotton fiber quality.

Timely approval and deployment of these new biotech cotton traits will provide the technological continuity necessary for developing increasingly improved biotech cotton and generate the momentum for growth. This will ensure prosperity for small cotton farmers in India with the expectation that the country will achieve a national production of 40 million bales by 2015 and a target of 100 million bales by 2030.

In 2012 Kharif season, the Indian Society for Cotton Improvement (ISCI) conducted the largest and most comprehensive survey on Bt cotton covering 2,400 farmers across three agro-ecologically distinct States focusing on rainfed, semi-irrigated and fully irrigated cotton area. The survey confirmed the wide-spread planting of Bt cotton in both rainfed and irrigated areas over a long period of time and observed several key trends in cotton cultivation in India. It confirms that, "Bt technology has decreased pesticide usages, increased cotton productivity and increased farmers' income, and contributed significantly to poverty alleviation. The survey study launched knowledge centric campaign called "An Alert Farmer is An Affluent Farmer".



Excerpts from:

James, Clive. 2013. Global Status of Commercialized Biotech/GM Crops: 2013. ISAAA Brief No. 46. ISAAA: Ithaca, New York.

Other Sources:

Brookes, G and P Barfoot. 2014. GM crops: Global Socio-economic and Environmental Impacts 1996-2012. <http://www.pgeconomics.co.uk/pdf/2014globalimpactstudyfinalreport.pdf/>

The World Bank. <http://www.worldbank.org/>

Food and Agriculture Organization of the United Nations. <http://www.fao.org/countryprofiles/>

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