



In 2017, the adoption of Bt cotton in India reached 93%, planted by 7.5 million farmers among the 10 major cotton growing states.

Since 2015, India has been the world's top cotton producing country, achieving cotton production of 37.7 million bales in 2017, higher than 34.5 million bales in 2016. India produces more than a quarter of the world's cotton.

In 2017, India planted 11.4 million hectares of IR (Bt) cotton, recording an increase of 600,000 hectares from 10.8 million hectares in 2016. The significant increase was due to favorable

market price and weather conditions for cotton cultivation in Kharif 2017.

A total of 7.5 million farmers in India planted 11.4 million hectares IR cotton in 2017, which is 93% of the total 12.24 million hectares of cotton grown in the country.

The increase in IR cotton area and adoption rate showed farmers' resilience to overcome constraints including the

infestation of pink bollworm (PBW) due to the poor quality of unauthorized sale of IR/HT cotton hybrids in India.

It was estimated that around 3.5 million packets of illegal IR/HT cotton expressing both Roundup Ready® events MON1445 and MON88913 were planted on 800,000 hectares in 2017. The unauthorized sale marked a major controversy due to PBW infestation and crop failure in some areas in Maharashtra.



BIOTECH CROPS IN INDIA

Bt technology accelerated the adoption of cotton hybrids in India, from 45% in 2002 to 96% in 2017.

In 2017, the Genetic Engineering Appraisal Committee (GEAC) of the Ministry of Environment, Forests & Climate Change (MOEF&CC) thoroughly assessed the safety and performance of GM mustard and recommended the environmental release of transgenic mustard hybrid Dhara

Mustard Hybrid -11 (DMH-11) and parental lines containing events bn 3.6 and modbs 2.99 developed using *barnase*, *barstar*, and *bar* genes developed by the Centre for Genetic Manipulation of Crop Plants (CGMCP) of the University of Delhi on May 11, 2017 (GEAC, 2017).

GM mustard is India's first state-of-the-art farm innovation that will allow mustard farmers to produce more per unit area. The barnase-barstar technology of GM mustard will accelerate mustard breeding programs of both public and private sectors, resulting in the introduction of high-yielding and superior mustard hybrids capable of revolutionizing mustard farming and edible oil production in the country.

However, on October 26, 2017, the MOEF&CC decided to keep the matters related to the environmental release of transgenic mustard pending further review based on receipt of various representations from different stakeholders (MOEF&CC, 2017).

During their meeting in 2016, the GEAC approved a large number of events for different crops, focusing on cotton, maize, pigeonpea, and chickpea and issued permits for event selection trials and biosafety research trials.

BENEFITS FROM BIOTECH CROPS IN INDIA

A cumulative 75.5 million small-holder cotton farmers planted Bt cotton in the 16-year period showing high repeat decision of planting IR cotton.

Notably, the increase from 50,000 hectares of Bt cotton in 2002 to 10.8 million hectares in 2016, represents an unprecedented 228-fold increase in 14 years.

India was estimated to have enhanced farm income from IR



cotton by US\$21.1 billion in the 14-year period 2002 to 2016, and US\$1.5 billion in 2016 alone.

Fourteen peer-reviewed research studies have been conducted over the years, three studies were conducted prior to the commercialization of Bt cotton from 1998 to 2001, whereas eleven studies were carried out to assess *ex-ante* impact of Bt cotton, which were reported during the post commercialization of Bt cotton from 2002 to 2013. The results of these studies on Bt cotton were consistent with the study undertaken by Gandhi and Namboodiri in 2006 showing yield gains of approximately 31%, a significant 39% reduction in the number of insecticide sprays, leading to an 88% increase in profitability, equivalent to a substantial increase of approximately US\$250 per hectare (Gandhi and Namboodiri, 2006).

CONCLUSION

India has achieved a great stride in cotton production in 2017 with the area planted to IR

cotton increasing by 6% from the previous year.

Insect resistant (Bt) technology in cotton hybrids delivered broad based benefits by saving losses caused by American bollworm and boosting cotton yield to 500 kg lint per hectare.

The next level of cotton yield targeting to achieve the global average cotton yield of 700+ kg lint per hectare can only be possible through the introduction of new generation biotech traits including stacked traits, smart agronomy, and high yielding cotton cultivars.

The recommendation of GEAC on GM mustard, which was based on a thorough assessment of the safety and performance of GM mustard shall not go into oblivion. The moratorium on IR brinjal by MOEF&CC in 2010 has not yielded any outcome in the last seven years, and thus a careful consideration of the recommendation of the regulatory agency on GM crops by MOEF&CC is immensely needed at this time.

SOURCE

ISAAA. 2017. Global Status of Commercialized Biotech/GM Crops in 2017: Biotech Crop Adoption Surges as Economic Benefits Accumulate in 22 Years. *ISAAA Brief No. 53*. ISAAA: Ithaca, New York.

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