



Biotech Crop Highlights in 2016





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In 2016, the 21st year of commercialization of biotech crops, 185.1 million hectares of biotech crops were planted by ~18 million farmers in 26 countries. From the initial planting of 1.7 million hectares in 1996 when the first biotech crop was commercialized, the 185.1 million hectares planted in 2016 indicates ~110-fold increase (Table 1). Thus, biotech crops are considered as the fastest adopted crop technology in the history of modern agriculture.

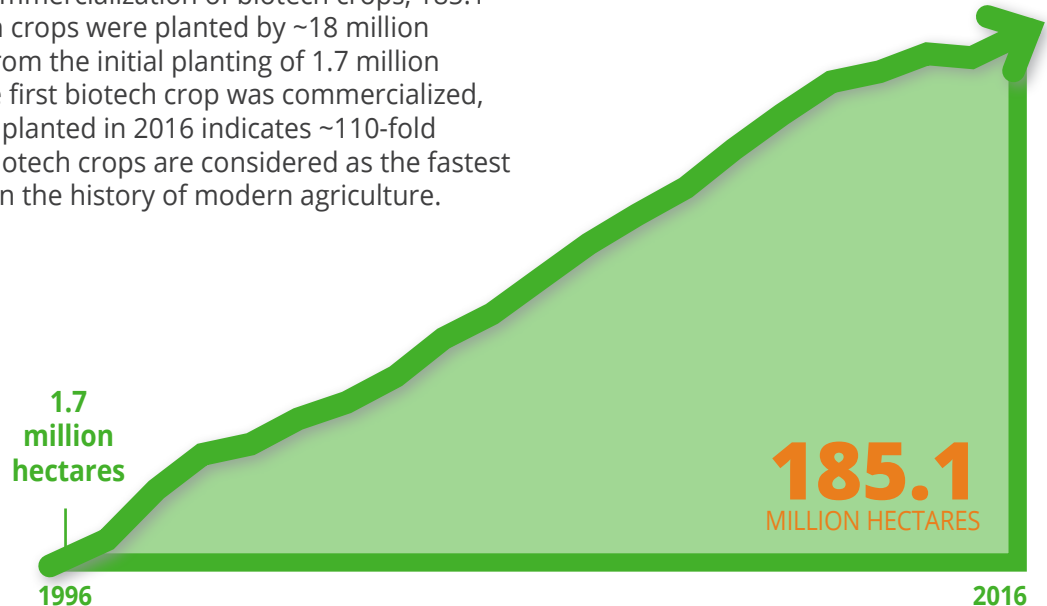


FIGURE 1. GLOBAL AREA OF BIOTECH CROPS, 1996 TO 2016 (MILLION HECTARES).

Source: ISAAA, 2016



Table 1. Global Area of Biotech Crops, 1996 to 2016

Year	Hectares (Million)	Acres (Million)
1996	1.7	4.3
1997	11.0	27.5
1998	27.8	69.5
1999	39.9	98.6
2000	44.2	109.2
2001	52.6	130.0
2002	58.7	145.0
2003	67.7	167.2
2004	81.0	200.0
2005	90.0	222.0
2006	102.0	250.0
2007	114.3	282.0
2008	125.0	308.8
2009	134.0	335.0
2010	148.0	365.0
2011	160.0	395.0
2012	170.3	420.8
2013	175.2	433.2
2014	181.5	448.0
2015	179.7	444.0
2016	185.1	457.4
Total	2,149.7	5,312.0

Source: ISAAA, 2016.

Biotech Crops in Industrial and Developing Countries

For the past five years, developing countries have planted more biotech crops than the industrial countries (Figure 2). In 2016, 19 developing countries planted 54% (99.6 million hectares) of the global biotech hectares, while 7 industrial countries took the 46% (85.5 million hectares) share. This trend is expected to continue in the upcoming years due to the increasing number of countries in the southern hemisphere adopting biotech crops and the commercialization of new biotech crops such as rice, which is mostly grown in developing countries.

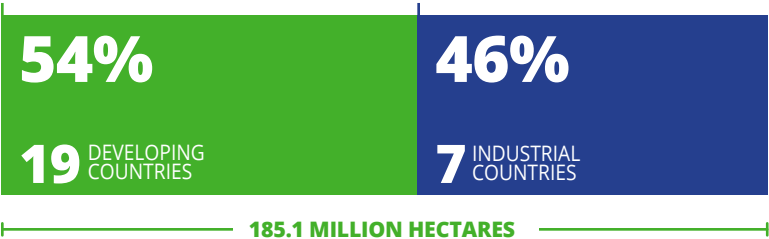


FIGURE 2.
DISTRIBUTION OF BIOTECH CROPS IN DEVELOPING AND INDUSTRIAL COUNTRIES IN 2016

Source: ISAAA, 2016



Distribution of Biotech Crops, by Country

Of the 26 countries that planted biotech crops in 2016, 18 countries were considered as biotech mega-countries, which grew at least 50,000 hectares. USA remained as top producer of biotech crops globally, which planted 72.9 million hectares in 2016, covering

39% of the global biotech crop plantings. Brazil landed on the second spot, with 49.1 million hectares or 27% of the global output. Brazil also had the highest biotech crop growth from 2015 to 2016 with a 4.9% increase.

Table 2. Global Area of Biotech Crops in 2015 and 2016: by Country (million hectares)

Rank	Country	2015	2016
1	USA*	70.9	72.9
2	Brazil*	44.2	49.1
3	Argentina*	24.5	23.8
4	Canada*	11.0	11.6
5	India*	11.6	10.8
6	Paraguay*	3.6	3.6
7	Pakistan*	2.9	2.9
8	China*	3.7	2.8
9	South Africa*	2.3	2.7
10	Uruguay*	1.4	1.3
11	Bolivia*	1.1	1.2
12	Australia*	0.7	0.9
13	Philippines*	0.7	0.8
14	Myanmar*	0.3	0.3

Rank	Country	2015	2016
15	Spain*	0.1	0.1
16	Sudan*	0.1	0.1
17	Mexico*	0.1	0.1
18	Colombia*	0.1	0.1
19	Vietnam	<0.1	<0.1
20	Honduras	<0.1	<0.1
21	Chile	<0.1	<0.1
22	Portugal	<0.1	<0.1
23	Bangladesh	<0.1	<0.1
24	Costa Rica	<0.1	<0.1
25	Slovakia	<0.1	<0.1
26	Czech Republic	<0.1	<0.1
Total		179.7	185.1

*Biotech mega-countries which grew more than 50,000 hectares, or more.

**Rounded-off to the nearest hundred thousand.

Source: ISAAA, 2016.



Global Adoption of Biotech Soybean, Maize, Cotton, and Canola

The most planted biotech crops in 2016 were soybean, maize, cotton, and canola. Although there was only 1% increase in the planting of biotech soybean, it maintained its high adoption rate of 50% of the global biotech crops or 91.4 million hectares. This area is 78% of the total soybean production worldwide (Figure 3).

A significant increase of 13% was recorded for the global adoption rate of biotech maize from 2015. Biotech maize occupied 60.6 million hectares globally, which was 64% of the global maize production in 2016.

Biotech cotton was planted to 22.3 million hectares in 2016, which indicates a decrease by 7% from 2015. This reduction is attributed to the low global cotton prices, which also affected the global planting of non-biotech cotton.

Biotech canola increased by 1% from 8.5 million hectares in 2015 to 8.6 million hectares in 2016. This raise is attributed to the marginal increases in biotech canola plantings in the USA, Canada, and Australia, addressing the demand for edible oil.

In 2016, farmers in the USA and Canada planted biotech alfalfa. Approximately 1.2 million hectares of herbicide tolerant alfalfa and 21,000 hectares of low lignin alfalfa were planted in the US, while Canada planted ~1,000 low lignin

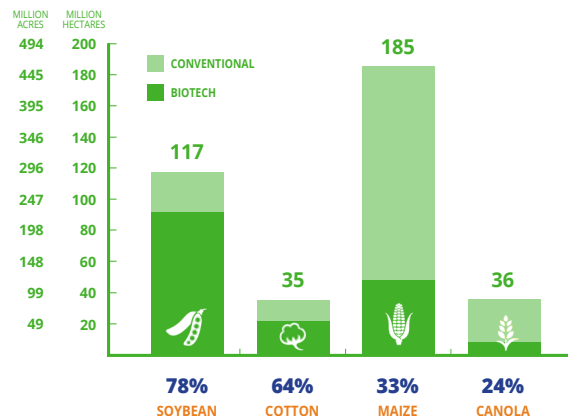


FIGURE 3. GLOBAL ADOPTION RATES (%) FOR TOP 4 BIOTECH CROPS (MILLION HECTARES)

Source: ISAAA, 2016

alfalfa. Low lignin alfalfa was first commercialized in 2016, and offers 15 to 20% increase in yield.

Aside from soybean, maize, cotton, canola, and alfalfa, the following biotech crops were also planted in different countries: sugar beet, squash, papaya, eggplant, and potato.



The Global Value of Biotech Crops

According to Cropnosis, the global market value of biotech crops in 2016 was US\$15.8 billion. This value indicates that there was a 3% increase in the global market value of biotech crops from 2015, which was US\$15.3 billion. This value represents 22% of the US\$73.5 billion global crop protection market in 2016,

and 35% of the US\$45 billion global commercial seed market. The estimated global farmgate revenues of the harvested commercial “end product” (the biotech grain and other harvested products) are more than ten times greater than the value of the biotech seed alone.

Future Prospects

As crop biotechnology faces the third decade of commercialization, new innovations are expected to transform the development of biotech crops and traits. This is manifested by the increasing use of stacked traits, the new generation of biotech crops that does not only address farmers' concerns but also consumers' preference and nutritional needs, and the amplified use of gene discovery in crop improvement and development of new varieties.

Together with conducive and harmonized regulations, crop biotechnology innovations can help double food production to address the needs of the growing global population, especially those in the developing countries.





POCKET K NO. 16 Biotech Crop Highlights in 2016

Pocket Ks are Pockets of Knowledge, packaged information on crop biotechnology products and related issues available at your fingertips. They are produced by the Global Knowledge Center on Crop Biotechnology (<http://www.isaaa.org/kc>).

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For more information, contact:

International Service for the Acquisition of Agri-biotech Applications (ISAAA) *SEAsia*Center
c/o IRRI, DAPO Box 7777, Metro Manila, Philippines.

Tel.: +63 49 5367933

Telefax: +63 49 7216

E-mail: knowledge.center@isaaa.org

Visit ISAAA website at:
<http://www.isaaa.org/>



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