Pocket K No. 16: Biotech Crop Highlights in 2018

In 2018, the 22nd year of commercialization of biotech crops, 191.7 million hectares of biotech crops were planted by up to 17 million farmers in 26 countries. From the initial planting of 1.7 million hectares in 1996 when the first biotech crop was commercialized, the 191.7 million hectares planted in 2018 indicates ~113-fold increase (Table 1). Thus, biotech crops are considered as the fastest adopted crop technology in the history of modern agriculture.

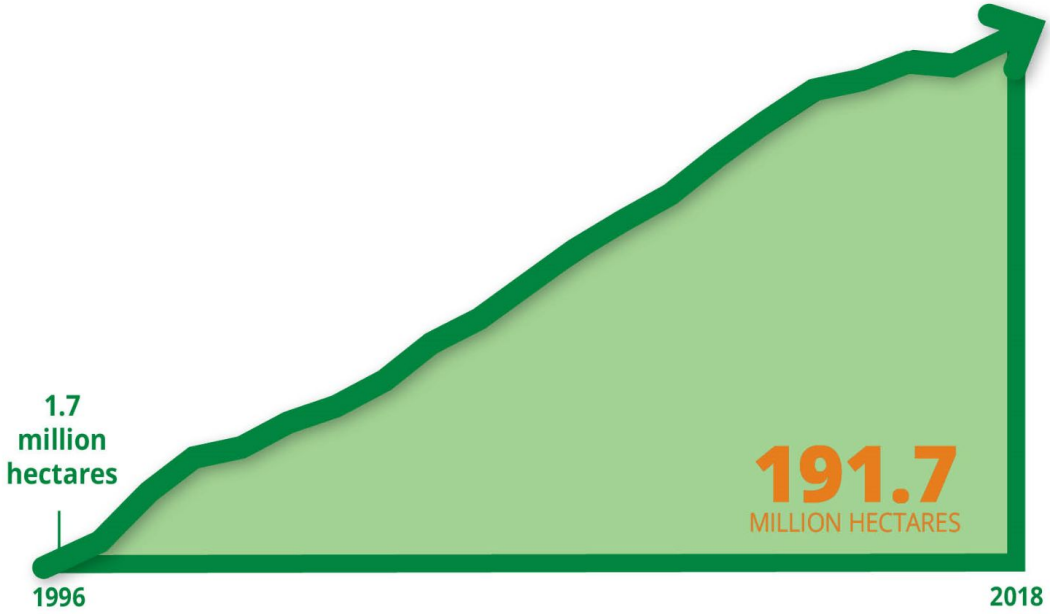

FIGURE 1. GLOBAL AREA OF BIOTECH CROPS, 1996 TO 2018 (MILLION HECTARES).

Source: ISAAA, 2018

Table 1. Global Area of Biotech Crops, 1996 to 2018

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
2017	189.8	469.0
2018	191.7	473.7
Total	**2,339.5**	**5,780**

Source: ISAAA, 2018.

Biotech Crops in Industrial and Developing Countries

For the past seven years, developing countries have planted more biotech crops than industrial countries (Figure 2). In 2018, 21 developing countries planted 54% (103.1 million hectares) of the global biotech hectares, while 5 industrial countries took the 46% (88.6 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.

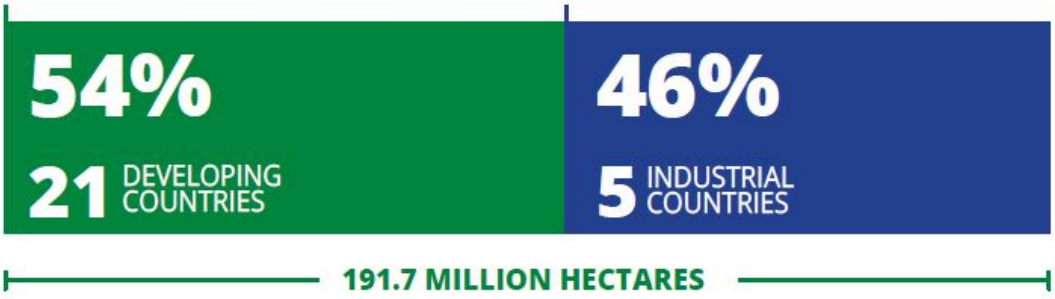

FIGURE 2.
DISTRIBUTION OF BIOTECH CROPS IN DEVELOPING AND INDUSTRIAL COUNTRIES IN 2018

Source: ISAAA, 2018

Distribution of Biotech Crops, by Country

Of the 26 countries that planted biotech crops in 2018, 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 75 million hectares in 2018, covering 39% of the global biotech crop plantings. Brazil landed on the second spot, with 51.3 million hectares or 27% of the global output.

Table 2. Global Area of Biotech Crops in 2017 and 2018: by Country (million hectares)

Rank	Country	2017	2018
1	USA*	75.0	75.0
2	Brazil*	50.2	51.3
3	Argentina*	23.6	23.9
4	Canada*	13.1	12.7
5	India*	11.4	11.6
6	Paraguay*	3.0	3.8
7	China*	2.8	2.9
8	Pakistan*	3.0	2.8
9	South Africa*	2.7	2.7
10	Uruguay*	1.1	1.3
11	Bolivia*	1.3	1.3
12	Australia*	0.9	0.8
13	Philippines*	0.6	0.6
14	Myanmar*	0.3	0.3
15	Sudan*	0.2	0.2
16	Mexico*	0.1	0.2
17	Spain*	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	Indonesia	--	<0.1
26	eSwatini	--	<0.1
	Total	**189.8**	**191.7**

*Biotech mega-countries which grew more than 50,000 hectares, or more.
**Rounded-off to the nearest hundred thousand.

Source: ISAAA, 2018

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

The most planted biotech crops in 2018 were soybean, maize, cotton, and canola. Although there was only 2% increase in the planting of biotech soybean, it maintained its high adoption rate of 50% of the global biotech crops or 95.9 million hectares. This area is 78% of the total soybean production worldwide (Figure 3).

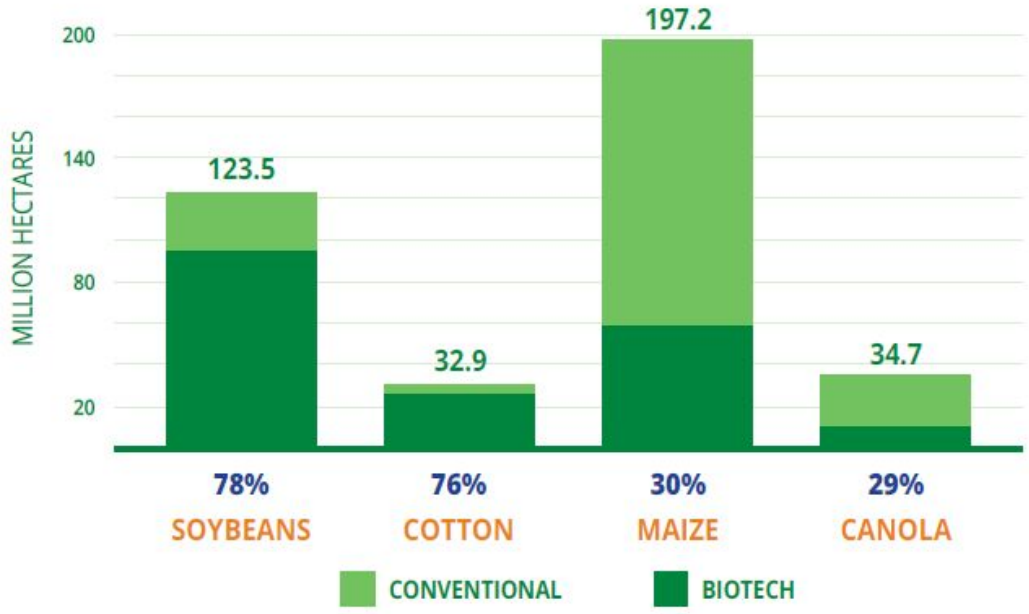

FIGURE 3. GLOBAL ADOPTION RATES (%) FOR TOP 4 BIOTECH CROPS (MILLION HECTARES)

Source: ISAAA, 2018

Biotech maize occupied 58.9 million hectares globally, which was 31% of the global maize production in 2018. A slight decline (1%) in the biotech maize area from 2017 is due to the unfavorable weather conditions in Latin America, low market price, lesser pest incidence, high year-end stocks and the problem of counterfeit seeds in the Philippines.

Biotech cotton was planted to 24.9 million hectares in 2017, which indicates a decrease by 3% from 2017. The 3% increase in total biotech cotton area globally was due mainly to the improved global market value and the high adoption rate of insect resistant/herbicide tolerant cotton in 2018.

Biotech canola decreased by 1% from 10.2 million hectares in 2017 to 10.1 million hectares in 2018. There was reduced planting in the USA and Canada due to lesser demand from growers in the northern hemisphere.

In 2018, farmers in the USA and Canada planted a total of 1.26 million biotech alfalfa, which is a 3.3% higher than 2017 area. Approximately 1.14 million hectares of herbicide tolerant alfalfa and 120,000 hectares of low lignin alfalfa were planted in the US, while Canada planted 4,000 hectares low lignin 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: papaya, eggplant, potato, apple, safflower, pineapple, and sugarcane.

The Global Value of Biotech Crops

According to Cropnosis, the global market value of biotech crops in 2017 was US$17.2 billion. This value indicates that there was a 9% increase in the global market value of biotech crops from 2016, which was US$15.8 billion. This value represents 23.9% of the US$70.9 billion global crop protection market in 2016, and 30% of the US$56.02 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

The continuous growth in the adoption of biotech crops is attributed to the technology's positive impact on the environment, human and animal health, as well as on the improvement of socioeconomic conditions of farmers and the general public. However, critics continue to spread non-scientific allegations about biotech crops that affect regulations and approvals. Studies have confirmed that delays in biotech crop approvals lead to immense economic losses and opportunity costs.

The benefits of biotech crops to farmers and consumers will only continue to be available if there is continuous implementation of science-based regulations, which focus on the benefits such as agricultural productivity with consideration to environmental conservation and sustainability, and most importantly to the large portion of the world population undergoing poverty and malnutrition, who are waiting for improvement in their state of living.

Reference

ISAAA. 2018. Global Status of Commercialized Biotech/GM Crops in 2018. ISAAA *Brief* No. 54. ISAAA: Ithaca, NY.

* Updated December 2019