Pocket K No. 16

Biotech Crop Highlights in 2015

2015 is the 20th year of commercialization of biotech crops. From the initial planting of 1.7 million hectares in 1996 to 179.7 million hectares in 2015, it was a remarkable 100-fold increase since start of commercialization. Thus, biotech crops are considered as the fastest adopted crop technology in the history of modern agriculture.

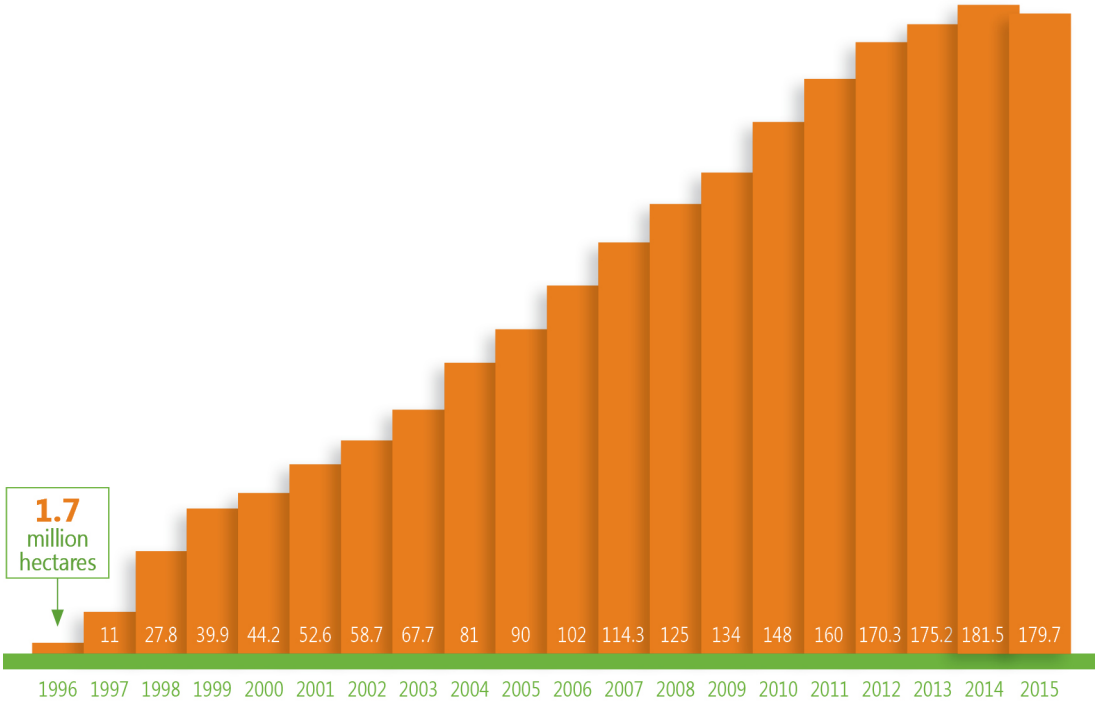

Figure 1. Global Area of Biotech Crops, 1996 to 2015 (million hectares).
Source: Clive James, 2015.

In 2015, ~18 million farmers planted biotech crops in 28 countries, wherein over 54% or about 97.1 million hectares were planted by small and resource-poor farmers from developing countries. The highest increase in any country, in absolute hectarage growth was Brazil with 2 million hectares.

In summary, during the period of 1996 to 2015, biotech crops have been successfully grown in accumulated hectarage of 1.96 billion hectares (4.85 billion acres).

Table 1. Global Area of Biotech Crops, 1996 to 2015

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
Total	**1,964.6**	**4,854.6**

Source: Clive James, 2015.

Distribution of Biotech Crops in Industrial and Developing Countries

Figure 2 shows the relative area of biotech crops in industrial and developing countries from 1996-2015. In 2015, for the fourth year, more than half (54%) of the global biotech crop area of 179.7 million hectares, equivalent to 97.1 million hectares, was grown in 20 developing countries. In 2015, year-to-year growth was higher in developing countries at 0.9 million hectares (1%) than in industrial countries which were reduced by 3% (2.7 million hectares). This is attributed to the increase in soybean plantings in Brazil and Argentina, as well as cotton plantings in Pakistan, Myanmar, and Sudan. Thus year-to-year growth was significantly faster in developing countries in 2015 and maintained a larger share of global biotech crops at 54% compared with only 46% for industrial countries.

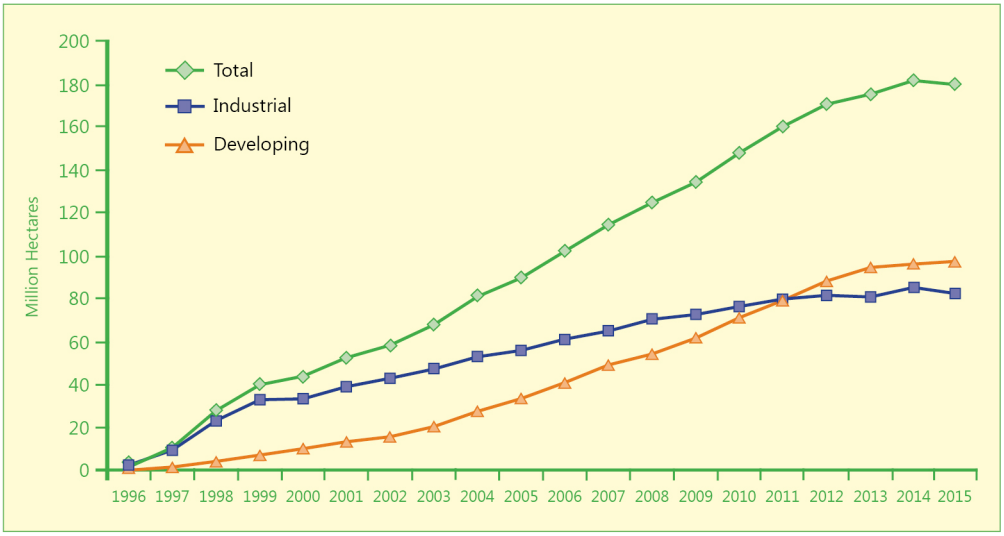

Figure 2. Global Area of Biotech Crops, 1996 to 2015: Industrial and Developing Countries (Million Hectares)

Source: Clive James, 2015.

Distribution of Biotech Crops, by Country

Biotech crops were grown commercially in all six continents of the world. Of the 28 countries planting biotech crops in 2015, 19 countries planted 50,000 hectares or more to biotech crops (Table 2). These mega-countries include the USA, Brazil, Argentina, India, Canada, China, Paraguay, Pakistan, South Africa, Uruguay, Bolivia, Philippines, Australia, Burkina Faso, Myanmar, Mexico, Spain, Colombia, and Sudan.

Table 2. Global Area of Biotech Crops in 2014 and 2015: by Country (million hectares)

Rank	Country	2014	2015
1	USA*	73.1	70.9
2	Brazil*	42.2	44.2
3	Argentina*	24.3	24.5
4	India*	11.6	11.6
5	Canada*	11.6	11.0
6	China*	3.9	3.7
7	Paraguay*	3.9	3.6
8	Pakistan*	2.9	2.9
9	South Africa*	2.7	2.3
10	Uruguay*	1.6	1.4
11	Bolivia*	1.0	1.1
12	Philippines*	0.8	0.7

13	Australia*	0.5	0.7
14	Burkina Faso*	0.5	0.4
15	Myanmar*	0.3	0.3
16	Mexico*	0.2	0.1
17	Spain*	0.1	0.1
18	Colombia*	0.1	0.1
19	Sudan*	0.1	0.1
20	Honduras	<0.1	<0.1
21	Chile	<0.1	<0.1
22	Portugal	<0.1	<0.1
23	Vietnam	<0.1	<0.1
24	Czech Republic	<0.1	<0.1
25	Slovakia	<0.1	<0.1
26	Costa Rica	<0.1	<0.1
27	Bangladesh	<0.1	<0.1
28	Romania	<0.1	<0.1
	Total	**181.5**	**179.7**

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

Source: Clive James, 2015.

Global Adoption of Biotech Soybean, Maize, Cotton and Canola

To provide a global perspective of the status of biotech crops, the global adoption rates as a percentage of the respective global areas of the four principal crops – soybean, cotton, maize, and canola, is presented below.

In 2015, 83% (92.1 million hectares) of the 111 million hectares of the soybean planted globally were biotech (Figure 3). Biotech cotton was planted to 24 million hectares, which is 78% of the global cotton hectarage. Of the 185 million hectares of global maize planted in 2015, 29% or 53.6 million hectares were biotech maize. Finally, herbicide tolerant biotech canola was planted in

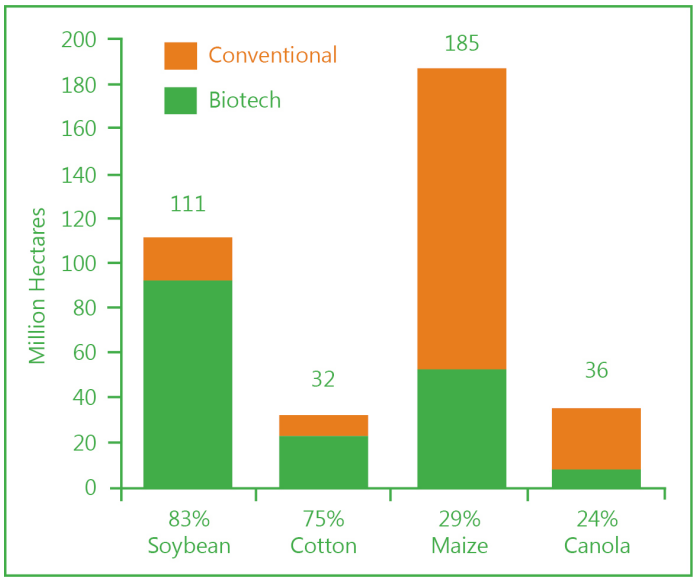

Figure 3. Biotech Crop Area as % of Global Area of Principal Crops, 2015 (Million Hectares)

Global Hectarages Data for 2015 (FAO, 2013)
Source: Compiled by Clive James, 2014.

8.5 million hectares or 24% of the 36 million hectares of canola grown globally in 2015. If the global areas (conventional and biotech) of these four crops are aggregated, the total area is 364 million hectares, of which 49% or 179.7 million hectares were biotech. These adoption figures should be viewed as indication of adoption, not as precise estimates of adoption globally for the four crops.

The Global Value of Biotech Crops

In 2015, the global market value of biotech crops was US$15.3 billion representing 20% of the US$76.2 billion global crop protection market in 2015, and 34% of the ~US$45 billion global commercial seed market. Of the US$15.3 billion biotech crop market, US$10.9 billion (72%) was in the industrial countries and US$4.4 billion (28%) was in the developing countries. The market value of the global biotech crop market is based on the sale price of biotech seeds plus any technology fees that apply. The accumulated global value of biotech crops since 1996 is estimated at US$148,808 million.

Future Prospects

The high rates of adoption of major biotech crops leave little room for expansion in mature markets in principal biotech crop countries. However, there is significant potential for selected products such as biotech maize.

New biotech crops are in the pipeline, which may be available in five years or more, depending on regulatory approval process. These include products with multiple modes of resistance to pests/diseases and tolerance to herbicides, Vitamin A-enriched rice, drought tolerant maize, biofortified bananas and pest resistant cowpea.

New genome-editing techniques such as CRISPR offer timely and potent advantages over conventional and biotech crops in terms of precision, speed, cost and regulation. Genome-edited products logically lend themselves for science-based, fit for purpose, and proportionate regulation.

Reference

James, C. 2015. 20th Anniversary (1996 to 2015) of the Global Commercialization of Biotech Crops and Biotech Crop Highlights in 2015. ISAAA Brief No. 51. ISAAA: Ithaca, NY.

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