

Future Prospects

Responsible stewardship allowed the first decade of biotech crops to be ushered in without any of the dire outcomes predicted by the opponents of the technology. In 2005, an important historic milestone was reached when the one-billionth acre (400 millionth hectare) of biotech crops was planted during the year that marked the tenth anniversary of biotech crops. The global number and proportion of small farmers from developing countries growing biotech crops is expected to increase dramatically in the next decade (2006-2015) as staple crops of biotech rice and maize are adopted by hundreds of millions of small farmers in Asia to meet their food/feed crop requirements and meat demands of their burgeoning and more affluent populations. A similar trend will apply to the less affluent and more agriculturally-based countries of Eastern Europe, such as the Czech Republic, which has recently joined the European Union, and those expected to join in 2007 and beyond. There were also signs of progress in the EU in 2005, as five countries, Spain, Portugal, Germany, France and the Czech Republic, commercialized Bt maize; and as the European Commission approved 17 maize varieties, with insect resistance conferred by MON 810, making it the first biotech crop to be approved for planting in all 25 EU countries. Taking all these global developments in both industrial and developing countries into account, the outlook for the period 2006 to 2010 points to continued growth in the global hectareage of biotech crops, up to 150 million hectares, with at least 15 million farmers growing biotech crops in up to 30 countries, or more.

Future Prospects

The Global Value of Biotech Crops

In 2005, the global market value of biotech crops was \$5.25 billion, representing 15% of the \$34.02 billion global crop protection market in 2005, and 18% of the ~\$30 billion 2005 global commercial seed market. The market value was based on the sale price of biotech seed and any technology fees that applied. The accumulated global value for the ten-year period, since biotech crops were first commercialized in 1996, is estimated at \$29.3 billion. The global value of the biotech crop market is projected at over \$5.5 billion for 2006.

Table 1. Global Area of Biotech Crops, 1996 to 2005

	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
TOTAL	474.6	1,173.3

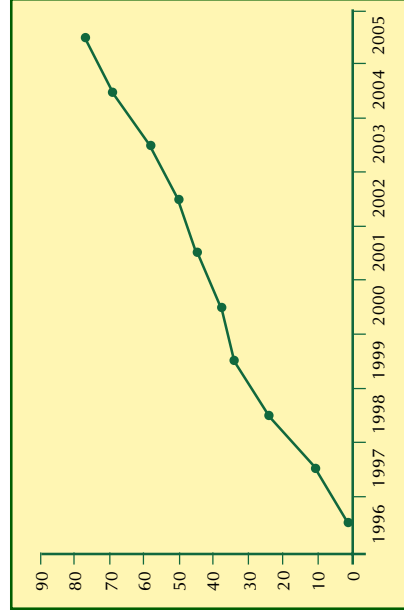
Increase of 11%, 9.0 million hectares or 22 million acres between 2004 and 2005.

Source: Clive James, 2005.

industrial and developing countries. The number of countries growing biotech crops tripled during the same nine-year period, increasing from 6 in 1999 to 9 in 1998, to 12 countries in 1999, to 21 in 2005.

In summary, during the period 1996 to 2005, an accumulated global biotech crop area of 475 mha (1.17 billion acres) was grown, equivalent to almost half of the total land area of the USA or China, or 20 times the total land area of the UK. Farmers have signaled their strong vote of confidence in crop biotechnology by consistently increasing their plantings of biotech crops by double-digit growth rates every year since biotech crops were first commercialized in 1996.

Figure 1. Global Area of Biotech Crops, 1996 to 2005 (Million Hectares)



Source: Clive James, 2005.

The global area of biotech crops increased more than 50 fold during the ten-year period from 1996 to 2005, from 1.7 million hectares in 1996 to 90.0 million hectares in 2005 (Figure 1). This rate of adoption is one of the highest rates of crop technology adoption in agriculture and reflects the growing acceptance of biotech crops by farmers in both

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>). For more information, please contact the International Service for the Acquisition of Agri-biotech Applications (ISAAA) SEAsia Center c/o IRRI, DAPD Box 7777, Metro Manila, Philippines.

Tel: +63 2 8450563
 Fax: +63 2 8450606
 E-mail: knowledge.center@isaaa.org

Revised January 2006



INTERNATIONAL SERVICE
 OF AGR-BIOTECH
 APPLICATIONS

Global Status of Commercialized Biotech/GM Crops in 2005

The year 2005 marks the first decade of the commercialization of genetically modified (GM) or biotech crops. 2005 also saw the planting of the billionth acre of biotech crops by one of 8.5 million farmers around the globe.

The year saw a total of 90.0 million hectares (mha) planted to biotech crops, representing a sustained double-digit growth rate of 11%, or an increase of 9 mha (see Figure 1). Biotech crops were grown by approximately 8.5 million farmers in 21 countries, 90% of whom were resource-poor farmers from developing countries, whose increased incomes from biotech crops contributed to the alleviation of poverty.

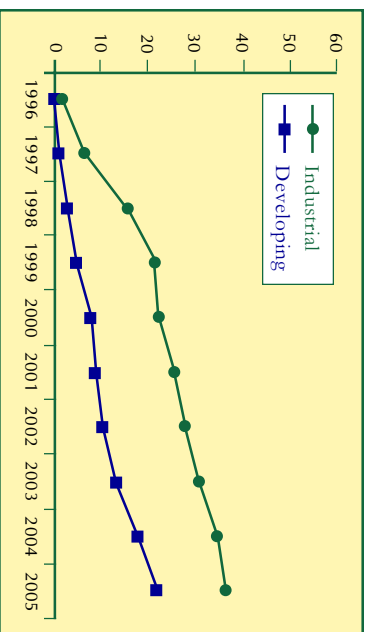


**Global Status
 of Commercialized
 Biotech/GM Crops
 in 2005**

GLOBAL KNOWLEDGE CENTER
 ON CROP BIOTECHNOLOGY

Distribution of Biotech Crops in Industrial and Developing Countries

Figure 2 shows the relative area of biotech crops in industrial and developing countries from 1996-2005. In 2005, more than one third of the global biotech crop area, equivalent to 33.9 million hectares, was grown in developing countries. While a substantial share (62%) is grown in industrial countries, the proportion of biotech crops grown in developing countries has increased consistently every year, with continued strong growth reported by China, India, and the Philippines in Asia; as well as by Argentina, Brazil, and Mexico, plus Uruguay and Paraguay in Latin America; and South Africa on the African continent. The percentage growth was almost five times as high (233%) in the developing countries of the South, compared to that of the industrial countries of the North (5%).



Source: Clive James, 2005.

Distribution of Biotech Crops, by Country

There were 21 countries planting 50,000 hectares or more to biotech crops in 2005. (See Table 2). These mega-countries included the USA, Argentina, Brazil, Canada, China, Paraguay, India, South Africa, Uruguay, Australia, Mexico, Romania, the Philippines, Spain, Colombia, Iran, Honduras, Portugal, Germany, France, and the Czech Republic, reflecting a more balanced and stabilized participation of a broader group of countries adopting biotech crops.

India had the highest percentage year-on-year growth in 2005, with an increase of 160% in Bt cotton area over 2004, followed by Brazil (88%), Paraguay (50%), Canada (7%), Argentina (6%), and the USA at 5%.

In 2004, for the first time, Paraguay reported 1.2 million hectares of biotech soybean, equivalent to 60% of its national soybean hectareage of 2 million hectares. It increased its adoption rate in 2005 by 50% to reach 1.8 million hectares, equivalent to 85% of its national soybean hectareage of 2.1 million hectares.

Country	2004	2005
USA*	47.6	49.8
Argentina*	16.2	17.1
Brazil**	5.0	9.4
Canada*	5.4	5.8
China*	3.7	3.3
Paraguay*	1.2	1.8
India*	0.5	1.3
South Africa*	0.5	0.5
Uruguay*	0.3	0.3
Australia*	0.2	0.3
Mexico*	0.1	0.1
Romania*	0.1	0.1
Philippines*	<0.1	0.1
Spain*	<0.1	0.1
Colombia	<0.1	<0.1
Iran	-	<0.1
Honduras	<0.1	<0.1
Portugal	-	<0.1
Germany	<0.1	<0.1
France	-	<0.1
Czech Republic	-	<0.1
TOTAL	81.0	90.0

Source: Clive James, 2005.

* Biotech mega-countries which grew more than 50,000 hectares, or more, of biotech crops in 2005.

Dominant Biotech Crops in 2005

Herbicide tolerant soybean continued to be the dominant biotech crop in 2005, occupying 54.4 mha, and representing 60% of the global biotech crop area of 90.0 mha for all crops (Table 3). It was grown commercially in the USA, Argentina, Brazil, Paraguay, Canada, Uruguay, Romania, South Africa, and Mexico.

The second most dominant crop was Bt maize, which occupied 11.3 mha, equivalent to 13% of the global biotech crop area. It was grown commercially in the USA, Argentina, Canada, South Africa, the Philippines, Spain, Uruguay, Honduras, Portugal, Germany, France, and the Czech Republic.

The third most dominant crop was Bt/Herbicide maize, up from sixth in 2004. It was grown over 6.5 million hectares

Table 3. Dominant Biotech Crops in 2005

	Million Hectares	% Biotech
Herbicide tolerant Soybean	54.4	60
Bt Maize	11.3	13
Bt/ Herbicide tolerant Maize	6.5	7
Bt cotton	4.9	5
Herbicide tolerant Canola	4.6	5
Bt/ Herbicide tolerant Cotton	3.6	4
Herbicide tolerant Maize	3.4	4
Herbicide tolerant Cotton	1.3	2
TOTAL	90.0	100%

Source: Clive James, 2005.

in the USA and Canada. This is equivalent to 7% of the global biotech area.

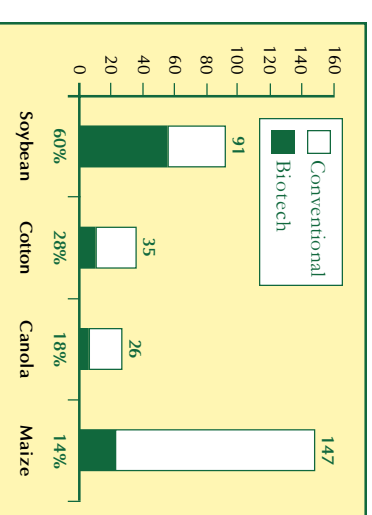
Global Adoption of Biotech Soybean, Maize, Cotton, and Canola

Another way to provide a global perspective of the status of biotech crops is to characterize the global

adoption rates as a percentage of the respective global areas of the four principal crops – soybean, cotton, canola, and maize – in which transgenic technology is utilized.

The data in Figure 3 indicate that in 2005, 60% of the 91 million hectares of soybean planted globally were biotech – up from 56% in 2004, despite an increase in the global area of soybean from 86 million hectares in 2004 to 91 million hectares in 2005. Of the 35 million hectares of cotton, 28% or 9.8 million hectares were planted to biotech cotton in 2005. The area planted to biotech canola, expressed on a percentage basis, was 18%, of the 26 million hectares of canola planted globally in 2005. Similarly, of the 147 million hectares of maize planted in 2005, 14% increase in the global area of maize from 143 million hectares in 2004 to 147 million hectares in 2005. If the global areas

Figure 3. Biotech Crop Area as % of Global Area of Principal Crops, 2005 (Million Hectares)



Source: Clive James, 2005.

(conventional and biotech) of these four crops are aggregated, the total area is 299 million hectares, of which 30% were biotech – up significantly from 29% in 2004.