

# A Synopsis of US Consumer Perception of Genetically Modified (Biotech) Crops<sup>1</sup>

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## Introduction

Over the last few decades, the use of modern tools of molecular biology has made it possible to discover, isolate, and introduce several important agricultural traits (useful to both farmers and consumers) in cultivated crops. Such improvements are usually accomplished by the technique known as genetic engineering. Genetic engineering (GE), also known as genetic modification (GM), is the process by which an organism's genome (the entirety of an organism's hereditary information) is deliberately modified by inserting, altering, and/or isolating a specific segment of DNA that contains a gene or genes of interest, with the aim of introducing a new trait or suppressing an undesirable one. Crops obtained by using GE techniques are also commonly known as Genetically Modified (GM) crops, or biotech crops. The main advantage of the application of this technique is that it greatly shortens the time of crop development and improves the certainty of the outcome, compared with conventional crop development methods such as crop breeding.

To date, there are more than 30 commercial GM crops grown on almost 160 million hectares of land in 29 countries. Moreover, it is expected that by 2015, there will be more than 120 GM crops (Stein and Rodriguez-Cerezo 2010; James 2008). ...



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Despite the fact that GM crops are widely grown, public opinion is mixed. While the European Union (EU) is very critical of GM crops, most of the other countries are either indifferent or favor GM and related products (products derived from GM ingredients) (Stein and Rodriguez-Cerezo 2010). Genetic modification crop research continues to be important...

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## Classification of GM Research ...

### World Situation

Commercial cultivation of GM crops began in 1996 and has been expanding ever since. Between 2001 and 2011, the global GM crop area increased at an annual rate of 20.41 percent, from 52.6 million hectares (MH) to 160 million hectares, representing about 8.65 percent of the total global crop area of 1.84 billion hectares that year (FAOSTAT 2013). In 2011, about 29 countries cultivated biotech crops, with the United States being the leading world producer of GM crops, with the cultivation of 69 MH, or about 43.1 percent of the global GM production area, followed by Brazil (30.3 MH, 18.93%); Argentina (23.7 MH, 14.81%); India (10.6 MH, 6.62%); and Canada (10.4 MH, 6.50%) (ISAAA 2011). Together, these five countries account for 90 percent of the total area under GM cultivation (Figure 1).

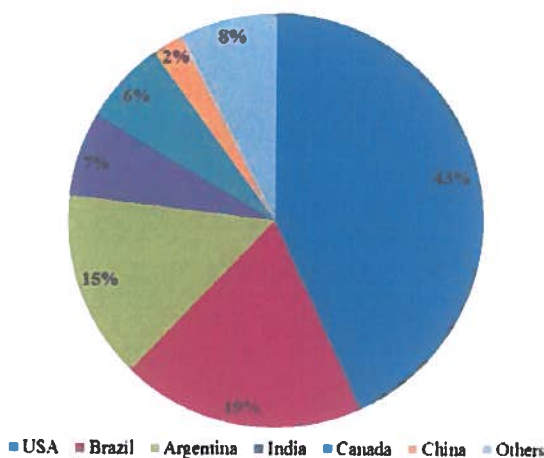


Figure 1. GM crops: Global area, by country, 2011 (%). Source: ISAAA (2011).

In terms of area cultivated, the main GM crops are soybean, maize, cotton, and canola, respectively. Historically, soybean has been the dominant biotech crop cultivated; its harvested area has grown at an annual rate of 12.6 percent, from 33.3 MH in 2001 to 75.4 MH in 2011. Biotech maize follows in importance, growing at an annual rate of 42 percent, from 9.8 MH in 2001 to 51 MH in 2011. Next is biotech cotton, growing at an annual rate of 26.3 percent, from 6.8 MH in 2001 to 24.7 MH in 2011. Finally, GM canola has expanded at an annual rate of 20.4 percent, from 2.7 MH in 2001 to 8.2 MH in 2011 (Figure 2). Other important GM crops include sugar beet, alfalfa, papaya, squash, poplar, tomato, sweet pepper, and potato, which together account for about 0.7 MH (1%) of the

total area under GM crop cultivation (ISAAA 2011).

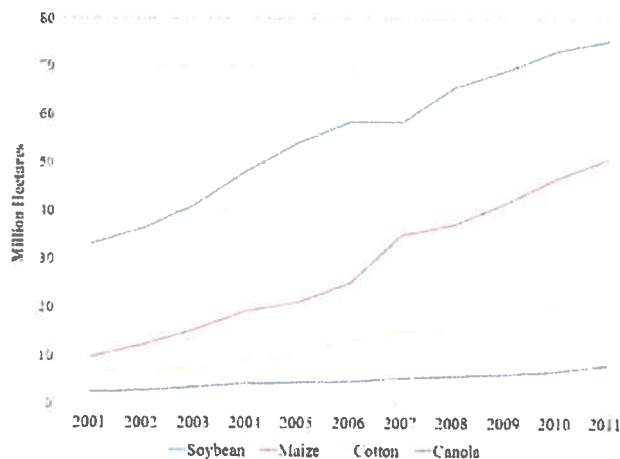


Figure 2. GM crops: Global area, by crop, 2001–2011 (million hectares [MH]). Source: ISAAA (various years).

When considered from an adoption rate perspective, biotech cotton is the global leading crop, followed by soybean, maize, and canola. As illustrated in Figure 3, in 2011, biotech cotton (24.7 MH) accounted for 82 percent of the global area of harvested cotton, followed by biotech maize (32%), biotech canola (26%), and biotech soybean (25%), respectively (ISAAA 2011).

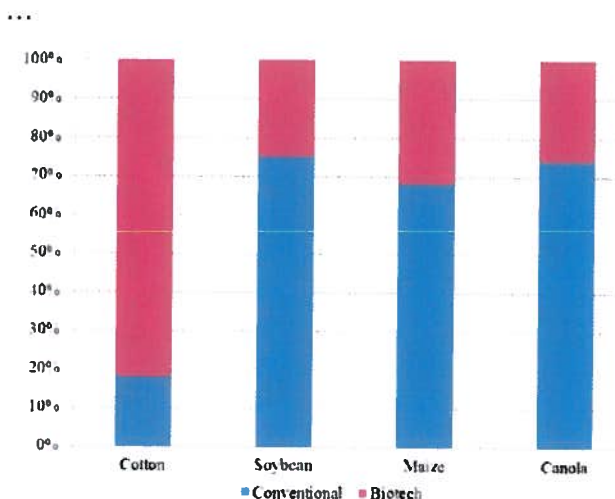


Figure 3. GM crops: Global adoption rates, by crop, 2011 (%). Source: ISAAA (2011).

Notwithstanding, biotech-derived food is considered a controversial issue, prompting government agencies of some developed countries, including some of the EU state members, Japan, Australia, Brazil, Russia, and China, to

implement legislation mandating the labeling of GM food products (Justlabelit.org 2012). ...

## US Situation

### Brief Overview of US GM Food Production, Trade, and Regulatory Framework

Before discussing consumer attitudes toward biotech products, it is important to provide a general overview about the current US GM food production, trade, and regulatory framework for biotech products. The United States is the largest world producer of GM crops. In 2011, the United States accounted for about 43.1 percent of the global biotech crop cultivated area (69 MH). **Biotech crops grown in the United States include corn, soybean, cotton, canola, sugar beet, alfalfa, papaya, and squash** (ISAAA 2011).

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A 2006 study (Heslop 2006) found that that **about 60–70 percent of processed foods sold by supermarkets in North America contain some ingredients derived from GM crops, primarily corn, soy, and canola. This percentage is likely to be much higher in the United States because of the higher adoption rate of biotech varieties of corn and soybean grown there. For crop year 2012, it was reported that about 88 percent of all the corn and 93 percent of all the soybeans grown in the United States came from biotech varieties.** (USDA/ERS 2012).

Many US consumers are unaware of the GM ingredient content in processed foods because federal regulations do not require disclosure of this information. ...

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### US Consumer Attitudes toward Biotech Food

An insight into US consumer attitude toward GM food commodities can be gleaned from a survey conducted by Hallman et al. (2003). Among other things, the authors found that **most Americans were not fully aware of GM foods ... [and] almost 50 percent were unaware that food products made with GM-derived ingredients are currently on supermarket shelves.**

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### Conclusions

... With more than 30 commercial GM crops grown on almost 160 million hectares in 29 countries and the expectation that there will be around 120 GM crops by

2015, it is clear that agro-biotechnology is growing.

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