

# GENETICALLY MODIFIED ORGANISMS: ARE THEY LABELED?



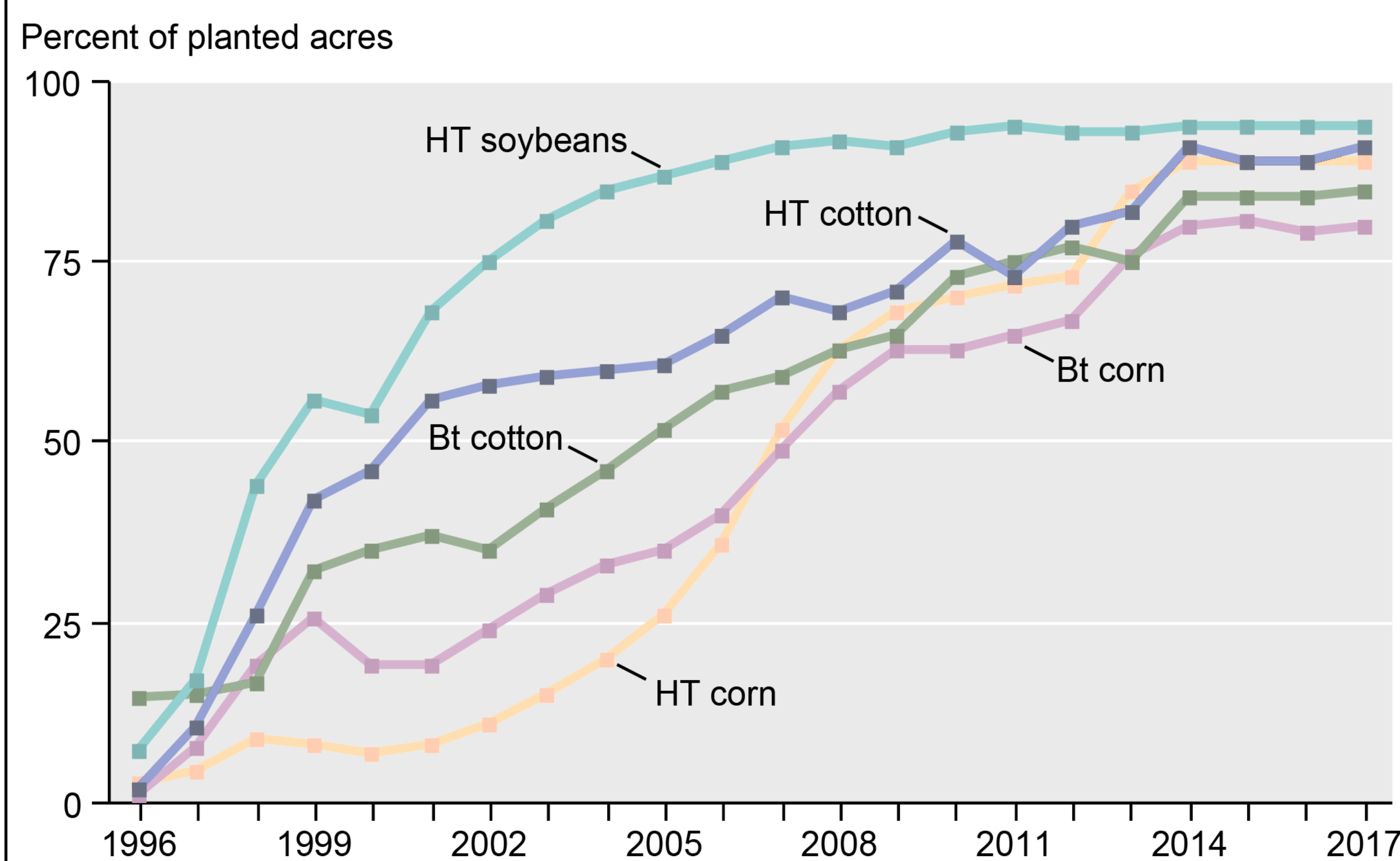
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## BACKGROUND

- In recent years, genetically modified organisms, also known as Amos, have become increasingly popular.
- In a recent study, the United States Department of Agriculture studied the adoption of genetically engineered crops in the United States between 1996 and 2017. Since 2014, every genetically modified crop studied was planted in over seventy-five percent of farm-land in the United States (Figure 1) ("Recent Trends in GE Adoption", 2017).
- Though the percentage of genetically engineered crops has steadily increased over the past twenty years, the genetically modified crops must meet the same standards as non-modified crops in order to be approved by the FDA ("Food from Genetically Engineered Plants", 2017)
- While the usage of genetically engineered crops has increased, consumer knowledge on the subject has been relatively low (Acosta, 2014).

Adoption of genetically engineered crops in the United States, 1996-2017



Data for each crop category include varieties with both HT and Bt (stacked) traits. Sources: USDA, Economic Research Service using data from Fernandez-Cornejo and McBride (2002) for the years 1996-99 and USDA, National Agricultural Statistics Service, June Agricultural Survey for the years 2000-17.

Figure 1: Graph displaying percentage of acres planted with genetically modified organisms based on different crop types.

## SPECIFIC AIM

The specific aim of this study was to discover which products, if any, contained GMOs in addition to if the products were labeled accordingly. I hypothesized that the products tested would be genetically modified but would not be labeled accordingly. Conducting this study is important because I believe that consumers have a right to know if the products they purchase are genetically modified.

## METHODS

Samples of a soy meatball, corn, and papaya, weighing exactly two grams, were added to 10 milliliters of water and ground with a mortar and pestle. 50 microliters of each sample were then placed into tubes containing 500 microliters of InstaGene matrix. In order to extract DNA, 20 microliters of each sample were placed into ten separate Polymerase Chain Reaction (PCR) tubes, with 20 microliters of green Plant Master Mix (PMM) and red GMO Master Mix (GMM), respectively.

In addition to a GeneRuler, 20 microliters of each sample were placed into separate wells in a gel electrophoresis machine, separating the DNA by size.

## RESULTS

- According to the results, a conclusive claim can only be made about the sample containing the soy meatball.
- The sample containing papaya seemingly contained no DNA, as seen in lane 1-2, and therefore, it cannot be conclusive stated if the sample was genetically modified.
- The sample containing the corn was also inconclusive due to an error inserting the sample into the electrophoresis gel, as seen in lane 1-3.
- The soy meatball displayed similar bands as the GMO+ GMO Master Mix, with lengths of 200 base pairs.

## CONCLUSIONS

The purpose of this experiment was to discover which products, if any, contained GMOs and if the products were labeled accordingly. Based on the data collected, it can be concluded that some products may contain GMOs while the packaging may not be labeled, notifying the consumer of the products contents. Knowing this information, we can assume that other products containing GMOs, while they meet the same standards as non-GMO products, are similarly not labeled correctly. This is important because consumers have a right to know what is in the food that they are purchasing and eating.

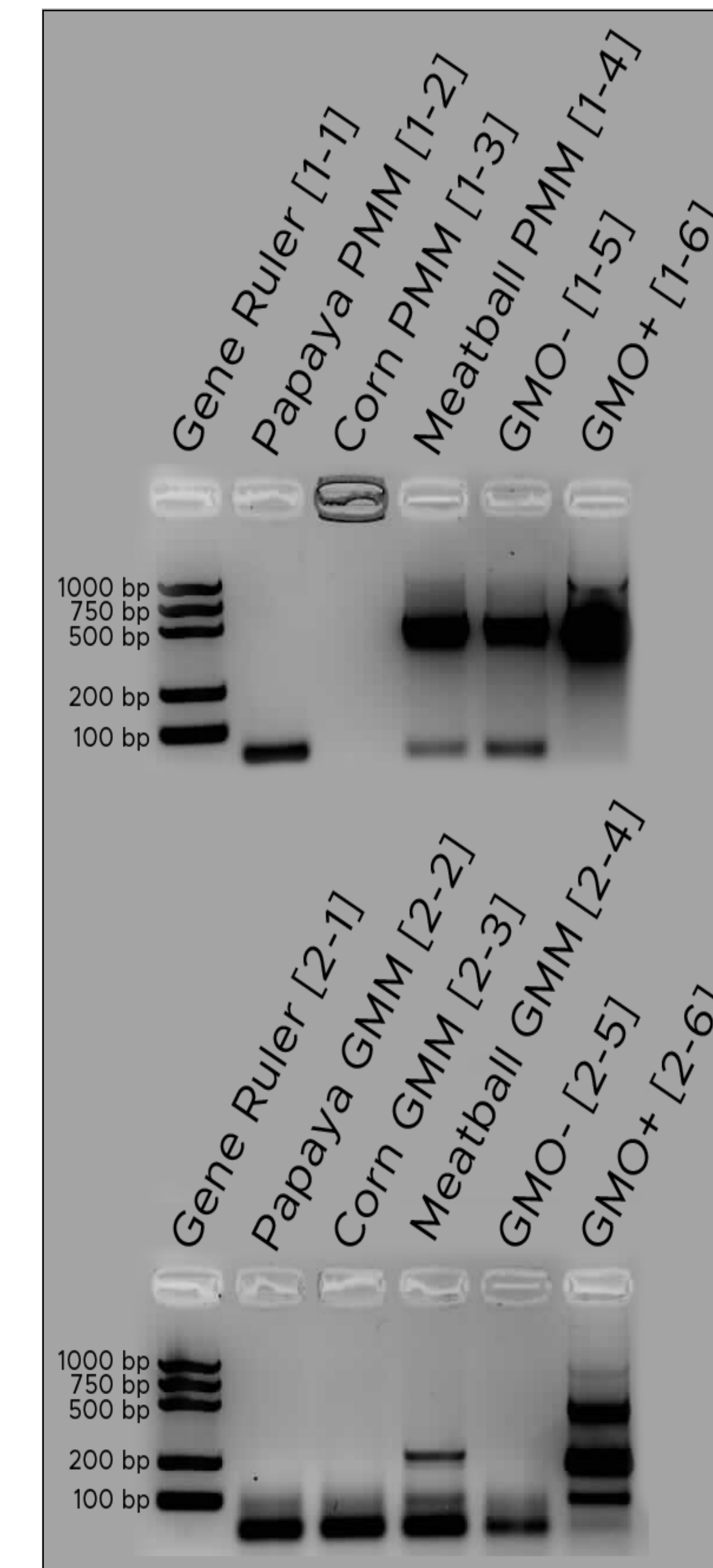


Figure 2: Labeled gel electrophoresis lanes, displaying finished results of gel electrophoresis process (Above).

## ACKNOWLEDGMENTS

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## CITATIONS

- [1] Acosta, Luis. "Restrictions on Genetically Modified Organisms: United States." Library of Congress, Library of Congress, Mar. 2014, [www.loc.gov/law/help/restrictions-on-gmos/usa.php#\\_ftn1](http://www.loc.gov/law/help/restrictions-on-gmos/usa.php#_ftn1).
- [2] "Food from Genetically Engineered Plants." U.S. Food & Drug Administration, U.S. Food & Drug Administration, 17 Oct. 2017, [www.fda.gov/Food/IngredientsPackagingLabeling/GEPlants/default.htm](http://www.fda.gov/Food/IngredientsPackagingLabeling/GEPlants/default.htm).
- [3] "Recent Trends in GE Adoption." United States Department of Agriculture, 12 July 2017, [www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us/recent-trends-in-ge-adoption.aspx](http://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us/recent-trends-in-ge-adoption.aspx).