**Genetically Engineered Crops for Pest Management in U.S. Agriculture: Farm-Level Effects**.
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# Abstract

Adoption of genetically engineered crops with traits for pest management has risen dramatically since their commercial introduction in the mid-1990's. The farm-level impacts of such crops on pesticide use, yields, and net returns vary with the crop and technology examined. Adoption of herbicide-tolerant cotton led to significant increases in yields and net returns, but was not associated with significant changes in herbicide use. On the other hand, increases in adoption of herbicide-tolerant soybeans led to small but significant increases in yields, no changes in net returns, and significant decreases in herbicide use. Adoption of Bt cotton in the Southeast significantly increased yields and net returns and significantly reduced insecticide use.

**Keywords**: Biotechnology, genetic engineering, pest management, field crops, input traits.

# Acknowledgments

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# Summary

Use of crops genetically engineered with traits for pest management has risen dramatically in only a few years since their commercial introduction. By 1998, around 40 percent of the U.S. cotton acres, a third of the U.S. corn acres, and more than 40 percent of the U.S. soybean acres were planted to genetically engineered varieties as acreage increased from about 8 million acres in surveyed States in 1996 to more than 50 million acres in 1998.

Despite environmental and food safety concerns about the use of genetically engineered crops, farmers believe that the use of these crops will offer them many benefits, such as higher yields, lower pest management costs, and greater cropping practice flexibility. While benefits and performance of these crops vary greatly by region because of pest infestation levels and other factors, the rapid adoption rates are evidence that for many farmers expected benefits outweigh expected costs.

The farm-level impacts of adoption of genetically engineered crops on pesticide use, crop yields, and net returns vary with the crop and technology examined. The econometric analysis using 1997 data shows that adoption of herbicide-tolerant cotton led to significant increases in yields and net returns, but was not associated with significant changes in herbicide use. On the other hand, increases in adoption of herbicide-tolerant soybeans led to small but significant increases in yields, no changes in net returns, and significant decreases in herbicide use. Adoption of Bt cotton in the Southeast significantly increased yields and net returns and significantly reduced insecticide use.

This report presents and discusses USDA survey results on the adoption of genetically engineered cotton, soybeans, and corn by U.S. farmers. In addition, the report presents the results of an ongoing econometric study using USDA survey data on the farm-level effects of adopting genetically engineered soybeans and cotton on pesticide use, yields, and net returns.