

## ISSUE IN BRIEF

November 17, 2009

### AGRICULTURAL BIOTECHNOLOGY BENEFITS FARMERS AND THE ENVIRONMENT

*In Response to Report Criticizing Herbicide and Pesticide Use and Biotech Seed Prices*

#### **SUMMARY:**

The [Organic Center](#) (TOC), the [Union for Concerned Scientists](#) (UCS) and the [Center for Food Safety](#) (CFS) released a report on November 17, 2009, saying the use of genetically engineered corn, soybeans and cotton has promoted increased use of pesticides, an epidemic of herbicide-resistant weeds, and more chemical residues in foods.

The groups also claim farmers are growing increasingly critical of GE crops because of drastically rising biotech seed prices and increasingly resistant weeds. According to the report, herbicide use grew by 383 million pounds from 1996 to 2008, with 46 percent of the total increase occurring in 2007 and 2008.

The report titled *Impacts of Genetically Engineered Crops on Pesticide Use in the United States: The First Thirteen Years* is posted on these organizations' websites.

#### **Farmers Benefit from Ag Biotech Seeds**

- Decades of documented evidence demonstrates that agricultural biotechnology is a safe and beneficial technology that contributes to both environmental and economic sustainability.
  - Farmers choose biotech crops because they increase yield and lower production costs.
  - Farmers get a greater financial return while using more environmentally friendly farming practices through the use of agricultural biotechnology.
- U.S. farm income benefits from 1996-2007 are estimated at nearly \$20 billion resulting from enhanced productivity and efficiency gains from agricultural biotechnology.  
*(Brookes, Graham and Peter Barfoot, 2009. Global Impact of Biotech Crops: Income and Production Effects, 1996-2007, AgBioForu, 12(2): 184-208.)*

#### **Herbicide Reduction**

- Biotech varieties have dramatically reduced farmers' reliance on pesticide applications:
  - Since 1997, the use of pesticides on global biotech crop acreage has been reduced by 790 million pounds, an 8.8 percent reduction.  
*(Brookes, Graham, & Peter Barfoot. 2009. Biotech Crops: Evidence, Outcomes and Impacts 1996-2007: Focus on Environmental Impacts. PG Economics Ltd., UK.)*
  - Through biotechnology, more specialized herbicides have been replaced by a smaller number of safer, broad spectrum compounds with reduced environmental impacts.

## Herbicide Resistant Weeds

- The manufacturers of herbicide products provide guidance to farmers as to how to avoid the development of weed resistance to their herbicide products.
  - Because farmers value these products, they employ these stewardships methods to ensure that they can continue to use these products effectively well into the future.
  - Weed resistance can occur with conventional crops as well if farmers do not use herbicides as directed.
- Weed scientists worldwide are carefully monitoring populations of weeds that are developing resistance to specific herbicides. According to them, very few weeds appear to be resistant to glyphosate, and these weeds tend to exist in small isolated populations.  
([www.weedscience.org](http://www.weedscience.org).)
- With improved weed control, plants are healthier and do not have to compete for nutrients in the soil. Healthier plants result in improved yield.

## Environmental Benefits:

- Thanks to biotechnology, farmers have adopted no- and reduced-tillage systems which utilize herbicidal weed control rather than plowing. This is delivering important benefits in the form of improved soil health and water retention, reduced runoff, fuel conservation, reduced greenhouse gas emissions and more efficient carbon storage in the soil.
- A reduction in plowing has enabled farmers to use less fuel and store additional carbon on the soil. In 2007, this was equivalent to removing 31.2 billion pounds of carbon dioxide from the atmosphere or equal to removing nearly 6.3 million cars from the road for one year. (Brookes, Graham, & Peter Barfoot. 2009. *Biotech Crops: Evidence, Outcomes and Impacts 1996-2007: Focus on Environmental Impacts*. PG Economics Ltd., UK.)
- Farmers who do not use herbicide-tolerant seeds are not as likely to use no-till practices. (Fawcett R, Towery D. 2002. *Conservation tillage and plant biotechnology: how new technologies can improve the environment by reducing the need to plow*. Conservation Technology Information Center.)

## Farmer Demand for Agricultural Biotechnology Continues To Grow

- The modern American farmer is a savvy business person, and an increasing number of farmers are choosing to plant biotech seeds. Agricultural biotechnology delivers significant and tangible benefits for farmers including increased crop yields and lower input costs.
- American farmers have adopted genetically engineered (GE) crops widely since their introduction in 1996, especially corn, cotton and soybean varieties. As of July 1, 2009:
  - Adoption of GE soybeans is **91 percent**.
  - Adoption of all GE cotton reached **88 percent**.
  - Adoption of all biotech corn climbed to **85 percent**.(USDA's Economic Research Service report, *Adoption of Genetically Engineered Crops in the U.S.* 2009.)

- In addition:
  - Adoption of biotech sugarbeets is estimated by industry to be over **90 percent**.  
(James, Clive. *Global Status of Commercialized Biotech/GM Crops* 2008. International Service for the Acquisition of Agri-biotech Applications)
  - Adoption of biotech papayas is estimated to be **over 70 percent**.  
(USDA's Agricultural Research Service)
- These adoption statistics show that U.S. farmers prefer biotech varieties to conventional crops, which require more production inputs such as sprays to control insect pests and tilling to control weeds.

### **FOR MORE INFORMATION:**

PG Economics has published a critique of the report on its website at [www.pgeconomics.co.uk](http://www.pgeconomics.co.uk).

In its analysis, author Graham Brookes says “PG Economics welcomes the Organic Center (OC) latest release *Impacts of genetically engineered crops on pesticide use: the first thirteen years* by Charles Benbrook, which confirms the positive impact biotech crops have had on reducing insecticide use and associated environmental impacts. However, the OC’s assessment of the impact of biotech herbicide tolerant traits (HT) is disappointingly inaccurate, misleading and fails to acknowledge several of the benefits U.S. farmers and citizens have derived from use of the technology.”

Among PG Economics’ criticisms of the report:

- **Failure to acknowledge the environmental benefits arising from use of HT technology:** No-till and reduced tillage production systems, for example, have resulted in important reductions in greenhouse gas emissions.

U.S. HT biotech crops contributed, in 2007, to the equivalent of removing 9.48 billion pounds (4.3 billion kg) of carbon dioxide from the atmosphere or equal to removing nearly 1.9 million cars from the road for one year. In addition, whilst usage of broad spectrum herbicides, notably glyphosate (and to a lesser extent glufosinate) has increased significantly, usage of less environmentally benign products has fallen substantially, leading to net benefits to the environment.

- **Inaccuracies:** The report uses assumptions relating to herbicide use on biotech crops in the United States that do not concur with actual practice. As a result, it overstates herbicide use on U.S. biotech crops significantly. For example, it overstates herbicide use on the HT crops of corn, cotton and soybeans for the period between 1998 and 2008 by 63.4 million pounds (28.75 million kg) of active ingredient.
- **Misleading use of official data:** The report states many times that the pesticide impact data is based on official, government (USDA NASS) pesticide usage data. Whilst this dataset is used, its limitations (namely not covering pesticide use on some of the most recent years and not providing disaggregated breakdowns of use between conventional and biotech crops)

mean that the author's analysis relied on own-estimates of usage and cannot reasonably claim to be based on official sources. As a result, the herbicide usage assumptions on conventional crops, if they replaced biotech HT traited crops, are significantly understated and unreliable.

Combined with the overstated use assumptions on HT biotech crops, it is therefore not surprising that the document concluded that biotech crops lead to an increase in U.S. herbicide use. This contrasts sharply with the findings of PG Economics' peer reviewed analysis that estimated that biotech crop adoption in the United States has reduced pesticide spraying in the United States, eg, by 357 million lbs (162 million kg: -7.1 percent 1996-2007) relative to what might reasonably be expected if the crops were all planted to conventional varieties.

PG Economics Ltd. is a specialist provider of advisory and consultancy services to agriculture and other natural resource-based industries. Its specific areas of specialization are plant biotechnology, agricultural production systems, agricultural markets and policy.