Adoption and Coexistence of GE, Conventional non-GE, and Organic Crops

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Abstract
The adoption of genetically engineered (GE) crop varieties by U.S. farmers is widespread for major crops—94 percent of planted acres for soybeans, and 88 percent for corn in 2012 (USDA-NASS 2012).

The potential exists for GE crop production to impose costs on organic and conventional non-GE production via unintended presence of GE material along the supply chain through:

- Contamination of seed stock
- Accidental cross-pollination
- Accidental co-mingling during planting, harvesting, handling, and storing of crops (Bullock and Desquilbet 2002).

Maintaining the integrity of GE-differentiated product markets relies on segregation protocols such as:

- Hybrid selection and seed purity testing
- Physical distancing during crop production
- Equipment cleaning and product segregation during processing
- GE-testing (Greene and Smith 2010).

Keywords
food safety, genetically engineered (GE) crops, compliance cost, regulatory burden, segregation protocols, GE seed

Disciplines
Agricultural and Resource Economics | Agriculture Law | Biosecurity | Food and Drug Law | Food Security

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Adoption and Coexistence of GE, Conventional non-GE, and Organic Crops

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Introduction
The adoption of genetically engineered (GE) crop varieties by U.S. farmers is widespread for major crops—94 percent of planted acres for soybeans, and 88 percent for corn in 2012 (USDA-NASS 2012).

The potential exists for GE crop production to impose costs on organic and conventional non-GE production via unintended presence of GE material along the supply chain. 

• Contamination of seed stock
• Accidental cross-pollination
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Maintaining the integrity of GE-differentiated product markets relies on segregation protocols such as:

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GE-testing (Greene and Smith 2010).

The potential exists for GE crop production to impose costs on organic and non-GE conventional crops. 

• Non-GE farmers who grow organic crops are paid to contain GE material are paid for by the organic / non-GE farmers.

Tools & Methods
Analyses of new data on the costs of coexistence from a pilot project that is part of the USDA’s Agricultural Resource Management Survey (ARMS) for Organic Corn (2010) and Soybeans (2012).

• Site visits and interviews with ten major Organic and non-GE grain dealers for corn and soybeans in the U.S.

• Focus group at the 2013 Midwest Organic and Sustainable Education Service (MOSES) Organic Farming Conference to better assess the challenges of maintaining coexistence for farmers.

USDA Agricultural Resource Management Survey
USDA’s major annual economic survey of producers is the Agricultural Resource Management Survey (ARMS), which collects detailed information about production practices, costs, and returns in major farm sectors. In 2005, ERS and NASS expanded the ARMS survey to include periodic oversamples of organic producers in order to enable side-by-side comparisons of organic and conventional production. A targeted oversample of certified organic corn producers was in the 2010-ARMS survey, and the questionnaires included questions on GE-testing and shipment rejection. The 2012 ARMS survey of conventional soybean producers had questions about non-GE soybean production and marketing.

USDA ARMS Survey States and Locations of Grain Dealers Interviewed

Table 1. Soybean Production

<table>
<thead>
<tr>
<th>Certification</th>
<th>U.S. Production Area (%)</th>
<th>Soybeans:</th>
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<th>Soybeans:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic</td>
<td>3.2%</td>
<td>74.4%</td>
<td>Non-GE</td>
<td>76.8%</td>
<td>56.0%</td>
</tr>
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<td>Non-GE</td>
<td>96.8%</td>
<td>25.6%</td>
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Table 2. Corn Production

<table>
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Table 3. Characteristics of GE-Differentiated Corn and Soybean Markets in the U.S.

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Conclusions
• Organic corn and soybean production has already stagnated in the U.S., and processors find it increasingly difficult to source non-GE corn and soybeans. The uneven distribution of the costs and risks to maintain GE-differentiated markets contributes to the challenges suppliers face in meeting the growing demand for organic and non-GE products.

• The strategies to reduce accidental presence of GE material in non-GE and organic food products are costly for both farmers and processors. The lack of a uniform tolerance-standard also increases uncertainty.

References

Further Information