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**“Potential Impact of Biotechnology in Eastern Europe:
Transgenic Maize, Sugar Beet and Oilseed Rape in
Hungary”**

Topic:

Impact of science

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ABSTRACT

During the eight-year period from 1996 to 2003, global area of transgenic crops increased 40 fold, i.e. from 1.7 million to 67.7 million hectares. The first United States *ex post* welfare studies reveal that the benefits of these innovations are essentially shared among farmers and the seed industry. On the level of the European Union (EU), the first *ex post* welfare study on transgenic maize adoption in Spain has now been published, reporting a total welfare gain of 15.5 million euros during the six-year period 1998-2003, of which Spanish farmers captured two thirds, the rest accruing to the seed industry. Some *ex ante* impact results on transgenic sugar beets are documented as well, reporting a global welfare increase of 1.2 billion euros during the five-year period 1996-2000, shared among EU producers (33%), the seed industry (16%) and the rest of the world (52%).

As of May 1st, 2004, 10 new Central and Eastern European Member States joined the EU, i.e. Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia. However, up to now no *ex ante* study has been published on the potential impact of transgenic crops in these new Member States. In the present paper, we analyze the case of Hungary and assess the size and distribution of the *ex ante* welfare effects of transgenic crops, more specifically insect resistant *Bt* (*Bacillus thuringiensis*) maize, herbicide tolerant (HT) maize, HT sugar beet and HT oilseed rape.

We develop a partial equilibrium model following a counterfactual approach for the agricultural season 2003. Our model and data are conservative, such that the results have to be interpreted as lower estimates of the true impact. For uncertain parameters, we include subjective prior distributions. Maize, sugar beet and oilseed rape are planted in Hungary on an area of respectively 1,150,000 ha, 53,000 ha and 71,000 ha. Total benefits of *Bt* maize resistant to the European corn borer amount to an estimated 3 million euros, of which 76% accrues to the farmers and 24% to the seed industry. The adoption of *Bt* maize resistant to the Western corn rootworm translates into a total welfare increase of 16 million euros, of which farmers gain 65% and the industry 35%. The introduction of herbicide tolerant maize potentially generates 14 million euros, of which 73% is shared by the farmers and 27% is extracted by the industry. Herbicide tolerant sugar beet involves a welfare gain of 3 million euros, of which 50% flows to farmers and 50% to the seed industry. The adoption of herbicide tolerant oilseed rape could potentially engender a total benefit of 0.8 million euros, of which 61% is absorbed by Hungarian farmers and 39% is captured by the seed industry. We then conduct a stochastic sensitivity analysis through Monte Carlo simulation techniques to analyze the robustness and sensitivity of the model to the underlying parameter estimates and assumptions.