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Economic Effects of Gmos on Small Developing Countries

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Economic Effects of Gmos on Small Developing Countries

The advent of “Gene Revolution” has sparked a significant research effort aimed at identifying the market and welfare effects of the introduction of genetically modified (GM) crops into the food system. Due to the producer orientation of the first generation of GM products, particular emphasis has been placed on the agronomic benefits of the new technology and the potential for a productivity boost in developing countries.

The studies on the economic effects of agricultural biotechnology on the developing world have generally been based either on World Trade Equilibrium (WTE) models or on Partial Equilibrium models, sometimes modified to incorporate peasant production. The latter approach has shed light on the potential for productivity improvements in small developing countries by using a country-specific setting, with the production sector being the only explicitly modeled sector of the economy. Consumer behavior and the conduct of the life science sector are, generally, only implicit and superficially treated in this literature.

On the other hand, research based on WTE models has mainly focused on the effects of the introduction of GM products on developed countries, or large developing countries with direct influence on the world prices of the GM crops under study. While these studies provide several useful simulated aggregate welfare effects for different regions of the world, the insights on the economic effects of GM crops on small developing economies are very limited.

In this context, existing studies cannot provide insights on, say, the decisions of African nations (like

Market Report	Yr Ago	4 Wks Ago	10/19/07
<u>Livestock and Products,</u>			
<u>Weekly Average</u>			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.....	\$87.22	\$93.60	\$92.89
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.....	118.33	125.83	119.32
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.....	114.26	121.05	115.05
Choice Boxed Beef, 600-750 lb. Carcass.....	146.11	145.73	145.05
Western Corn Belt Base Hog Price Carcass, Negotiated.....	59.85	63.41	56.01
Feeder Pigs, National Direct 50 lbs, FOB.....	52.76	47.89	48.57
Pork Carcass Cutout, 185 lb. Carcass, 51-52% Lean.....	66.69	66.42	62.25
Slaughter Lambs, Ch. & Pr., Heavy, Woolled, South Dakota, Direct.....	*	103.25	94.00
National Carcass Lamb Cutout, FOB.....	250.95	257.83	265.45
<u>Crops,</u>			
<u>Daily Spot Prices</u>			
Wheat, No. 1, H.W. Imperial, bu.....	4.84	7.64	7.75
Corn, No. 2, Yellow Omaha, bu.....	2.88	3.34	3.38
Soybeans, No. 1, Yellow Omaha, bu.....	5.68	8.78	9.04
Grain Sorghum, No. 2, Yellow Dorchester, cwt.....	4.57	5.79	6.36
Oats, No. 2, Heavy Minneapolis, MN, bu.....	2.37	2.71	*
<u>Hay</u>			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.....	135.00	135.00	135.00
Alfalfa, Large Rounds, Good Platte Valley, ton.....	87.50	87.50	87.50
Grass Hay, Large Rounds, Good Northeast Nebraska, ton.....	82.50	*	*

* No market.



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Zimbabwe, Lesotho, Malawi, Mozambique, Swaziland, and Zambia) to reject United States humanitarian aid in the form of GM corn in 2002 and 2003, while having about 25 percent of their population at risk of starvation; or on the situation in Egypt where, after eight years of potato research, the government decided not to commercialize the Bt potatoes in 2001.

A study completed in the University of Nebraska Department of Agricultural Economics and published in *AgBioForum* recently, seeks to analyze the market and welfare effects of the introduction of GM products into the food system of small, open developing countries under alternative regulatory regimes for products of biotechnology. To analyze the system-wide effects of GMO introduction in small developing economies, the study develops a consistent theoretical framework that captures the empirically relevant consumer aversion to GM products, different effects of the GM technology across producers, and imperfect competition among GM seed suppliers.

The research reveals that the effects of the introduction of GM crops in small developing countries are case-specific and dependent on (1) the labeling regimes in the world market, (2) the labeling regime in the small economy, (3) the segregation costs and the marketing margins under the different labeling scenarios, (4) the attitudes of the small economy's consumers towards GM products, (5) the price premium enjoyed by the conventional, non-GM crops in the world market, (6) the relative cost effectiveness of GM crops in the small developing country, and (7) the market power of GM seed suppliers.

An important implication of these results is that while the agronomic benefits associated with the first-generation, producer-oriented GM technology are certainly important, their presence does not guarantee a positive effect on the aggregate welfare of small developing economies. In fact, the agronomic benefits associated with the GM technology do not even assure gains in producer welfare, as the introduction of GM products is shown to create winners and losers even among the producers of the small developing countries.

Before concluding this article, it is important to note that since the introduction of GM products creates winners and losers among the consumers and the suppliers of GM and conventional products, and

since the identity of these winners and losers is shown to be affected by the labeling regime in the small countries, the regulatory and labeling decisions of small developing economies can be expected to be affected by the incidence of (labeled and unlabeled) GM products, and the relative weight placed by the regulator on the welfare of the different groups. In this context, an appropriate calibration of our model with data from small developing countries and a quantitative assessment of the effects of GMO introduction can provide policy makers and stakeholder groups with valuable insights both on the market potential of various biotechnology innovations and the likely effect of these innovations on the welfare of the interest groups involved.

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Note: This article is based on the first essay of Plastina's Ph.D. Dissertation at the University of Nebraska–Lincoln.

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