The costs of staying GE-free

Opinion polls around the world have repeatedly demonstrated that the majority of people are concerned about the safety of GE (genetically-engineered) foods and expect that, if they are marketed, then they should be separated and labelled (Harris Poll (2004), European Commission (2001), Yomiyuri Shimbum (1997) etc). Thus, market, safety and political demands often require that GE crops and harvests be maintained separately from conventional ones.

The burden on food production systems that stems from GE crops imposes economic costs on farmers, grain merchants, the food industry and, ultimately, the public. In the broadest perspective, costs generated by GE crops are reflected in major grain markets. Since 2000, the Tokyo Grain Exchange has operated a futures market in non-GE soya. Non-GE soya futures consistently price higher than other soya contracts (TGE, 2009). This reflects both consumer demand for GE-free foods and the additional costs to conventional farmers of preventing contamination from GE soya.

Increased costs for the seed producer

The cost of GE food begins at the level of producing seeds for sale. GE seed is well-known to be more expensive than conventional seed; but what is less appreciated is that GE seeds can also add to the cost of conventional ones.

Because of the danger of cross-pollination between GE and non-GE varieties, conventional seed producers must take measures to prevent contamination. These measures must be rigorously followed to avoid GE contamination such as has occurred in Chile, where GE maize sown to produce seed for export contaminated seeds used locally (INTA, 2008).

European Commission scientists estimate that if GE canola (oilseed rape) was introduced in Europe, keeping conventional canola from being contaminated at the seed production level would add 10% to seed duplication costs (Bock, 2002).

Increased costs for the farmer

On the farm, GE imposes another set of expenditures. These include the costs of maintaining physical and/or temporal separation between GE and non-GE crops in the field, during and after harvest. For example, when a seeder (planting machine) switches between types, it must be thoroughly cleaned, costing farmers additional labour each time it is necessary. Alternatively, farmers can ‘flush out’ equipment by planting conventional crops after GE ones; but this practice requires that the farmer then sells a portion of the non-GE harvest at the GE price, due to potential contamination.

Preventing on-farm GE contamination also requires the expense of cleaning other equipment such as harvesters, trucks, storage bins, and dryers.

An additional on-farm cost caused by GE seed is control of volunteer plants. When conventional varieties are sown in the same field, or near where GE crops have previously grown, fallen or windswept GE seeds from prior seasons may germinate. Once the seeds have germinated, the plants must be killed with herbicides or be chopped down before flowering in order to prevent the conventional crop from being contaminated.

Eliminating volunteer plants can be very expensive to farmers. A Canadian study projecting costs of the proposed introduction of GE wheat determined that volunteer control would be largest single on-farm expense, at $5.15 Canadian dollars a tonne (at a 0.1% contamination threshold) (Huygen 2003). This amounts to 3.96% of the Canadian Wheat Board farm price for wheat for the study year (variety: red spring straight wheat).

Increased costs during storage and distribution

Harvests must be kept separate as they make their way from the field to silos and elevators, and through shipping channels to food processors. Here again, GE crops impose price penalties on conventional crops, requiring spatial or temporal segregation.

The total combined on farm and shipping penalties vary by crop and location. The total projected cost to keep conventional Canadian wheat free of GE contamination was 5.4% - 6% from farm to food processor (Huygen et al 2003).

Other recent studies include a 2006 estimate placing the cost of preventing GE contamination in Western Australian canola exports at 5-9% of farm cost (Crowe 2006). A 2009 projection of costs in Europe if GE canola were introduced put the total expense to seed producers, farmers, and grain elevators at a debilitating 21% of the farm price (Menrad et al, 2009).

Increased costs for food processors

Finally, if food processors must separately handle GE and non-GE harvests, as consumers and labelling requirements frequently demand, another layer of costs is imposed. A 2009 study on costs to German industry estimated up to 12.8% added cost for canola, 4.9% for sugarbeet and 10.7% for wheat (Menrad el at, 2009). These are in addition to farm and grain merchant costs.

GE avoidance costs

Rather than segregate GE grains and cereals from conventional ones, some food processors (especially in Europe) simply don't buy GE ingredients. This too creates costs, because companies must verify their compliance with GE avoidance policies.

A 2007 study surveyed German food processors on their expenditures to avoid use of GE canola and maize. Companies identified a variety of costs related to staying GE-free. The costs cited most often were for sampling and laboratory testing of incoming shipments, additional documentation and additional labour. The food processors reported widely-ranging costs to avoid GE maize and canola, which were estimated to average between €2.46 and €23.70 per metric tonne of canola and maize (Gawrun 2007).

The cost penalties imposed by GE seeds on farmers, grain merchants and the food industry are significant and have been found in studies from different parts of the world. Costs are incurred at every level of the production system, from seed multiplication through to food processing. This problem currently affects globally important bulk food commodities (maize, soya, and canola) and has the potential to impact more if new GE crops are approved.

Sources

Anonymous (1997). Survey on Genetically Engineered Agricultural Products, Yomiyuri Shimbum, 26 April 1997. Results available in English at the Roper Center Japanese Public Opinion Database. http://www.ropercenter.uconn.edu/jpoll/JPOLL.html

Bock A-K, Lheureux K, Libeau-Dulos M, Nilsagard H and Rodriguez-Cerezo E (2002). Scenarios for co-existence of genetically modified, conventional and organic crops in European agriculture. European Commission Joint Research Centre, May 2002.

Crowe B and Pluske J (2006). Is it Cost Effective to Segregate Canola in WA? Australasian Agribusiness Review, V. 14. 2006.

European Commission (2001). Europeans, Science, and Technology. Eurobarometer 55.2.

Gawron J-C and Theuvsen L (2007). Costs of Processing Genetically Modified Organisms: Analysis of the Rapeseed and Corn Industries. 47th Annual Conference of the German Association of Agricultural Economists. September 2007. http://purl.umn.edu/7601

Harris Interactive (2004). Harris Poll #49: Genetically Modified Foods and Crops: Public Still Divided on Benefits and Risks. 2 July 2004.

Huygen I, Veeman M and Lerohl M (2004). Cost Implications of Alternative GM Tolerance Levels: Non-Genetically Modified Wheat in Western Canada. AgBioForum 6, pp. s169-177.

Menrad K, Gabriel A and Zapilko M (2009). Cost of GMO-related co-existence and traceability systems in food production in Germany. International Association of Agricultural Economists Conference Paper, Beijing, 16-22 August 2009.

Tokyo Grain Exchange (TGE) (2009). Monthly Trading Data. http://www.tge.or.jp/english/trading/tra_m01.shtml