

# **The Economic, Social and Environmental Implications of Genetically Modified Crops (GMOs) on Islands**

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## **Introduction**

Honourable Chair and members of the Standing Committee on Agriculture, Forestry and the Environment, the Institute of Island Studies is pleased to have this opportunity to present our brief on the economic, social and environmental implications of Genetically Modified crops (GMOs) on Islands.

The Institute of Island Studies has submitted briefs in the past to Legislative committees, which is part of our mandate to "serve as a bridge between the University and Island Communities" and "to contribute to the formulation of public policy in Prince Edward Island."

In this spirit, the researchers involved have sought to collect data that clearly outlines the impact GM crops could have on the economic, social and environmental status of Prince Edward Island based on the experience of other islands. We hope this will help the Standing Committee in coming to a decision as to whether or not to recommend that Prince Edward Island be a GM-free zone.

Debates on GMOs often focus on the safety of genetically modified organisms as food, and the concern that these crops have not been adequately tested for human consumption. This brief will address aspects of this debate, but will also provide evidence, using Ireland and Hawaii as two island case studies, that demonstrates the potential economic, social and environmental risks of growing GM crops even when crops are only grown for animal consumption; an issue particularly relevant to Prince Edward Island. This brief will also address the important differences between genetically modified organisms and genetic technology, explaining that going GMO-free does not mean that Prince Edward Island would be excluded from the benefits of all forms of genetic technology.

## **Island Advantage**

Deciding to go completely GM-free would give Prince Edward Island significant opportunities that deserve serious consideration. As an island, our province prides itself on being separate and different from the rest of the country. While the isolation of the island has created many economic challenges, it is this isolation that is now creating an economic advantage, because it is isolation that is imperative to the establishment of a truly GM-free zone. The inability to maintain solid divisions between crop lines have led to GM crops contaminating organic and traditional crops and generating pernicious, herbicide-resistant weeds around the world. (This will be demonstrated later in the paper.) Once GM crops are released into the environment their movement cannot be controlled. When seeds are spilled, the wind blows, or birds and bees travel, modified genes are transported. Our advantage is that transportation vectors to an island have to cross a barrier of water. A GM-free Prince Edward Island, if strictly regulated, could establish a market niche unavailable to any other (non-island) province in the country. Studies show that the international market is moving towards the support and promotion of GM-free products. As a small island jurisdiction, Prince Edward Island depends on strong relationships with external markets and cannot afford to ignore these market signals. Having a limited land base, we cannot compete with mainland agricultural areas in terms of volume and price; we must focus on quality and grasp opportunities that are based on our inherent strengths that come with "islandness". In an increasingly homogenized global marketplace, the provincial government and the island's people will benefit from the protection and enhancement of the island's uniqueness.

## **Safety**

There are real risks attached to all forms of genetic modification. As Dr. David Suzuki states, genetic engineering is a "revolutionary technology: a pig cannot normally exchange genes with a plant or a human with a fish, but now biotechnology makes it possible. Now a gene can be placed in a genome (the entire genetic material of an organism) in which it never existed. Without the evolutionary context, we can no longer predict how the transferred gene will behave. Unlike drugs that are found to be unsafe and can be pulled from the market, genetically modified food crops are living creatures and cannot be recalled" (1999: 3). Transferred genes of viruses and bacteria, which are the predominant vectors used to create GM crops that are resistant to pesticides, have the potential to jump from one species to another, even where the species are not related. The enhancement of gene transfer created by genetic engineering has already been proven to "be the major route to creating new disease agents." The inability to control such gene transfer could also lead to "antibiotic resistant genes that make infections more difficult to treat" (Ho 2003:32).

To date the Canadian federal government has approved the production of 36 genetically modified plants and an additional 3 plants for animal consumption only. Many of these are not currently in production. For various reasons, Health Canada regulates only 10 GM crops. There are five acts that regulate biotechnology products under the supervision of the Canadian Food Inspection Agency including, the Feeds Act, Fertilizer Act, Seeds Act, Health of Animals Act and the Plant Protection Act.

Considering crop safety, the Canadian government does have an assessment process. This process looks at how the crop was developed, ie. What molecular changes might result from the modification; the composition of the novel (or GM) product compared to non-modified foods; its nutritional content compared to non-modified foods; the potential for the genetic modification to create new toxins; and its potential for causing allergic reactions. However, only very recently has the government begun to apply this process to GMO products. An Action Plan was established in November of 2001 on the recommendation of the Royal Society of Canada Expert Panel. Research projects were then funded to determine the social and environmental health risks associated with growing GMO crops ("Action Plan of the Government of Canada" 2003). Their mandate does not include establishing the economic potential of such food products.

The most relevant study to Prince Edward Island that the Canadian government is currently funding is on breeds of genetically modified wheat and Brassicas, such as canola and flax - all of which have already been approved and are growing in Canadian fields. The research shows that these GM crops have the capacity to cross-pollinate with related wild species. Of particular concern is the capacity for GM canola and flax to cross with wild mustard, already a pernicious weed on Prince Edward Island and one that would be much worse if it developed resistance to herbicides ("Consultation Summary Report - Grains and Oilseeds," 2005). Nigel G. Halford (2004) in his book *Genetically Modified Crops*, notes other scientific research that has demonstrated that GM herbicide-tolerant oilseed rape (canola), of which there are millions of acres being grown in Canada, "will cross [pollinate] with other cultivated or wild Brassicas, including Chinese cabbage, Brussels sprouts, Indian Mustard, hoary mustard, wild radish and charlock" (91). In spite of this evidence Halford, who is a proponent of GM crops, goes on to argue that "herbicide-tolerant genes would be unlikely to persist in the wild" (91 emphasis added). In actual fact, the recently published evidence strongly suggests that GM crops being grown in Canada do have the potential to modify, through direct interbreeding, the more than 3000 species of wild and domesticated Brassicas that exist in our ecosystem.

### **Safety Testing In Canada**

Although the Canadian government has begun to assess the environmental risks of growing GM crops, it has yet to conduct human feeding studies on Canadian grown GM products. Only one such study, performed in the US, has been published to date worldwide. As Dr. E. Ann Clark, professor of science at the University of Guelph, points out in her paper entitled "Food Safety of GM Crops in Canada: Toxicity and Allergenicity" (2000), Health Canada does not assess the toxicity and allergenicity of GM crops. More than 70% of GM crops approved in Canada have not actually been tested at all for toxicity or allergenicity levels. According to Clark, "all conclusions of safety regarding toxicity and from allergenic responses were based entirely on inferences and assumptions." In fact, a study performed by Altieri and Rosset (1999) suggests that there are risks to eating GM foods. According to their research, new proteins produced in GM foods could "act as allergens or toxins, alter the metabolism of the food-producing plant or animal, causing it to produce new allergens or toxins" (1999:7).

The Canadian government has a mandate that was set out by the Action Plan, which states that "public awareness regarding biotechnology and their regulations in Canada; potential benefits and/or risks; social and ethical considerations" will be addressed efficiently and within a timely

manner ("Biotechnology Projects and Research at Health Canada," 2005). This mandate has yet to be satisfied. Several surveys performed by independent groups such as The British Columbia Biotechnology Circle (BCBC) show that Canadians are very concerned with the lack of commitment and responsibility that has been demonstrated by the government towards the health of Canadians and the health of their environment, and are also very concerned that GM products have been approved and released into the environment and the food chain without being adequately tested.

As we will discuss below, outside influences such as foreign market restrictions or outright bans on GM products will have a serious impact on the ability of Canadian farmers to access the worldwide market.

### **Economic Risks**

The European Union, which represents 25 countries and some of Canada's major trading partners, has already imposed a "de facto moratorium on the approval of new GM crops since 1998 because six member countries, France, Italy, Denmark, Greece, Austria and Luxembourg, block every application" (Halford 2004: 72). The European Union has also established mandatory labeling laws for all foods containing more than 0.9% GM ingredients. This legislation has cost Canadian farmers growing GM products millions of dollars in lost export revenue and has led to large scale trade disputes. Realizing the long-term costs of complying with such legislation, farmers in Canada, Argentina and the US have begun a court action, claiming that the World Trade Organization Laws deem them exempt from the European Union regulations ("No Market for GM-Labeled Food in Europe" 2005: 38-39). To date, their applications have been unsuccessful and their chances of success in the future do not look good.

The European Union is currently seeking to expand its labeling laws to include "any food produced from a GM organism, regardless of the presence or absence of novel genetic material (in other words oils, sugar and other products that do not contain DNA or protein will no longer be exempt)" (Halford 2004: 72-73). Although the European Union has yet to impose labeling laws on meat, milk and eggs obtained from animals that were fed GM crops, many member countries, along with major food producers, have chosen to legislate the production and labeling of such products internally.

While the European Union has developed crop coexistence laws that are applicable to all European Union member countries, it has opted to "leave significant aspects of the coexistence [of GM and traditional or organic crops] to national legislation." The European Union is only willing to directly regulate the "technically unavoidable presence of GMOs in non-GMO seed" ("Ways Forward for Sustainable Agriculture," December 2004). In the absence of any EU level impediment to local regulations, Ireland, Austria, Belgium, England, France, Germany, Greece, Italy, and Slovenia have allowed subnational jurisdictions to declare themselves GMO-free.

## **The Case of Ireland**

A report published in January 2005 called "No Market for GM-Labeled Food in Europe" (2005: 8) details the refusal of Europe's 30 largest food brands and 30 largest supermarkets, such as Marks and Spencer, to carry GM food of any kind, including milk and meat products that come from animals fed GM animal feed. Concerns for the marketability of their Certified Organic Farm crops as well as their beef (80% of which is exported abroad) has encouraged Ireland - an island in a position much like PEI - to fight to maintain its GM-free status. There is also grave concern about the potential for GM crops to contaminate national park lands and protected ecological sites. "Leading farming organizations, restaurants, chefs, food producers, and consumers around the country are getting involved in the campaign to keep Ireland GM-free." (Deasy 2004). Over 1000 regions in Ireland, including counties and provinces, have held referendums that have successfully banned GM crops. As a result, islanders are now demanding that the national government provide legal protection from the contamination of GM crops, recognizing that without the implementation of national legislation, GM crops could still be introduced into their environment under the co-existence laws of the European Union. The Irish Cattle Farmers and Sheep Farmers Associations too have called for the support of the government to resist the European Union's push to develop coexistence plans for GM crops in all European Union member countries. John Heney, the chair of the Irish Cattle and Sheep Farmers Associations (ICSA) Rural Development Committee, and Ruaidhri Deasy, the Deputy President of the Irish Farmers Association, agree that Ireland's "status provides a unique opportunity for a credible GM-free policy for high value beef and lamb export. [...] We don't need them [GM products], we certainly can't pay for them, and consumers don't want them" ("The GM Threat to Irish Farmers," 2004).

## **Proliferation of GMO-free Zones Internationally**

Along with Europe, many subnational jurisdictions within North America, South America and Africa have followed in the footsteps of Mendocino County, California, which has banned GM crops. (Note: Their position and circumstances were presented to this committee by Renata Berringer from California.) Regions that have implemented GMO-free resolutions at the state and municipal levels include 75 cities in Vermont, and counties in Colorado, Hawaii, New York, Missouri, and North Dakota. In response to public concern, certain regions of Kenya, Brazil, Australia and even Canada have also approved GMO-free resolutions. Most of these resolutions have occurred at the provincial or state level.

## **The Case of Hawaii**

In the mid-1990s farmers in the US state of Hawaii - an island archipelago with a unique agricultural industry - were encouraged to invest in a virus resistant GM papaya that was advertised as the solution to an aggressive ringspot virus epidemic that had destroyed much of their crops. Yet, when the new papaya crops began to mature in large quantities in late 1999, they were rejected by foreign buyers. Argentina and Canada were among those who refused to buy GM papaya from Hawaiian farmers. Japan, which had traditionally purchased 40% of the papaya grown in Hawaii, rejected the GM fruit and now offers more money for traditional varieties. As a result, the premiums for the non-GM varieties have increased 700%, while

growers of GM products are struggling to find buyers, losing an estimated 2 million dollars per annum in export revenues. The situation has become so serious that farmers have begun to cut down entire orchards of GM papaya trees and any trees they find infected with the GM strain of papaya. The islands' government is considering implementing a five year moratorium on the growth of all GM products ("Biotechnology and Agriculture Education Program" 2005).

### **Prince Edward Island's Future Opportunities in a GMO-contaminated World**

Currently Prince Edward Island allows the growth of genetically modified canola and soybean, which are produced primarily for animal consumption (although it is unknown whether seeds purchased back by Monsanto end up in our food supply). While a small number of farmers grow GM canola and soybean in PEI, as we can see from the evidence just presented, it is difficult to see the long-term economic, social or environmental benefits of continuing to grow these crops.

It is important to note that banning further release of GM crops into the environment of Prince Edward Island does not mean that the province has to be excluded from all potential future benefits of genetic technology. Genetic technologies can be used in laboratories to improve production and productivity in agriculture and forestry. Genetic research provides valuable information on "gene promotion activity, the functional characterization of regulatory elements within gene promoters, their determination of gene function, [...] metabolic pathways and analysis of protein structure and function" (Halford 2004: 33). However, although genetic research technologies may be useful for understanding and improving crop production this does not mean that we should eat genetically modified plants, feed them to our livestock or release them into our environment.

### **Conclusion**

Evidence suggests that the new genetically modified crops do pose a significant threat to the environment for example by generating more aggressive, herbicide-resistant weeds. Some GM crops may also be unhealthy as foods. And because of consumer resistance, GM crops are not likely to be economically viable. Foreign restrictions and in some cases outright bans on GM products have already had a serious impact on Canadian farmers' access to the international market.

The establishment of Prince Edward Island as a GM-free region will create a market niche for producers and an opportunity for island farmers to capture premium prices for their GM-free crops. The example of the Hawaiian papaya indicates that, in order to be successfully marketed as GM-free, crops must be guaranteed to have not been contaminated by the pollen and residues of GM crops. Prince Edward Island has several unique marketing advantages. As an island, it has a natural barrier to GM contamination, and as a separate jurisdiction able to regulate internal affairs, PEI could guarantee that foods grown here under strict regulations would be GM-free.

As the incidence of allergies, asthma, immune disorders, chemical sensitivities and other modern diseases rises, people are becoming more and more concerned about the purity of their food and their environment. The public is also increasingly sceptical of the motives of large corporations, and the willingness of governments to protect public health and the environment. As the public

becomes more aware of the ecological impacts of GMOs, the uncertainty around toxicity and allergens, and the level of contamination that currently exists in the food supply, the search for GM-free food products is very likely to increase. Market standards and international trade rules are already having an economic impact on Canadian farmers, and these regulations are destined to become more stringent. The Prince Edward Island government should encourage farmers to seek out the greatest opportunities available to them. Going GM-free is an environmental, social, and economic advantage that should not be taken lightly. It is an opportunity that will be lost forever if it is not grasped quickly. We are at a crossroad, and must choose the direction that is going to carry island farming into the future. Do we try to be just like all the larger, mass-market oriented mainland agricultural areas, suffering continued low prices for commodities that can be grown and shipped more cheaply elsewhere? Or do we capitalize on our natural advantages, our "islandness", and carve out market niches for traditional and organic farm crops where we have the competitive advantage? If we do nothing, and allow GM crops to be fully released onto our island environment, this opportunity for advancement will be lost, and there will be no possibility of turning back. If we grasp this opportunity to build on our natural advantage, it will be a dramatic move that will bring much positive attention to our province, and there will be benefits not only to agriculture, but also for tourism, immigration and island quality of life.

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