

Brief respecting Bill C-27, The Canadian Food Inspection Agency Enforcement Act

Submitted by
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(Views expressed are those of Dr. Clark, and do not bear on those of the University of Guelph)

EXECUTIVE SUMMARY

Rather than reiterate the concerns expressed by earlier speakers, including Cathy Holtlander, Shiv Chopra, Margaret Hayden, Gerard Lambert, and Lester Freidlander, as well as Terry Pugh and Colleen Ross - whose views I fully endorse - this Brief asks whether Bill C-27 will help or hinder the ability of the Canadian government to address the really big issues facing agriculture today.

Evidence is presented to support the conclusion that Bill C-27 will perpetuate and worsen existing design flaws in Canadian farm policy, and as such, will not achieve its avowed intent. Catering to the interests of agribusiness and international trade directly compromises the health and safety of the Canadian food system. However, the issue is more than the obvious conflict of interest that necessarily arises when two contrary mandates are vested in the same organization - promotion of trade and regulation of food safety.

Government is operating under demonstrably false assumptions, which impede effective policy and decision making. Even worse, the collegial relationship between industry and government has entrenched a mentality of symptom-oriented thinking that literally obscures both assessment of problems and identification of novel, causally oriented solutions.

Recommended courses of action include:

1. Recognize the patent impossibility of making policy that benefits both industry and people, and re-assert your role as a strong guardian of the public interest. Critically review underlying assumptions, and divest yourselves of those which are unsound.
2. Avail yourself of gifted system thinkers such as William McDonough (Cradle to Cradle, and <http://www.mcdonoughpartners.com/projects/ford-dtp/default.asp?projID=ford-dtp>), and others, and emulate progressive jurisdictions which are finding ways of reconciling economic, ecological, and social interests in effective ways;
3. Have the courage to stop wasting time on legislation which addresses **symptoms** - including Bill C-27 - and focus instead on the **causes** of our many problems. Craft new, “era-appropriate” strategies for reducing our ecological footprint, conserving natural resources, producing safe and wholesome food, and ‘living within our means’.

INTRODUCTION

I have had the opportunity to review some of the transcripts of earlier presentations and the ensuing dialogue before this committee, so rather than repeat what was said, let me frame a broader, 'big picture' question:

- ✓ Does Bill C-27 *strengthen* or *weaken* your ability to address the really big problems facing agriculture today?

By 'really big problems', I mean:

- ✓ **the virtual absence of profit in primary agriculture**, with all that that foretells in terms of food security, food safety, and rural community integrity
- ✓ **the progressive erosion of farmgate profits by agribusiness**, and most especially in the present context, by biotechnology firms
- ✓ the accumulating ramifications of **externalized costs of 'bigger is better' agriculture** on human health and the environment,
- ✓ the profound implications of **rising energy prices** on the whole agri-food system, including potentially restricting global trade, altering apparent scale-dependent economies, and profiling our worrying dependence on imported food.
- ✓ the implications of **global warming** on many aspects of farm operation and risk - and others

While these problems evolved from earlier times, they are coming home to roost on your watch. So, will Bill C-27 help or hinder you in leading Canada through these challenging times?

My reading of the Legislative Summary (LS-500E) of Bill C-27: *Canadian Food Inspection Agency Enforcement Act* suggests that this Bill will tie your hands and consign Canadians to the role of unwilling recipients of decisions made to suit other agendas. Indeed, evidence presented below supports the conclusion that Bill C-27 will **prevent** meaningful solutions to the really big problems facing Canada.

The closest parallel is the CFIA and Health Canada process for regulating GM crops. The Canadian GM risk assessment process is so simplistic that not a single submission has ever been rejected in Canada. Everything submitted - almost wholly by industry - has been accepted. The inescapable inference is that the Canadian GM regulatory process is a ruse, claiming to safeguard human and environmental health, but actually intended to facilitate commercialization of GM crops. Likewise, Bill-C-27 appears intended to facilitate international trade primarily by streamlining inspections, replacing Canadian assessment with those by foreign powers, and harmonizing regulations with the US and other countries, all of which challenge, rather than to safeguard the health and safety of Canadians.

[For the judgement of the elite scientific community of Canada on the weakness of the regulatory process employed by Health Canada and the CFIA, refer to the report of the Royal Society of

Canada (Panel on the Future of Food Biotechnology) (2001)¹.]

HOW DID WE GET HERE?

What might cause legislators to craft a Bill contrary to the best interests of their own citizens? I would suggest two reasons: that the drafters of this legislation - reflecting the prevailing philosophy of recent Canadian governments - are being guided by premises which are demonstrably false; and that the decision to adopt a ‘partner’ rather than a leadership role with the agribusiness industry - and especially the biotechnology industry - has led government to think like industry, with unquestionably adverse outcomes for society.

Demonstrably False Premises.

Premise 1 - that what is good for industry is good for society. When oversight is weak and compliant, industry - including the agri-food industry - can and does profit at the expense of public health and safety. Whether distal or proximal in nature, and even when the harm is known, industry continues to lobby for decisions favorable to their bottom line.

Distal Effects. In the interests of space, just two examples will be presented.

Globalization, Environment, and Health. The dominant government emphasis on ‘bigger is better’ (see quotes in NFU, 2003), consolidation, globalization, and international trade - specifically in Bill C-27 - directly contravenes the health of both people and the environment. To explore just one example, today’s heavily consolidated food system allows business to reap the economies of bigness, but also puts traffic miles on food, wastes fossil fuel and produces GHG which adversely affect human health (Pirog et al., 2001).

A study conducted at Iowa State University compared both fuel consumption and GHG emissions from 3 different approaches to supplying just 10% of per capita consumption of 28 fresh products in Iowa (Table 1).

Table 1. Comparison of fuel consumption and GHG emissions (adapted from Pirog et al., 2001)

	Conventional (integrated retail/wholesale from national sources using large semi-trailer trucks)	Iowa-Based Regional (Iowa farmers supply to Iowa retailers and wholesalers using large semitrailer and mid-size trucks)	Local - farmers direct market to consumers, through CSA, farmers markets or institutions using small light trucks
Fuel consumption, gallons/year	368,102 (= 100%)	22,000 to 43,500 (= 9%)	49,564 to 88,265 (= 19%)
CO2 emissions (lb/y)	8,392,730 (=100%)	501,700 to 993,000 (= 9%)	967,000 to 1,730,000 (= 16%)

In this study, replacing the contemporary Wal-Mart or Loblaws approach to food sourcing with

either regional or local food sourcing would reduce both fuel consumption and GHG emissions by 91% for regional or 81-84% for local sourcing. That the effluents from vehicular travel harm human health has been known since the classic Health Effects of Fossil Fuel Burning (1980) by Spengler and Wilson. The USEPA lists 21 'Mobile Source Air Toxics' emanating from vehicular traffic, ranging from benzene and dioxin/furans to lead, mercury, and xylene. The Clean Air Task Force (2005) estimated that diesel fumes alone are responsible for 21,000 deaths a year in the US, as well as causing 27,000 nonfatal heart attacks, 410,000 asthma attacks, and 2.4 million lost-work days. Davis (2002) provides an extensive historical chronology of the evidence available to decisionmakers today regarding the health implications of vehicular-source air pollution - which is an inescapable byproduct of globalization and international trade.

This is a clear example where government support for consolidation/globalization/trade - the unambiguous intent of Bill C-27 - externalizes costs to society at large by wasting fossil fuels, while actively harming its own people.

Biased Research. One of the less obvious approaches used by industry to maintain sales is to manipulate scientific information through industry-funded research. The objectivity of industry-funded research has been questioned in analyses reported in both the scientific literature [Baker et al. (2003), Bekelman et al. (2003); Burton and Rowell (2003); Levinsky, 2002); Lexchin et al. (2003); Melander et al. 2003); and Yaphe et al. 2001] and in popular academic texts and publications [Angell, 2004; Bruneau and Turk, 2004; Healy, 2004; Press and Washburn, 2000; Turk, 2000].

For GM crops, Marvier (2004) examined the rigor of the research trials which industry provides in support of submissions to US regulators. For approved Bt crops, studies comparing effects of Bt on non-target organisms almost always used less than 5 replicates per treatment and consistently showed no statistically significant impact. Analyses employing industry-supplied variance estimates for 5 of the submissions revealed that at least 3 times as many replicates (e.g. 15) would be needed to have a 90% chance of correctly detecting differences even as large as 20%. She concluded that "the methodology being used in these...tests is predisposed to finding no effect, even when an effect exists".

Does industry funding affect the outcome of refereed research? Biomedical research has been most heavily scrutinized. Based on surveys spanning 1140 biomedical studies ranging from calcium channel blockers to non steroidal anti-inflammatory drugs, Bekelman et al. (2003) concluded that industry-sponsored studies yield pro-industry conclusions. Examples included 'publication bias', or publishing results that were positive but not those that were negative for product efficacy, and 'multiple reporting' of studies with positive outcomes, to inflate favorable perceptions. Based on a review of 30 studies, Lexchin et al. (2003) found evidence of systematic bias in experimental design favoring outcomes advantageous to the industry sponsor, whether due to inappropriate comparator or publication bias. Institutionalizing industry bias, by channeling government and academic researchers to the service of industry through matching fund obligations ill-serves society and compromises perceived integrity (Clark, 2005).

Proximal Effects. Numerous examples have been documented.

Infant formula. The aggressive promotion of infant formula as a replacement for breast milk in the Third World - focusing on Nestle which held 49% of international market share - is a matter of public record. The detailed public relations strategy employed by Nestle to sustain sales in the face of irrefutable evidence of the multiple hazards of bottle-feeding to Third World babies is documented in Food Politics (2002; Table 18), written by the Chair of Nutrition and Food Studies at New York University, Marion Nestle (no relation),

Tobacco. Ong and Glantz (2000) of the University of California at San Francisco documented the efforts of the tobacco industry - and Philip Morris in particular - to “stop, affect the wording of, delay, and counteract” a pending study by the International Agency for Research on Cancer (IARC), the research branch of the WHO. In 1998, the IARC had initiated an epidemiological study on second hand smoke. Based on industry information released during the settlement of the landmark State of Minnesota v. Phillip Morris case, Ong and Glantz (2000) detailed the explicit efforts of the tobacco industry to manipulate and control scientific evidence in order to sustain tobacco sales, despite the evident harm from second hand smoke.

Meat producers/processors. In Marion Nestle’s second text, Safe Food, an entire chapter discusses the efforts of the meat industry to resist regulations intended to promote food safety (Nestle, 2003). She draws attention to a) the weakness of US government oversight, based on historical and recent events; b) the collegial relationship between meat and poultry producers with government regulators; c) the often successful efforts of industry to block regulations contrary to their commercial interest; d) industry’s persistent refusal to accept responsibility for outbreaks of foodborne illness; and e) “science-based” reasoning as the fallback position to avoid unwanted government oversight.

Pharmaceuticals. As the former Editor-in-Chief of the *New England Journal of Medicine*, and now at the Harvard Medical School, Marcia Angell writes with considerable authority about how the pharmaceutical industry influences research, legislation, and medical practice to sustain enormous profits, irrespective of the human health and financial burdens imposed on the consuming public (Angell, 2004).

Lumber. An unusually transparent window into industry strategies was revealed when documents were leaked from an 8-year campaign by a public relations firm acting on behalf of *Timberlands West Coast Ltd.* (Hager and Burton, 1999). *Timberlands* is owned by the N.Z. government, and is responsible for logging N.Z. forests. Environmental groups campaigned to protect remaining old growth, native forest in N.Z. The counter-campaign, authorized by secret government memos, encompassed everything from efforts to discredit and marginalize opponents in the media to sending moles to activist meetings and ghost-writing letters to the editor for front groups (Hager and Burton, 1999).

Asbestos. Industry approaches to prolonging the lifespan of a lucrative product

are succinctly synthesized in the following quote from David Ozonoff of Boston University. From the perspective of a witness in litigation involving asbestos, he described the approach industry used to downplay liability:

“Asbestos doesn’t hurt your health. OK, it does hurt your health but it doesn’t cause cancer. OK, asbestos can cause cancer but not our kind of asbestos. OK, our kind of asbestos can cause cancer, but not the kind this person got. OK, our kind of asbestos can cause cancer, but not at the doses to which this person was exposed. OK, asbestos does cause cancer, and at this dosage, but this person got his disease from something else, like smoking. OK, he was exposed to our asbestos and it did cause his cancer, but we did not know about the danger when we exposed him. OK, we knew about the danger.....” etc. (cited in Rampton and Stauber, 2001; p.86).

Indeed, a full range of methods for controlling both information and decisionmaking is utilized by industry, as detailed in a ‘how-to’ manual - Managing Activism - written by Denise Deegan (2001).

In sum, ample evidence exists to question the universality of the premise that what is good for industry is good for society. Industry exists for profit, but government exists to serve its people. Problems necessarily arise when government presumes that both social and industry agendas can be met through the same policies.

Premise 2. that the near absence of profit in primary agriculture today is just the nature of free market forces, rather than the intentional outcome of industry-friendly government policies (NFU, 2003) The intentional ‘cheap food’ policy of the federal government, as formulated in the 1969 Federal Task Force on Agriculture report, Canadian Agriculture in the Seventies, has:

- given Canadians very cheap food indeed, as Canadians spend just 11% of disposable income on food, compared with 10% for the US and UK, 19 to 20% for Italy, Germany, Japan, Israel, and Spain, 33% for Mexico, and 50% for India (Martz, 2004), while simultaneously,
- successfully bankrupting the Canadian farm community.

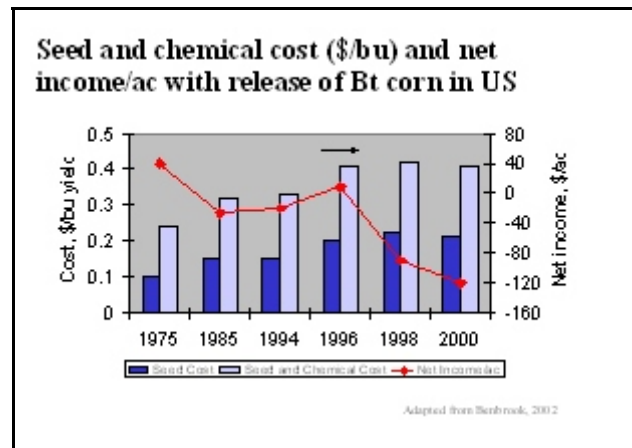
The failure of Canadian farm policy to support Canadian farmers is well and fully discussed in the 2003 NFU publication The Farm Crisis, Bigger Farms, and the Myths of “Competition” and ‘Efficiency’.

Suffice it to say here, that farmers are in perpetual ‘crisis’ for two reasons. First, farmers responded energetically - but incautiously - to government exhortations to become ever more ‘efficient’. How does increasing efficiency portend the farm financial crisis? Whether crop yield or calf rate of gain or rolling herd average, yield responds to inputs in a diminishing returns

curve, illustrating what Allan Nation calls the ‘easy 80% rule’. He says that the first 80% of anything is ‘easy’ to get and comparatively profitable (good return per unit investment on the steep part of the curve). The problem occurs when farmers spend the profit from the first 80% to attain the last 20%, and end up with nothing. This is the inexorable outcome of pushing farmers to become ‘more efficient’ - pushing them further out onto the flatter part of the diminishing returns curve. This is particularly true when the costs of so doing rise sharply while commodity value decline².

The second reason is consolidation, enabled by weak or unenforced anti-trust legislation. In point of fact, Canadian farmers are so efficient that production efficiency has little to do with it anymore. Government has intentionally positioned farmers in the middle as helpless price **takers**, caught between the heavily consolidated input and commodities sectors. The National Farmers Union (NFU, 2003) notes that while the value of Canadian farm production has doubled since the 40's - from \$17 to \$35 billion - the corporations which sold the yield-boosting inputs absorbed not just the whole \$18 billion in added production revenue but a further \$8 billion, leaving farmers worse off than before. In other words, **industry captured 144% of the revenue added by farmers** through increased productivity since the 1940s.

Similarly, for Bt corn between 1996 and 2001, Benbrook (2002) calculated that US farmers paid at least \$659 million in price premia to grow Bt corn, but returned just \$567 million, **for a net loss of \$92 million**. He further demonstrated that seed and chemical costs borne by cornbelt farmers, *per bushel of grain produced*, increased by about 35 and 40%, respectively, between 1994 (pre-GM release) and 1996 - the first year of Bt seed corn availability, remaining constant thereafter.



The \$659 million in price premia paid by farmers between 1996 and 2001 was split among just 3 companies - Pioneer/DuPont (nearly half); Monsanto/DeKalb/Asgrow (just over 20%); and Syngenta/Garst (just over 30%) (Benbrook, 2002). Expressed as a percent of company profits between 1998 and 2000, the Bt price premia averaged 2% for Pioneer/DuPont, 48% for Monsanto, and 25% for Syngenta.

Clearly, the economic benefit of modern technology - and especially GM crops - has accrued to the purveyors of the technology, not to the farmers.

The key point to get here is that the farm financial crisis has little to do with free market economics, and everything to do with consolidation enabled by government policy. What has been made by policy can also be unmade by policy.

Premise 3. that the displacement of small to medium sized farms and infrastructure with megafarms and mega-processors is good for Canada. High density confinement creates a range of adverse environmental influences which directly compromise human as well as livestock health, as summarized by Clark (2004).

In the recent outbreak of avian flu, over 19 million birds were slaughtered in BC, of which 1.2 million tested positive. The slaughter included 18,000 birds from 600 backyard flocks, yet only 1 of those 600 backyard flocks tested positive - and that was 3 days after a neighboring high density confinement barn was depopulated, 400 m away.

Disease spreads most readily when animals are crowded together in sterilized facilities, denied any opportunity to develop immunity, and routinely exposed to prophylactic antibiotics in the feed. Thus, the same high density confinement approach to livestock production which generates economies of scale was also responsible for virtually all of the cases of avian flu in BC.

According to Dr. Earl Brown of the University of Ottawa (ebrown@uottawa.ca), avian flu comes from wild, migratory, aquatic birds. Once it is in a flock, risk of mutation leading to high-virulence forms of the influenza virus is a function of animal density and time duration of exposure. Thus, the high density confinement which permits economies of scale that favor industry also exposes everyone else - including small backyard operations - to risk of disease evolution, adaptation, and spread. The problem is not the livestock industry, but the configuration of the industry into ever larger and more consolidated production units with clear implications for both human and environmental health.

Processing infrastructure in Canada is increasingly dominated by mega-operations, often under foreign ownership. For example, 60% of all the beef processed in Canada comes from just 2 Alberta plants - Lakeside at Brooks (owned by IBP-Tyson) and Excel at High River (owned by Cargill) - both US companies. Meat packing is the fourth largest manufacturing industry in Canada (behind cars, petroleum, and wood) - and is dominated not just by mega-corporations, but by foreign-owned mega-corporations. The magnitude concentration of power in just a few corporations - whether for pork or beef or grains - puts farmers and other independent entrepreneurs at a huge disadvantage. And to whose benefit?

As of April 2004, there were 33 federally-inspected abattoirs in Ontario which accounted for roughly 90% of the meat produced, with the remaining 10% from 191 smaller, provincially-regulated abattoirs distributed in more remote communities (Haines, 2004). Provincially-inspected abattoirs, which produce for consumption within the province, have declined by 28% just since 1998-99. It is proving increasingly difficult for farmers and farmer co-ops to access abattoirs, egg handling stations, millers, bakers, or cheesemakers able to handle small scale production within a realistic travel distance. Again, does this trend really improve food safety, or does it simply increase dependence on large-scale production units and imported product?

Local and regional food processing infrastructure is disappearing in Ontario, as in the rest of Canada - in part due to the prohibitive expensive of upgrading to meet HACCP and other

regulations. But is the risk to public safety from small, local processing facilities sufficient to justify onerous upgrades? Where are the really huge challenges to food safety actually occurring? The largest meat recalls in history were obliged through contamination at consolidated mega-facilities:

- 1997 (Hudson Foods, **25 million lb** of meat contaminated with *E. coli* from Columbus, NE); 1998 (Bil Mar/Sara Lee, **15 million lb** of meat contaminated with *Listeria* at a Zeeland, MI plant; and Thorne Apple Valley, **30 million lb** of meat contaminated with *Listeria* at a Forrest City, Arkansas plant) (<http://www.cnn.com/FOOD/news/9901/29/meat.recall/>) and
- 2002 (Pilgrim's Pride/Wampler Foods, **27 million lb** of meat contaminated with *Listeria* from a Franconia, PA plant; and ConAgra, **19 million lb** of meat contaminated with *E. coli* from a Greeley, CO plant) (Schlosser, 2002).

In these cases, each from a different mega-plant, people - sometimes hundreds of people - were sickened or killed by contamination originating at huge plants which distribute meat over vast geographical areas. In each case, the industry had lobbied aggressively - and successfully - to avoid regulation. As reported in the New York Times (Meat Safety at Risk, 1 Feb 03, p.18),

“Judge Joseph Bataillon of the Federal District Court rebuffed an Agriculture Department effort to shut down the operations of Nebraska Beef, an Omaha slaughterhouse with numerous citations for violating standard sanitary operating procedures. The plant was chosen for special scrutiny after the discovery last year of deadly *E. coli* bacteria in ground beef produced by a Nebraska Beef customer. In granting a temporary restraining order blocking the closure, the judge elevated the economic interests of a local employer over public health while questioning the government's power to act under current law.”

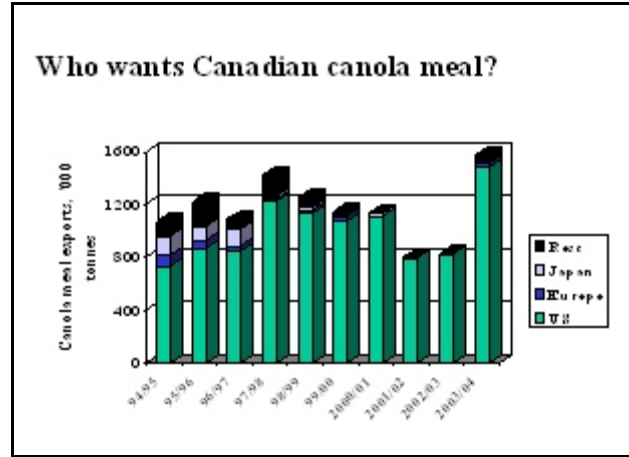
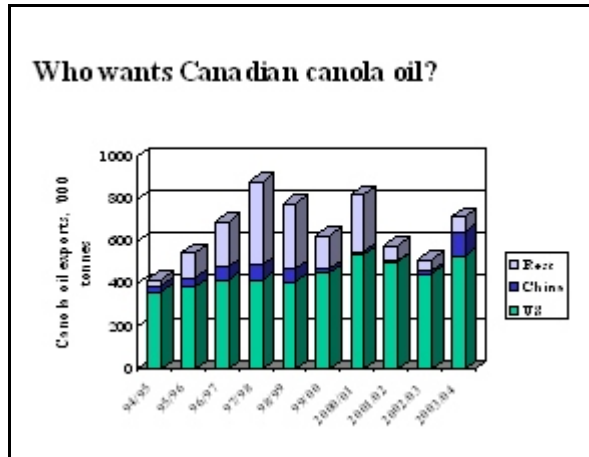
Numerous examples of industry lobbying successfully to resist needed regulation are documented by Nestle (2002). According to Schlosser (2002), who is also the author of Fast Food Nation, “America's food safety system has been expertly designed not to protect the public health but to protect the meatpacking industry from liability”. And these are the people that Bill C-27 proposes to entrust with the safety of imported food for Canadian tables?

Premise 4. that biotechnology has actually benefitted both Canadian agriculture and the place of Canada in the world. Both in Bill C-27 and in proposed changes to the Plant Breeders Rights Act and Seeds Act, there is a clear emphasis on strengthening the rights of the seed industry, and in particular, the biotechnology industry, at the expense of the farm community. It does not seem to imprudent to ask why.

We now have 9 years of commercial experience upon which to assess whether the confidence of the Canadian government in agricultural biotechnology was justified. Yet curiously enough, no federal agency has yet commissioned or published an on-farm survey to gauge how well GM has actually fulfilled its promises for higher yield, lower biocide use, or greater profit for farmers. In

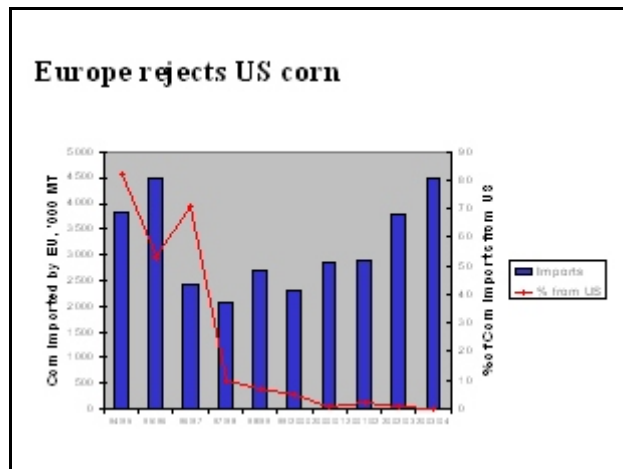
fact, the only publicly available farmer survey information comes from a dated exercise conducted by the Canola Council of Canada in 2000 (An Agronomic and Economic Assessment of Transgenic Canola), which is itself the proprietor of a GM canola cultivar.

What can be deduced, however, is the reluctance of the rest of the world to buy GM canola from Canada. According to data mounted at the Canola Council of Canada website,



the world began to shun Canadian oil and meal - with the fortunate exception of the US (oil and esp. meal) and in just the last year, China (oil) - as the GM fraction of the Canadian crop increased. As a result, Canada is now almost wholly dependent upon the US to buy a major export crop.

Global refusal to buy GM is not limited to Canadian canola. Another example is the loss of US corn exports to Europe, coincident with the introduction of GM corn. Over this time interval, that is a loss of **500 million bu**, a lost demand which is estimated to have cost US farmers \$1/bu or \$10 billion just for the 2003 crop (<http://www.mindfully.org/GE/2004/Corn-Exports-Loss5mar04.htm>).

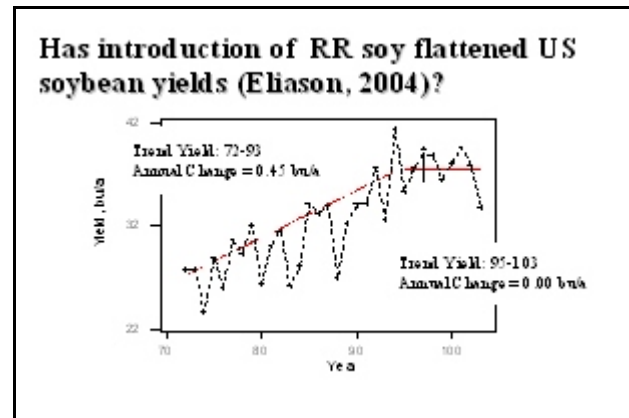


In truth, even today, just 6 countries jointly account for 99% of global GM hectareage, with just 3 - US, Argentina, and Canada - accounting for fully 90% (Pew Initiative on Food and Biotechnology, 2004). The world is **resisting** - not welcoming - both GM technology and those nations which are forcing it on them.

Since when do people have to buy something just because we want to sell it?

Has ag biotech delivered in the US? Unlike Canada, farmers are periodically surveyed by the USDA, yielding almost uniformly disappointing results. Contrary to expectation, yield of RR soy - the single largest GM crop in the US - actually appears to be constrained by the RR trait. In a report presented at the 2004 Midwest Soybean Conference, Eliason and Jones (2004) demonstrated that US soybean yields peaked in 1994 and then flattened following release of RR cultivars. They were unable to relate this pattern to severe weather events, leaving open a possible adverse effect of the RR trait itself.

Supporting that conclusion, a range of industry-, university-, and state-sponsored surveys summarized by Benbrook (2001) and Martinez-Ghersa et al. (2003) have shown that RR soybean typically yields 5 to 10% *less* than conventional soybeans - *not more*. In fact, because 99% of the GM traits in commerce today are either herbicide tolerance (HT) or Bt - **rather than yield** - it would be surprising if yield of GM crops were be higher. The general absence of a yield benefit, coupled with the fact that 99%



of GM consists of just four industrial - **not human food** - crops, discounts the notion that biotech is helping to 'feed the world'. This may also explain the marked lack of enthusiasm for GM in the rest of the world, as seen at the Biosafety Protocol negotiations and elsewhere.

Both Bt and HT are implausible candidates if the goal is to reduce biocide use. Insecticides are not typically used at all on the target of most Bt corn - European cornborer. Thus, no savings in insecticide use could come from Bt-corn, although Bt-cotton shows more promise, as its target - the budworm/bollworm complex - is liberally sprayed with insecticides.

USDA researchers Fernandez-Cornejo and McBride (2002) reported that RR soy requires **more**, not **less**, active ingredient (a.i.) per acre than competing herbicides, many of which are designed to act at very small concentrations. Using typical US tank mixes, herbicide rates on farms range from **0.84 to 2.63 kg a.i./ha for RR soybeans** vs. **0.09 to 1.68 kg a.i./ha for conventional cultivars** (Table 1.10; Benbrook, 2001). While the USDA researchers attributed a net reduction of **2.5 million pounds** biocide a.i. in 2000 to the adoption of GM corn, soy, and cotton crops, primarily due to Bt-cotton in some states, total biocide use on corn, soy, and cotton in 2000 was about 327 million lb. Thus, as of 2000, converting 68% of US soybean acreage to HT soybean, 56% of US cotton acreage to HT cotton, 19% of US corn acreage to Bt corn, and 37% of US cotton acreage to Bt cotton reduced biocide use by 2.5 of 327 million lb or a barely distinguishable **0.7%** in biocide a.i.. There is no objective evidence to support the claim that either RR soy or Bt corn reduce biocide use.

In fact, Benbrook (2003) reported that the cumulative effect on US biocide use over the last 8

years was: HT crops *increased* biocide use by 70 million lb; Bt crops *reduced* biocide use by 19.6 million lb (almost wholly on cotton, although even this amount is a small fraction of total biocide use for cotton over the previous 8 years), with the net effect that **cumulative biocide use** in the US over the last 8 years has **increased by 50.6 million pounds** due to GM crops.

Calculations from Benbrook (2004) indicate that rate of herbicide (glyphosate plus other herbicides) application to GM soy has *increased* over the previous 9 years at a rate of 0.07 lb a.i./ac/year ($r^2 = 0.87$) primarily due to herbicide resistance in weeds. Seven weed species now have biotypes resistant to glyphosate - rigid ryegrass, goosegrass, marestalk, Italian ryegrass, hairy fleabane, buckhorn plantain, and ragweed (<http://www.weedscience.org/>). The recent emergence of RR-marestalk biotypes in soy or cotton fields in each of 10 US states and most recently, RR-ragweed in Missouri soy fields, suggests that use of glyphosate on RR-crops is the cause. Martinez-Ghersa et al. (2003) also referenced Roundup resistance in 2 other soybean weeds - common waterhemp and velvetleaf.

And what about profit? Based on survey data, USDA researchers Fernandez-Cornejo and McBride (2002; p.24) stated: **“Perhaps the biggest issue raised by these results is how to explain the rapid adoption of GE crops when farm financial impacts appear to be mixed or even negative....Even more puzzling, the adoption of herbicide-tolerant soybeans and Bt corn has been rapid, even though we could not find positive financial impacts in either the field-level nor the whole farm analysis”**.

Whether for yield, biocide use, or profit, there is no objective evidence - apart from industry-funded lobby groups - to suggest that GM crops have actually fulfilled what was promised to gain approval for commercializing this technology. As such, continued government support, funding, and even cheerleading for agricultural biotechnology - and for the seed trade that continues to promote it - is without demonstrable justification.

The evidence presented above challenges each of the four premises which appear to underpin the thinking of legislators drafting Bill C-27.

Partner vs. Leadership Role for Government

The second possible reason why legislators might draft a bill contrary to the interests of their own citizens is an overly collegial relationship with industry. Not only does this give industry unprecedented license to set the agenda, establish the priorities, and direct research in Canadian government and academic labs - at taxpayers expense - but it also causes government to ‘think’ like industry.

What does that mean? Consider that how you frame a question predetermines the range of possible outcomes. In broad terms, industry’s goal is to sell product. To continue to sell product, the **problem** or issue addressed by the product must persist long enough to recover development costs and make a profit. As a result, industry necessarily focuses on symptoms rather than causes of problems. If Monsanto’s Roundup worked at the causal end of weed problems, it would put

them out of business in a year. Ensuring that the problem reoccurs year after year sustains sales, but disadvantages farmers who become dependent on ever more costly products.

Conversely, to actually **solve or avoid** the problem in the first place - and in so doing, to benefit farmers by lightening their dependence on purchased symptom fixes - frames an entirely different question, yielding entirely different approaches (Table 2). To genuinely solve or avoid a problem requires strategies focusing on the causes rather than symptoms. Solutions often require ‘whole system’ rather than piecemeal thinking, as shown in Table 2.

Table 2. Comparison of problem perpetuating vs. solving approaches to the same problems.

Problem	Problem <i>Perpetuating</i> (Industrial) ‘Symptom-oriented’ Approach		Problem <i>Solving/Avoiding</i> (System) ‘Causally-oriented’ Approach	
	Symptom	Solution	Cause	Solution
Endemic farm financial crisis	Angry farmer tractorcades on the 401	Periodic bail out packages	Industry-driven farm policies	Rethink the policies: “design is the first sign of intention”
Nutrient contaminated surface- and groundwater	Excess P going onto land around confinement facilities	Nutrient Management Act of 2002; and the GM enviro-pig	Factory farming	Land-based, behavior-oriented livestock systems
Increasingly aggressive weeds	Weed escapes	Herbicide tank mixes, applied more often	Dysfunctional crop rotation/mgt	More complex rotations
Death and sickness from eating contaminated meat	Pathogenic <i>E. coli</i> contamination	Irradiation	High grain feedlot ration (Diez-Gonzalez et al., 1998)	Grass-based production systems

Thus, thinking like industry perpetuates the problems facing farmers by prolonging dependence on purchased solutions - to the benefit of industry - with no end in sight.

In the industrial paradigm which increasingly dominates government thinking, the problem never actually ends, leading to the increasingly intrusive, almost desperate regulatory stance reflected in Bill C-27, in Ontario’s Nutrient Management Act of 2002, in the obligation for HACCP (Hazard Analysis Critical Control Point) compliance at all levels, and countless other regulatory burdens. This is like trying to stop up holes in a dike, when fresh holes are opening faster than you can cover them.

A further societal detriment occurs because ‘thinking like industry’ **concentrates benefit**, funneling profit back to the purveyor of technology, at the expense of other stakeholders. Surely, the business of government is to equitably distribute rather than concentrate benefit. Yet, adopting industry-style thinking - as in the government’s willing collaboration with Monsanto on RR-wheat - precludes that.

RR Wheat Case Study. Consider the example of RR wheat - an application developed collaboratively by Monsanto and the Canadian government with little or no consultation with the affected farm community. At the Univ of Saskatchewan, Furtan et al. (2003) concluded that introducing RR wheat in Canada would **cause:**

- **losses of \$45.8 and \$32.3 million annually to the adopters and non-adopters of the technology, respectively, and**
- **gains of \$156.6 million annually to Monsanto.**

Farmers lose because most importers of Canadian wheat say they won't accept GM wheat, and it is not feasible to segregate them. Everybody loses except Monsanto because the price of GM-contaminated wheat would be devalued in the marketplace.

RR wheat was conceptualized in the industrial model - as a way to sell product, without regard to what either farmers or consumers wanted or needed. It is therefore not surprising that the only beneficiary would be Monsanto. This case encapsulates elements of what needs to change if academia is going to be prepared to deal with the really big issues facing society today and tomorrow.

In sum, retreating from a leadership to a 'partner' relationship with industry not only advantages industry, but also blinds government to both the magnitude of - and genuine solutions to - the big problems facing us today.

CONCLUSIONS

McDonough and Braungart (2002) observed that '**regulations are an indication of design failure**'. Specifically, the more you need to regulate something to make it work, the more you should step back and look for flaws in the design itself. In the context of food safety, you have clearly looked at the mounting complexity - and vulnerability to failure - of attempting to regulate a fundamentally flawed system and found it impossible. The question is, should you:

- further weaken government responsibility/liability for the inevitable food-related outbreaks such as mad cow, avian flu, and pathogenic *E. coli* - which are unquestionably encouraged by consolidation, specialization, and factory farming - by streamlining the entire system into a logistically impossible burden for CFIA inspectors; and
- make the safety of Canadian foods subject to decision making by foreign regulators with a well documented track record for incompetence; while simultaneously
- downloading ever more of the regulatory burden onto the farm community,

all in a futile effort to make the system work? Or do you step back, reconsider the assumptions upon which Bill C-27 is based, acknowledge the degree to which partnering with industry by contemporary governments is detrimental to the health and safety of Canadian food - and **redesign the system?**

Add to this the unprecedented environmental and resource issues which confront us on every side, and it is clear that 'more of the same but better' is not the right answer. According to the Millenium Ecosystem Assessment (<http://www.maweb.org/en/index.aspx>), we are past the time

when we could simply twist a few knobs and bring things back into balance. We have evolved a culture that is living beyond its means. Facilitating even more globalized trade cannot but make it worse. The bottom line is that human activity has sufficiently strained many ecosystems as to raise serious doubts about the ability of the planet to sustain future generations. So - what are you going to do about it? Bill C-27 is not the answer.

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EndNotes

1. Following is a listing of just a few of the many recommendations made by the Royal Society of Canada Panel on Food Biotechnology, none of which has yet been implemented by either the CFIA or Health Canada.

No.	RSC (2001) Recommendation:	Change in CFIA protocol to date?
7.1	“...that approval of new transgenic organisms for environmental release, and for use as food or feed, should be based on rigorous scientific assessment...should replace the current regulatory reliance on “substantial equivalence” as a decision threshold.”	None
7.2	. “...that the design and execution of all testing regimes of new transgenic organisms should be conducted in open consultation with the expert scientific community”	None
7.3	. “...that analysis of the outcomes of all tests on new transgenic organisms should be monitored by...’arms-length’ experts from all sectors who report their decisions and rationale in a public forum.”	None
8.1	. “...that new technologies should not be presumed safe unless there is a reliable scientific basis for considering them safe. The Panel rejects the use of ‘substantial equivalence’ as a decision threshold to exempt new GM products from rigorous safety assessments on the basis of superficial similarities..”	None
9.2	“...that Canadian regulatory agencies seek ways to increase the public transparency of the scientific data and scientific rationales upon which their regulatory decisions are based.”	None