

Standing Committee on Agriculture and Agri-Food

STUDY: C-474: An Act respecting the Seeds Regulations (analysis of potential harm)

Speaking notes

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Thank you for inviting me to present to the Committee on Bill C-474, an Act respecting the Seeds Regulations.

I should preface my remarks with my background and expertise. I am an international political economist with the Johnson Shoyama Graduate

School of Policy at the University of Saskatchewan in Saskatoon. I teach, do scholarly research and consult on the role of technology in economic development, markets and trade, with a particular focus on agricultural biotechnology.

In the interests of full disclosure, I have past employment experience in industry (banking) and government (Saskatchewan) and have held a number of academic appointments in Canada and abroad that have allowed me to investigate matters of technological change and innovation policy. In particular, I have been applicant and senior research collaborator on more than 20 national and international grants and contracts that have generated more than C\$150 million to support research and scholarly investigation of new technologies in the global agri-food system. I have held peer-reviewed grants from SSHRC, NSERC, the NCE program and Genome Canada, contracts with Saskatchewan Department of Agriculture and Food, Agriculture and Agri-Food Canada, the Canadian Food Inspection Agency, Western Economic Diversification, the Canola Council of Canada, the Saskatchewan Seed Growers Association, Monsanto, AgWestBio, the State of Victoria, the OECD, and a number of law firms in Canada and the US litigating market effects of innovation. I was a member of the Canadian Biotechnology Advisory Committee for 7 years (I served as co-chair of the review of Canada's regulatory regime for biotechnology)

and was a Canadian member of the NAFTA Chapter 13 expert panel investigating GM corn in Mexico. I am also co-editor of *AgBioForum*, the preeminent on-line peer-reviewed journal that concentrates on the economics and politics of the global agricultural biotechnology industry.

We are here today to discuss the merit of a proposed amendment to the Seeds Regulations. It is important to start from the intent of the Act and Regulations, which is to ensure the efficacy and transparent identification of commercial seeds imported into, produced in and exported from Canada. The ultimate goal of this measure is to ensure the marketplace is able to optimally develop, access, use and trade commercial seeds--in short to enhance innovation in the crops industry by balancing the interests of individual producers with the interests of seed developers, seed merchants and the grain trade.

This proposed amendment has laudable intent. In a perfect world it would enhance Canada's capacity to produce highly competitive, quality-assured, differentiated seeds and trade them successfully in Canadian and foreign markets.¹

While the intent of the amendment is admirable, the mechanism is flawed—it could very likely yield perverse effects on producers, on the

¹ Bill C 474, S.2: "The Governor in Council shall, within 60 days after this Act comes into force, amend the Seeds Regulations to require that an analysis of potential harm to export markets be conducted before the sale of any new genetically engineered seed is permitted."

rate of innovation in the sector, on the national and global food trade and on centres like Saskatoon that are integrally involved in furthering science-based agriculture.

At the heart of this discussion is what type of innovation we will be able to sustain in the Canadian agri-food industry. In brief, innovation involves the introduction of a new good or a new quality of an existing good, a new method of production, opening of a new market, introduction of a new supply of inputs to a production system or a new organizational structure in an industry.

While one might expect we might be able to create something new that does not affect others, this is seldom the case. Austrian economist Joseph Schumpeter asserts that innovation is fundamentally about “creative destruction”—innovative entry by entrepreneurs generate the force that sustains long-term economic growth, even as it destroys the value of established companies and labourers that enjoy some degree of power or privilege based on previous technological, organizational, regulatory and economic structures.² In short, economic progress is about the unrestrained contesting of markets by new ideas, new technologies, new products and new organizations.

² Schumpeter, J. (1934), *The theory of economic development*, Cambridge, MA: Harvard University Press. Schumpeter, J. (1939), *Business cycles: a theoretical, historical and statistical analysis of the capitalist process*, New York: McGraw-Hill. Schumpeter, J. (1954), *Capitalism, socialism, and democracy*, London: George Allen and Unwin.

Obviously, there are many types of change.³ At one extreme, most technological change involves small, incremental, infill inventions that can easily fit within existing systems governing production, marketing and use. They emerge, are adapted and are adopted almost without any apparent effort or conscious decision. At the other extreme, transformative innovations are much more dynamic and expansive. This type of change involves disjointed, step adjustments in our productive and institutional capacity which displaces, destabilizes or overturns pre-existing systems. They are usually driven by new epistemologies, they offer significant complementarities (within and across sectors) and they tend to involve convergent, recombined or hybrid technologies. While they are often enthusiastically announced, they seldom remain under the control of any single sector, market or domain, as they tend to infiltrate and influence others over a long and variable timeline. The pervasive and expansive nature of transformative change creates uncertainty—it is seldom clear until well after a launch where, when, how, by whom and why the technology will spread to other uses—which tends to generate significant debate and controversy.

Professor Nathan Rosenberg from Stanford University asserts that transformative technology requires “the freedom to conduct

³Phillips, P. 2007. *Governing transformative technological innovation: Who’s in charge?* Oxford: Edward Elgar, pp. 306.

experiments.”⁴ Given the uncertainty about where, when and how new transformative technologies can be usefully adapted and adopted (and by extension an inability to identify who should be engaged), there is probably a fine balance between over-governing and under-governing transformative innovation. This poses a major challenge for societies that wish to make a serious commitment to technological innovation.

In that context, asserting that new crop varieties—whether the products of genetic engineering or not—should or even can be assessed to ascertain their market acceptance is problematic.

Let me use a real-world example that I have studied extensively in recent years to illustrate the challenge. The development and commercialization of genetically-modified, herbicide-tolerant canola in Western Canada exemplifies the problems of successfully undertaking (and regulating) transformative innovation.

In 1994-5, when Monsanto and AgrEvo (since consolidated in Bayer Cropscience) were nearly ready to introduce herbicide tolerant canola (anticipating regulatory approval in Canada and the US), the oilseeds trade and producers’ associations expressed concern that the new traits had not received approval for import into Japan and the European

⁴ Rosenberg, N. (1994), *Exploring the black box: technology, economics and history*, Cambridge University Press.

Union, which together accounted for about half of the market for Canadian canola in the 1992-5 period.⁵ In response, the two companies, the Canola Council of Canada and the regulators collaborated to develop and quality-assure an identity preserved production and marketing (IPPM) system to contain the seed in North America. After two years of successful operation, Japan authorized both varieties for import and Monsanto and Agrevo, after consultation with the CCC, wound up the IPPM system.

This story illustrates a number of aspects of agri-food innovation I encourage you to consider before proceeding with this amendment.

First, those two traits—combined with 10 additional GM traits introduced in canola in the intervening period—are estimated to have generated more than \$1.2 billion of net benefit to Canadian farmers in the past 15 years, to have netted the seed developers more than \$1.5 billion in revenues (which has been reinvested, taxed or disbursed to shareholders in Canada and around the world) and to have enhanced the welfare of consumers (many of whom are low-income families in developing nations) by about \$600 million.⁶ All in all, the canola-based

⁵ The full story is told in Smyth, S. and P. Phillips. 2002. Competitors co-operating: Establishing a supply chain to manage genetically modified canola. *International Food and Agribusiness Management Review* 4(1), pp. 51-66.

⁶ Brookes, G., Barfoot, P. (2009). Global Impact of Biotech Crops: Income and Production Effects, 1996-2007. *AgBioForum*, 12, 184-208. Accessed from (http://www.pgeconomics.co.uk/pdf/2009socioeconimpacts_agbioforumpaper.pdf). Phillips, P. 2003. The economic impact of herbicide tolerant canola in Canada. In N. Kalaitzanon (ed) *The economic and environmental impacts of agbiotech: A global perspective*. Kluwer, pp. 119-140.

innovative effort has enhanced economic and social welfare in Canada and around the world by as much as \$3.3 billion.

Second, the EU market has not yet approved the Agrevo variety. If the seed developers had been held to the intent of this amendment, all of their investments in canola (estimated at more than C\$300million in 2000\$)⁷ would have been forfeit and Canadian farmers and global consumers would have foregone more than \$3 billion in economic gain from this new technology.

Third, if successful commercialization of HT canola was delayed or foregone, private seed development in many key Canadian crops would have been at jeopardy. Some of my earlier research has estimated that the purpose-built IPPM system constructed by Monsanto, Agrevo and the canola industry generated net gains of more than \$100 million by accelerating the adaptation and adoption of the new varieties before full market acceptance.⁸ Agrifood innovation and productivity has been lagging in recent years (CAIRN 2009). Productivity in non-farm settings has risen far faster than in farm settings, at least partly because of the lack of investment in R&D to bring new traits or new crops to the

⁷Phillips, P. 2003. The economic impact of herbicide tolerant canola in Canada. In N. Kalaitzanonakes (ed) The economic and environmental impacts of agbiotech: A global perspective. Kluwer, pp. 119-140.

⁸Smyth, S. and P. Phillips. 2002. Competitors co-operating: Establishing a supply chain to manage genetically modified canola. International Food and Agribusiness Management Review 4(1), pp. 51-66.

market.⁹ According to the UN and FAO, biotechnology offers one of the more important tools for sustaining and enhancing innovation, enhancing global productivity and sustaining relative incomes in the global farm sector.¹⁰ There is a very real threat that grain farming, which is increasingly knowledge and capital intensive, would be unable to compete (both in Canada and abroad) for mobile factors of production. This would exacerbate the consolidation of the farm sector and contribute to the forecast rising instability in global food markets.

Fourth, the market is both able and willing to manage the introduction of new technologies. The canola story set the gold standard for introduction of new technologies into contested markets. When GM wheat was proposed by Monsanto in 2005, there was similar controversy. In response, Monsanto issued a “pledge” to producers in Canada and the US to forgo release of their technology until major export markets approved the variety—to date they have abided by that pledge and the technology remains out of the market.¹¹ Other controversial or potentially disruptive technologies have been similarly managed by

⁹Alston, J., M. Mara, P. Pardey and T. Wyatt (1998), ‘Research returns redux: a meta-analysis of the returns to agricultural R&D’, Environment and Production Technology Division Discussion Paper No. 38. Washington: International Food Policy Research Institute. W. Lessor, P. Phillips, et al., 2003, “IPRs in Agriculture: Implications for Seed Producers and Users”, report and statement to the American Society of Agronomy-Crop Science Society of America-Soil Science Society, November.

¹⁰ Byerlee, D. (2009, June). Feeding the world in 2050: The yield challenge for cereals and the role of biotechnology. Paper presented at the 13th International Consortium on Agricultural Biotechnology Research (ICABR) Conference, Ravello, Italy.

¹¹Kalaitzandonakes, N., P. Suntornpithug, and P. Phillips. 2004. Roundup Ready wheat in Canada and the US: A survey and analysis of potential farmer adoption. Conference paper presented at the 8th ICABR International Conference on Agricultural Biotechnology: International Trade and Domestic Production, Ravello (Italy), July 8-11.

developers in collaboration with key producers associations or supply chain actors. Some argue these processes have succeeded not in spite of but because the government is not defining the rules—market actors fundamentally have the most at stake and the most flexibility in developing solutions to market problems.

Fifth, even though HT canola has been successfully adopted, some market segments have not accepted it. The attempted class-action lawsuit by Hoffman and Beaudoin on behalf of the Saskatchewan Organic Directorate against Monsanto Canada Inc. and Aventis Cropscience Canada Holding Inc. in 2003 was one effort to halt, roll-back or seek compensation from the two technology developers for the purported loss of organic canola markets in North America and the EU. While the class was not certified, and hence the claims have not been dealt with in substance, it does highlight that even with highly successful products that some ‘creative destruction’ is likely and probably inevitable. Putting the burden of proof on the proponent of new technology would likely have a significant chilling effect on private investment.

Sixth, while this set of innovations was commercialized by global life science companies, the underlying science, agronomy, industrial and commercial infrastructure and sheer innovativeness was and remains largely the product of federal and producer investments in and individual

commitment to research in Canada, especially in Saskatoon. In some ways, these research centres will be sentinels of any effects of this amendment, acting as the proverbial ‘canary in the coal mine.’ Extensive effort and investments in Canada—by AAFC, the NRC, the governments of Canada, Saskatchewan and Saskatoon, the University of Saskatchewan, various provincial and national producers’ associations and the Canadian biotechnology industry—have helped to create a world-class, agri-food research cluster in Saskatoon that has brought you GM canola, most of the new pulse varieties, major developments in small grains, key animal vaccines, and many other animals-based innovations needed for 21st century agriculture.¹² Neither the public sector nor small, disjointed private research groups can deliver these kinds of outputs. We increasingly need the scale and scope benefits of global research clusters. Adding to the regulatory burden, and in some creating rules that will halt further development of entire research streams in response to perceived market difficulties would much of that investment. The long-term viability of agriculture is not about keeping up with our foreign competitors—it is about generating enough value-added to compete for land, labour and capital with other domestic industries. Without science, the industry is unlikely to sustain that effort (in Canada, at least).

¹²Phillips, P. and G.G. Khachatourians. 2001. *The Biotechnology Revolution in Global Agriculture: Invention, Innovation and Investment in the Canola Sector*. CABI, pp. 360. Phillips, P. 2002 *Regional Systems of Innovation as a Modern R&D Entrepot: The Case of the Saskatoon Biotechnology Cluster*. In J. Chrisman et al. (eds.), *Innovation, Entrepreneurship, Family Business and Economic Development: A Western Canadian Perspective*. University of Calgary Press, pp. 31-58.

In a perfect world, every new innovation would be easily accepted into the market. Unfortunately, sometimes we can supply things that some consumers in the market are not overly excited by or initially do not appear to want. Matching demand and supply is something the market is best suited to lead—supported by government but not led by or constrained by inflexible government rules.

In conclusion of my substantive argument, I strongly assert that innovation is not and cannot be about managing change. Management of innovation is an oxymoron. Innovation by nature is chaotic. It only truly thrives where there are competing models, competing structures, competing ideas, competing investments and competing organizations. Looking to the international marketplace, we are unlikely to predict what our opportunities will look like in 2015 or later. In absence of clear insight, the most likely successful approach is to tolerate widespread challenges to our existing technologies, products and organizational structures, accepting that while some will fail, the seeds of our future are in the successes.

I commend the committee for engaging in a discussion about the regulation of GM foods in Canada. As noted by CBAC as far back as 2002, our regulatory system is among the best in the world—but it is

currently incomplete.¹³ I believe this proposed 42-word, well-intentioned and apparently simple and straightforward amendment is a veritable Trojan horse that would destabilize the vitally important Canadian agri-food innovation system. As an alternative, I strongly urge you to broaden the dialogue to consider how we might truly achieve the stated goals of this amendment—an efficient, effective and commercially viable research, development, regulatory commercialization system that delivers world-class agri-food products.¹⁴

Thank you for this opportunity to present to the committee. I have annotated this document with the primary references for my comments and would be pleased to make them available to the committee.

I would be pleased to answer any questions you might have.

¹³CBAC. 2002. Improving the Regulation of Genetically Modified Foods and Other Novel Foods in Canada: A Report to the Government of Canada Biotechnology Ministerial Coordinating Committee (Final report).

¹⁴ Some ideas for change are incorporated into: Phillips, P., S. Smyth and W. Kerr (eds). 2006. *Governing Risk in the 21st Century: Lessons from the World of Biotechnology*. Nova Science Publishers, pp. 112. Smyth, S. P. Phillips, W. Kerr and G. Khachatourians. 2004. *Regulating the Liabilities of Agricultural Biotechnology*. Wallingford, UK: CABI Publishing, pp. 210. Phillips, P and R. Wolfe (eds). 2001. *Governing Food: Science, Safety and Trade*. McGill University Press/Queens School of Policy Studies, pp. 174.

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Professional Career:

- 2009-14 **Director**, Masters of International Trade Program, Johnson Shoyama Graduate School of Public Policy, University of Saskatchewan.
- 2009-14 **Professor of Public Policy** (tenured), Johnson Shoyama Graduate School of Public Policy, University of Saskatchewan; associate member in Bioresource Policy, Business & Economic (Agriculture) and Economics & Political Studies (Arts).
- 2007-9 **Professor and Head**, Political Studies, University of Saskatchewan.
- 2007-8 **Director** (Pro Tem), Johnson Shoyama Graduate School of Public Policy.
- 2006-8 **Professor at Large**, Institute for Advanced Studies, University of Western Australia.
- 2005-6 **Sabbatical**: Visiting Professor, London School of Economics, London, UK (Aug-Sept 2005); Consultant, OECD, Paris (October-December 2005); Visiting Professor, European University Institute, Florence, Italy (Jan-Mar 2006); Honorary Research Fellow, School of Agricultural and Resource Economics, UWA.
- 2004-9 **Professor** (tenured), Department of Political Studies, University of Saskatchewan; Associate Member, Agricultural Economics; Associate Member, Management and Marketing, College of Commerce.
- 2002-2005 **Director**, vCollege of Biotechnology, University of Saskatchewan.
- 1999-2004 **Professor of Agricultural Economics, NSERC/SSHRC Chair in Managing Knowledge Based Agri-food Development**, University of Saskatchewan; Associate Member, Management and Marketing, College of Commerce; Professional Associate, Department of Political Studies.
- 1997-99 **Van Vliet Chair Professor of Agricultural Economics**, University of Saskatchewan.
- 1992-96 **Assistant Deputy Minister**, Policy, Saskatchewan Economic Development.
- 1990-92 **Director**, Policy and Research Branch, Saskatchewan Economic Diversification & Trade.
- 1983-87 **Senior Economist**, Economics and Forecasting, Saskatchewan Executive Council.
- 1981-83 **Research Economist**, Economics Division, Royal Bank of Canada, Montreal.

Education:

- 1987-89: **Ph.D. in International Relations (International Political Economy)**, London School of Economics. Thesis title: *The making of the European Community's wheat policy 1973-88: an international political economy analysis*. Supervisors: Professor Susan Strange & Michael Donelan (published as *Wheat, Europe and the GATT*, Pinter, 1990; reprinted in Japanese in 1992).
- 1980-81: **Masters of Science in Economics**, The LSE.
- 1976-80: **Bachelor of Arts** (Double High Honours) in Economics and Political Science, University of Saskatchewan, Saskatoon.

Key Accomplishments:

- Author, co-author or editor of eight books (one award winning and one translated into Japanese), 30+ peer reviewed book chapters, 20+ peer reviewed journal articles (one translated into Japanese and one into French), 30+ peer reviewed conference papers, 13 book reviews, 14 industry studies and more than 30 major invited conference presentations.
- Applicant, principal investigator or collaborator on peer reviewed research projects worth more than C\$150M in the past decade. During 2009-2013 applicant, principal investigator or collaborator on 9 peer-reviewed and funded collaborations, including: the International Consortium for Barcoding of Life (iBOL, \$50 million); Genome Canada Value Addition Through Genomics and GE3LS (VALGEN, \$5.4M); SSHRC MCRI on Innovation Systems Research Network II (\$2.5M); Genome Canada Designing Oilseeds for Tomorrow's Markets Project (\$17M); the Advanced Foods and Materials National Centre of Excellence (\$22M); AAFC Policy Research Networks on Trade and on Innovation (each \$750K); Genome Canada GELS project on Translating Knowledge in Health Systems (\$2.6); and SSHRC Knowledge in Society Project (\$300,000).
- During recent years completed five government and industry funded studies of international regulation of biotechnology and have produced research on the economic impact, institutions and research policy related to new technology (projects with a budget of \$7.8 million).
- Active policy participant with industry and government advisory groups:
 - Member, Science Advisory Board, WineGEN
 - Member of the Board and Senior Research Associate, Estey Centre for Law and Economics in International Trade.
 - Member, Canadian Biotechnology Advisory Committee (1999-2007); Co-chair, subcommittee on Regulation of GM Foods (2000-3); member, exec. committee (2003-7).
 - Member, NAFTA CEC Ch. 13 Expert Panel on Transgenic Maize in Mexico (2002-4).
 - Member, Board of Directors, Canadian Agri-food Policy Institute (CAPI) (2004-5).
 - Fellow, The Centre for Innovation Studies (THECIS), Calgary (2003-).
 - Member, Board of Directors, Pharmalytics Inc., Saskatoon (2003-6).
 - Founding member and active participant in the International Consortia on Agricultural Biotechnology Research based in Rome, Italy (1998-).

Honours and Awards:

- Listing in Who's Who in Canada since 2001.
- Co-editor of and contributor to *Saskatchewan Encyclopedia*, which won Saskatchewan Book Awards for scholarly writing, publishing and publishing in education.
- Joint recipient of the International Chris Award (third place out of 600+ entrants), Columbus, Ohio, for development of *Canola Wars* Multimedia CD, 2004.
- Co-Author of *The Biotechnology Revolution in Global Agriculture*, winner of the Saskatchewan Books Award for Scholarly Writing, 2001.
- Contributor to the *Atlas of Saskatchewan*, winner of the Saskatchewan Book Award for Publishing in Education, 2000.
- Holder of 15 graduate and undergraduate fellowships worth a total of C\$75K between 1976-81 and 1987-90.
- Member, Governor General's Canadian Study Conference, 1987.
- Adjunct Professor, Public Administration, University of Regina, 1997-2000.