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Agriculture: Farmers, Agrifood Industry, Scientists, and Consumers

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AGRICULTURE: FARMERS, AGRIFOOD INDUSTRY, SCIENTISTS, CONSUMERS

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ABSTRACT:

The global agri-food system is undergoing a fundamental change in its structure and operation. Until recently, the farm sector in most parts of the world has been protected and managed by farmers and a relatively small and select group of locally based industrial actors, government agencies and academics. A variety of changes after 1980—e.g. the advent of biotechnology, extension of rights to new forms of intellectual property, rise of consumer demand for greater product differentiation and liberalization of both international factor and product markets—have combined to open the farm policy debate to a wider range of actors. Consequently, markets have both integrated and fragmented, such that new issues and conflicts have come to the fore in Canada-U.S. relations. Given the extent of bilateral trade and common international interests, Canada and the U.S. individually and jointly have the opportunity to craft innovative solutions to global problems.

1. INTRODUCTION

Historically, the North American (and much of the global) agri-food system was operated by and managed for the interests of farmers, excluding many others from the setting, decision making and disputes settling. Some

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have asserted that this corporatist model led to extensive rent seeking and a situation where at least 50% of agriculture was politics.[1]

Farmers were separated and, some would assert, protected from the pressures of both local markets and the global marketplace. Measures were introduced to ensure farmers were protected from the rigors of the land, labor and capital markets, and that technologies and markets were equally available to all producers, without discrimination. Where rules existed, they harmonized the opportunities for and pressures on producers. One result of this policy and regulatory stance was that non-farm interests were largely excluded from the policy systems and that policies related to finance, markets, technologies and skills could be handled in the context of narrow and relatively discrete policy debates. It was both practical, and many believed desirable, for example, for land tenure policies to be separated from technology strategies.

A variety of events have transpired in the past two decades to open up the policy processes. In the first instance, the relative importance of agriculture has diminished, which has made it less acceptable or even necessary for farming to occupy a privileged policy position. In the early 1900s, farming and food production engaged more than half of the North American population; by the turn of this century the agri-food sector contributes only about 10% of Canada's national GDP[2] and 5% in the U.S., much of which is added via off-farm value-added activities. This has diluted any ability to organize and manage an effective corporatist policy community. In addition, the increasing segmentation and differentiation in the global agri-food system has narrowed producer and supply chain interests, reducing the rationale and support for harmonizing farm policies. Increasingly, debates about skills, finance, technology and markets are framed in the context of vertically integrated international supply chains, where many producers have more in common with their suppliers and downstream partners than they do with other producers in apparently similar product markets. Thus, debates about the factor and product markets tend to involve a wide range of new actors—including academics from a range of disciplines, science and technology companies, food processors and marketers. Policy debates have inexorably

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[1] *See*: ROBERT PAARLBERG, FIXING FARM TRADE (Ballinger Publishing, 1988); EDMUND NEVILLE-ROLFE, THE POLITICS OF AGRICULTURE IN THE EUROPEAN COMMUNITY (Policy Studies Institute, 1984); PETER PHILLIPS, WHEAT EUROPE AND THE GATT: A POLITICAL ECONOMY ANALYSIS (Pinter, 1990); BARRY WILSON, BEYOND THE HARVEST: CANADIAN GRAIN AT THE CROSSROADS (Western Producer Prairie Books, 1981); AGRICULTURAL TRADE: DOMESTIC PRESSURES AND INTERNATIONAL TENSIONS (Institute for Research on Public Policy, Grace Skogstad & Andrew Fenton Cooper, eds. 1990).

[2] David Rice, *Supreme Court of Canada Endorses Landmark 'Polluter Pays' Law*, WORLD MARKET ANALYSIS, Nov. 7, 2003.

become more complex and inclusive, with the demise of many of the horizontal homogenizing institutions and the emergence of a new set of actors.

This paper examines the governance challenges flowing from these circumstances and changes. Section 2 examines the connections between various legal and economic institutions and their contribution to governance. Section 3 considers the evolution of institutional structures related to skills, finance, technology, and product markets. Section 4 offers some observations on the potential impact of the Canada-U.S. relationship on global agrifood development.

2. THE ECONOMICS AND POLITICS OF AGRIFOOD PRODUCTION AND TRADE

Governance systems involve a complex web of legal, social, economic and political relationships. In the management of markets, law and economics are inextricably linked. At the root of the neoclassical framing of markets, Coase argues that if property rights are fully assigned, then markets will deliver an optimal array of production and consumption.[3] The question left unsaid by economists is how those rights are allocated and enforced. Ultimately, "institutions" assign those rights. Institutions encompass a wide set of rules, both formal (e.g., statues) and informal (e.g., norms), which constrain relationships among individuals or groups.[4] Institutions are not simply nominal rules—they are defined by those effective rules that can be enforced.[5] Institutions can be established, enforced and policed either by an external authority or they can be voluntarily accepted, but the key is that they are predictable, stable, and applicable in repeated situations. While many of the norms that govern our society and markets are the result of informal social action, various institutions have a legal basis—many of the most important rules are the result of the rule of common law, which has evolved and been passed down over millennia, while, more recently, elected governments have made prescriptive laws to effect social values. Specifically in the context of markets, while both formal and informal rules are essential, economic wishes, expectations and pressures are important. Ultimately, the management of a sector is a complex balance of the legal, economic, social and po-

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[3] Ronald Coase, *The Problem of Social Cost*, JOURNAL OF LAW AND ECONOMICS, 1960, 3:1-44.

[4] Douglas North, *Institutions*, JOURNAL OF ECONOMIC PERSPECTIVES, Winter 1991, 5: 97-112.

[5] Thomas Eggertsson, Economic Perspectives on Property Rights and the Economics of Institutions, Ch. in ECONOMIC APPROACHES TO ORGANIZATIONS AND INSTITUTIONS: AN INTRODUCTION (Dartmouth Publishing, Pal Foss ed., 1995).

litical norms of the period, which is often difficult to appreciate fully because of the subtlety of many of the interconnections.

The critical role for governance systems only becomes transparent when the market fails to deliver an "optimal" outcome. When there are stable and clearly delineated rights in a competitive marketplace made up of many informed buyers and sellers, unmediated, arms-length market exchange usually effectively governs the production and consumption of goods and services (i.e., matches the marginal cost of providing a good to the marginal value of that good to society). When the marginal social benefit is not equal to the marginal social cost in a product market, however, then a market failure is said to exist. In standard economic theory, market failures are usually associated with public goods, natural monopolies, common pool resources and technical externalities, all which represent examples where property rights are unclear or incomplete. Despite overall benefits from public goods (e.g. public health and safety), markets fail to produce adequate amounts as firms cannot charge users the full marginal cost for their consumption because no one can be excluded from their consumption. Natural monopolies exist when the production of a good has economies of size such that average cost declines with increases in output, and it becomes cheapest for one firm to produce all of the product (e.g. some transformative technologies). Common pool/access resources (e.g. fresh water) suffer from an inability to exclude users; with rival usage, overuse leads to resource depredation. Finally, technical externalities (e.g. pollution or knowledge spillovers) occur when activities of an individual can affect the welfare of others (negatively or positively) outside the product market.

The North American agri-food system is increasingly being challenged to deal with market failures that either extend beyond the traditional borders of the agri-food complex (e.g. pollution, biodiversity) or involve policies that were established to govern non-food situations (e.g. intellectual property rights). Ultimately, these pressures have lead to a re-examination of prevailing institutions and consideration of new rules for the sector.

3. THE CHANGING FACE OF NORTH AMERICAN FARM POLICY

While Canada is relatively more dependent on agri-food production and trade (table 1), both countries are major global agri-food producers and traders and have similar commercial interests. Canada and the U.S. engage in the largest single bilateral trade in agri-food products in the world. The U.S. is Canada's single largest market for agri-food products, while Canada is the U.S.'s second largest market, behind Japan.[6] In 2002, Canada's agri-food

[6] Bill Hord, *Outlook for U.S. Crop Exports Dips May Projection Of '98 Exports*, OMAHA WORLD HERALD, May 30, 1998, at 1.

exports to the United States totaled C$17.4 billion[7] and Canada's agri-food imports from the U.S. totaled C$13.2 billion.[8] They also have extensive bi-national relationships through policies and market structures, yet remain major competitors in a number of global product markets. Any changes in their bilateral relationship have significant potential to influence the welfare of the two countries directly and to influence the global trading rules and global welfare.

In the past quarter century there has been a radical shift in how farm policy operates in North America, and a corresponding shift in the scope and tenor of cross-border policy debates. In addition to an array of new bilateral and multilateral trade agreements, both countries have undertaken extensive reform of their domestic policy structures.[9] To illustrate this, it is useful to examine the structure and management of the key factor and product markets—skills, finance, technology and markets—to illustrate the extent of the change and to identify the key areas where either cooperation or conflict have emerged or are likely to emerge.

3.1 Labor Markets

Farmers are the last "jacks of all trades." Historically they have been encouraged to remain the last vestige of the pioneering spirit in North America. For the most part, the policy in Canada and the U.S. was to exempt farmers from any external pressures to adapt or adopt to new labor market standards. Farmers were mostly exempted from labor standards and trade unionization and there has been little pressure for farming to become a profession. Some jurisdictions have offered specialized, targeted training and a few skills certification programs (e.g. the Institute of Agrologists in Canada) but until recently, these were mostly enabling rather than proscriptive policies. As a result, there was virtually no interaction between Canada and the U.S. on farm labor policies.

The increasing specialization within the North American agrifood system has put pressure on farmers to enhance their skills. Within Canada and the U.S., educational institutions, government extension agencies and many private industrial actors have provided incentives and support for farmers to

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[7] Agriculture and Agri-food Canada, *Country Profiles – United States, available at*: http://www.agr.gc.ca/itpd-dpci/english/country/us_e.htm (last visited Nov. 1, 2004).

[8] Agriculture and Agri-food Canada, *Overview of the Canadian Agriculture and Agri-Food System, available at*: http://www.agr.gc.ca/spb/rad-dra/publications/system/system_e.pdf (last visited Nov. 1, 2004).

[9] USDA, *U.S. Farm Bill 2002 Information, available at*: http://www.usda.gov/farmbill/ (last visited Nov. 1, 2004), Agriculture and Agrifood Canada, *Agriculture Policy Framework: An Agricultural Policy for the 21st Century, available at*: http://www.agr.gc.ca/cb/apf/index_e.php (last visited Nov. 1, 2004).

standardize and upgrade their skills. Increasingly, differentiated supply chains require farmers to adopt standards of performance, which require extensive new skills.

The North American agri-food labor market offers an opportunity to establish rules that may have application in many areas and more widely in the global marketplace. One cross-border result is that a number of multinational corporations and certifying bodies are beginning to train and audit performance of farmers in both markets. This is leading to increasing cross-border flows of skilled workers, as they deliver their services to their farmer partners. While tightened cross border rules post 9/11 have made some of these transactions more difficult, the NAFTA labor mobility provisions[10] and streamlined bilateral security and immigration procedures have enabled most of the highly-skilled workers involved in this area to continue to operate in both jurisdictions.

3.2 Finance and Trade

The financial system for farming in both countries has historically involved a mix of public and private capital. The single largest historical source of incremental capital has been retained earnings, family savings or off-farm incomes of farm family members. Private capital markets, at times, supplemented those resources with mortgage and operating loans while public institutions offered mostly transitional loans (to facilitate changes in operations or transfer of ownership). Whenever the flow of capital was insufficient, the public sector engaged in further transfers. In the first instance, governments preferentially supported farmers when designing rules related to ownership and control. After the 1930s, many jurisdictions (e.g. Saskatchewan) absolutely restricted ownership of farmland to resident farmers while others established special processes for dealing with insolvency, often acting to delay or restrict foreclosure on failing farms. As a result, there has at times been a shortage of private capital available for farm operations. National and provincial/state governments responded during some periods with production subsidies, income support, crop insurance or other financial incentives for family farm enterprises to remain in operation. Given that both countries maintained national banking rules limiting foreign banking and that international trade in agricultural products was for the most part uncontrolled, there were few opportunities for either cross-border conflicts or collaborations.

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[10] North American Free Trade Agreement, Dec. 17, 1992, Can.-Mex.-U.S., 32 I.L.M. 296, 32 I.L.M. 605 (1993), *available at*: http://www.nafta-sec-alena.org/DefaultSite/legal/index_e.aspx?ArticleID=78 (last visited Nov. 1, 2004).

This system began to change after the monetarist revolution of 1979-82. After almost two decades of increasing inflation and sub-optimal macroeconomic growth, governments in North America and Europe clamped down on growth in the money supply, interest rates soared and debts everywhere became unsustainable. Rather than simply provide more capital, many governments looked to restructure their agri-food sectors. In the first instance, Canada and the U.S. entered into a series of negotiations to liberalize their trade in agri-food products, culminating in the CUSTA (1998), NAFTA (1994) and WTO agreements (1995). Each of these agreements successively opened up Canadian and U.S. agriculture to new influences. Cross border and foreign banking increased, new actors entered the financial business (e.g. machinery and input suppliers offered credit), and new capital entered the market. Partly in response and partly as a trigger, governments engaged to lower their level of financial support to farming. While there are remaining disputes about who subsidizes their producers more, the most pressing issue for the sector is one that was not at all considered in those negotiations.

The most important emerging cross-border issue for governments and farmers in Canada and the U.S. relates to liability management for new products.[11] Liability is an evolving concept, especially as it pertains to agriculture. Historically, lawsuits in agriculture have been mostly about local production externalities, such as aerial spraying. Occasionally, an aerial application of a chemical would be too close to a neighboring farmer's land and it would drift onto a crop belonging to another farmer. Depending on the crop, the damage could be substantial and in some instances, the farmer whose crop was adversely affected sued the commercial sprayer of the chemical for damages suffered. The introduction of GM crops has changed the nature of the liability debate. The commercial release of transgenic crops has created a split within agriculture, not only between countries, but within countries as well. Internationally, there has been a split between European Union (EU) and North America (the U.S. and Canada). The EU views transgenic crops as a liability and will not allow domestic production of transgenic crops for large-scale food consumption, or the importing of transgenic raw materials for processed food products. North America has approved the commercial release of a variety of transgenic food crops, which, by some estimates, are incorporated into nearly 70% of all processed foods.[12] In North America, the production of transgenic crops and the consumption of the resulting food products have become the norm. In 2003, over 80% of all soybeans grown in

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[11] STUART SMYTH, P. PHILLIPS, W. PARK KERR & GEORGE KHACHATOURIANS, REGULATING THE LIABILITIES OF AGRICULTURAL BIOTECHNOLOGY (CABI Publishing, 2004.).

[12] *See* http://www.google.com/search?hl=en&ie=UTF-8&safe=off&q=transgenic+and+70%25+of+all+processed+foods&spell=1 (last visited Sept. 25, 2004).

the U.S. were transgenic,[13] as was over 70% of all cotton[14] and 40% of all corn grown in the U.S.[15] In Canada, over 65% of all canola grown was transgenic in 2003[16] (87% of canola grown was herbicide tolerant).[17] The split in agriculture can also be observed within domestic markets. In North America, there is a small organic market that is strongly opposed to further commercialization of transgenic crops due to the potential for co-mingling. The organic market's fear is that if transgenic seeds are detected in organic shipments, it will destroy organic export markets. Similarly, there is rising concern about the pending introduction of Roundup Ready™ wheat, which some fear may destabilize both domestic and international markets. Some producers and processors have responded by adopting quality control systems to differentiate between GM and GM-free produce.

This split within agriculture at both the international and domestic level gives rise to a new potential liability. International trade could potentially be damaged should an exported commodity be tested and found to contain unacceptable levels of transgenic varieties (or any unwanted trait). Domestic production opportunities could also be potentially affected by the widespread adoption of transgenic crop varieties. The overriding issue that is beginning to emerge is whether there is a liability if a sales market is damaged by co-mingling of genetically modified seeds and, if so, who should be held accountable? The United Kingdom (hereafter, "UK") Agriculture and Environment Biotechnology Commission released a report on co-existence and liability relating to the production of genetically modified (hereafter, "GM") crops and recommended to the UK government that the UK Environmental Protection Act of 1990[18] be amended to provide financial compensation to those harmed by the commercial release of GM crops, "... irrespective of criminal liability".[19]

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[13] Monica Riordan, *Ecologist Discusses Genetics*, THE NEWS RECORD, (Oct. 28, 2003) *available at*: http://www.nr.uc.edu/read.asp?ID=13875 (last visited Sept. 25, 2004).

[14] Daryl Bowman, *Genetic Uniformity of the U.S. Upland Cotton Crop Since the Introduction of Transgenic Cottons, Crop Science Society of America* (April 22, 2002) *available at:* http://crop.scijournals.org/cgi/content/full/43/2/515 (last visited Sept. 24, 2004).

[15] Greg Mandel, *Gaps, Inexperience, Inconsistencies, and Overlaps: Crisis in the Regulation of Genetically Modified Plants and Animals*, 45 WM AND MARY L. REV. 2167, 2177 (2004).

[16] *Overview of Canada's Canola Industry, available at*: http://www.canola-council.org/about/overview_text.html (last visited Sept. 25, 2004).

[17] *Manage Herbicide-Tolerant Crops and Volunteers*, BIOCROP NEWS, Jan 24, 2003, *available at*: http://whybiotech.ca/html/Canada1-2-14-03.html (last visited Nov. 1, 2004).

[18] Environmental Protection Act, 1990 § 34(1) (U.K.).

[19] Environment Biotechnology Commission, *GM Crops? Coexistence and Liability*, 11, *available at*: http://www.aebc.gov.uk/aebc/reports/coexistence_liability.shtml (last visited Nov. 1, 2004).

Canada and the U.S., as major developers and adopters of new technologies, are both at risk from any new liabilities that may arise but also perhaps best positioned to seek solutions to these issues. A number of civil cases related to patent infringement in the U.S. and Canada (e.g. *Monsanto v. McFarling* in the U.S.[20] and *Monsanto v. Schmeiser* in Canada[21]) have confirmed that companies own the rights and have the power to control use of their patented technologies, but courts have yet to resolve any cases that deal with liability. In Canada, a case (*Hoffman and Beaudoin v. Monsanto and Bayer*[22]) related to alleged losses in the organic industry resulting from the introduction of GM canola and wheat may establish some rules about how these issues will be resolved.

3.3 Technology

In the not so distant past, most of the new open-pollinated plant and animal varieties were developed by publicly-funded research programs or institutes and were commercialized on a concessionary basis (often given to farmers at nominal or no charge), with seed/breeding stock production, industrial inputs, production, handling, processing and retailing all being handled through arms-length market transactions. The few areas where the private sector led—in hybrid crops, such as corn, and in areas where private rights could be controlled, such as patented machinery and chemicals—simply illustrated how far from the market was most of the research and technological effort. This research model was possible because the technology of the day was relatively static and was appropriate for relatively small, discrete groups to manage. This model of technological management involved almost exclusive public ownership of the means and products of technology and only limited regulation of the efficacy or impact of new technologies on human and animal health or the environment. The presumption was that if new technologies were developed by public scientists using public funds, then there was no strong reason to assess the resulting products. The public focus, rather than on management and control, was instead targeted on extension and public access. Land grant universities and provincial and state extension services worked hard to inform and encourage farmers to adopt new and innovative farm practices.

The scale and complexity of using and commercializing products of new technologies—especially biotechnology—involves highly globalized science and has precipitated collaborations between traditional competitors and be-

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[20] *Monsanto v. McFarling,* 302 F.3d 1291, 64 U.S.P.Q.2d 1161 (Fed. Cir., 2002).

[21] *Monsanto Canada Inc. v. Schmeiser* (C.A.) [2003] 2 F.C. 165.

[22] *Hoffman and Beaudoin v. Monsanto and Bayer* (C.A.) [2003] 2003 SKQB 564, 242 Sask. R. 286.

tween public and private research organizations, which has required new institutions in support of development. Increasingly, the public sector has acknowledged that it does not have the financial and technical capacity and market knowledge to undertake enough appropriate research and development to keep the global agri-food sector profitable. Thus, more private capital and direction is required. As an incentive, the public sector has offered a variety of subsidies to private companies (e.g. free or low cost access to public research and infrastructure and cash transfers or tax credits) and extended new and more rigorous property rights to genes, genetic transformation systems and plant varieties through patents and plant breeders' rights.

While the plant variety protection system was evolving, patents began to be approved for an increasing array of technologies and components of plant varieties. On the technology front, the U.S. Patent Office granted in 1973 Cohen and Boyer a utility patent on gene splicing technology, starting the race to privatize biotechnology and genomic research.[23] Under U.S. patent law (and most other comparable national systems), patents are available for "anything under the sun" that is the product of human ingenuity, provided it is a "new, useful and non-obvious process, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof" (U.S. PTO, 2004).[24] Every patent offers exclusive rights to use and exclude others from using the patent, for a period of 20 years beginning with the date of filing. Since 1973, virtually all of the main technologies required for genetic manipulation of a plant or animal have been patented in the U.S.[25] To be eligible for patent, inventions must not have been known or used by others in the U.S., have been patented or described in a printed publication in the U.S. or any foreign country or have been in public use or on sale in the U.S. for more than one year prior to the date of application. Inventions that are novel, useful and non-obvious are then eligible for protection. Although U.S. patent protection is not automatically accepted in other countries, most of the key biotechnologies have been patented in prime markets. In the 1980s, a number of landmark rulings related to patenting living organisms opened the floodgates. In 1980, the U.S. Supreme Court ruled in *Diamond v. Chakrabarty* that the U.S. patent law provides for patenting life forms.[26] The first

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[23] Stanley N. Cohen et al., Construction of Biologically Functional Bacterial Plasmids in Vitro, 70 Proceedings of the National Academy of Science U.S.A. 3240 (1973), *See also* U.S. Patent No. 4,740,470 (issued April 26, 1988); U.S. Patent No. 4,468,464 (issued August 28, 1984); U.S. Patent No. 4,237,224 (issued December 2, 1980).

[24] USPTO, *FAQs*, *available at*: http://www.uspto.gov/main/faq/ (last visited Sept. 24, 2005).

[25] *See* P. W. B. PHILLIPS & GEORGE G. KHACHATOURIANS, THE BIOTECHNOLOGY REVOLUTION IN GLOBAL AGRICULTURE: INVENTION, INNOVATION AND INVESTMENT IN THE CANOLA SECTOR, (CABI Publishing 2001).

[26] *Diamond v. Chakrabarty* 447 U.S. 303, 100 S.Ct. 2204, 65 L.Ed.2d 144, 206 U.S.P.Q.

patent on a life form was for genetically modified oil-eating bacteria. In 1985, the first patent for a living plant was issued.[27] Since then a large number of plants have been patented in the U.S. In contrast, in Canada, the Supreme Court in 2003 ruled that patents are not valid on multi-cellular organisms. Plant patents, where available, provide additional protection over PVPA rights in that plant patents do not provide for either a researcher's exemption or farmers' privilege.[28]

New private rights to inventions related to seeds and the resulting complementarities between privately developed germplasm and industrial chemicals have caused new integrated relationships to emerge among biotechnology seed developers, chemical companies and farmers. One implication is that the results of the research—both new technologies and new plant and animal varieties—has been exploited in narrow monopolistic situations, which span international borders.

One result of the privatization of research is that governments no longer defer to researchers about the safety of their products. Along with the emergence of biotechnology, governments around the world, but especially in North America, developed new, more aggressive regulatory systems to evaluate and manage the new products.[29] Canada and the U.S. have similar systems, but they have different triggers and applications. In Canada, all new varieties are required to be tested in regulated field trials and assessed against a base line (or 'check') variety for efficacy; in the U.S., conventional varieties may be regulated in some states but most are assessed only by the breeder. Furthermore, unlike most other countries, Canada's system is triggered by the presence of a novel trait rather than by the method used to create that novel trait. Hence, mutagenic novel trait varieties are reviewed with the same rigor as transgenic varieties. Both countries have similar regulatory systems for transgenic varieties. The U.S. FDA/Health Canada evaluates the new crop variety for its impact on food safety while the USDA APHIS/CFIA evaluates the proponent's evidence of its impact on animal health (if it is fed to livestock) and the environment (U.S. EPA has authority for both food and environmental assessments when insecticidal genes are involved). A highly complex set of reviews are completed, and if in the judgment of the respective agencies the variety with the transgene (in U.S.) or novel trait (in Canada) is "substantially equivalent" to existing varieties, such that it does not

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193 (1980).

[27] *Ex parte Hibberd, et al.* 227 U.S.P.Q. 443.

[28] *Dutch Industries Ltd. v. Barton No-Till Disk Inc. and Flexi-Coil Ltd., The Commissioner of Patents* [2003] CarswellNat 3903.

[29] P. W. B. PHILLIPS & GEORGE G.KHACHATOURIANS, THE BIOTECHNOLOGY REVOLUTION IN GLOBAL AGRICULTURE: INVENTION, INNOVATION AND INVESTMENT IN THE CANOLA SECTOR (CABI Publishing, 2001), and G. ISAAC, AGRICULTURAL BIOTECHNOLOGY AND TRANSATLANTIC TRADE: REGULATORY BARRIERS TO GM CROPS (CABI Publishing, 2002).

pose any new risks, then it receives approval. Another difference between the two systems is that split approvals—i.e. feed but not food approvals—have been allowed while in Canada no varieties may be commercialized until all safety assessments have been completed successfully and the efficacy of the variety is tested and accepted by a varietal registration committee that operates under the aegis of CFIA's *Seeds Act and Regulations*.[30] These regulatory hurdles in Canada and the U.S. take on average 3-7 years, depending on the degree of novelty of the proposed trait.

Two major cross-border issues have emerged. First, the recent SCC decision rejecting patents on higher life forms in Canada[31] (SCC 2003) has made the property systems inconsistent between the countries. There always have been minor differences, but this gap threatens to change research priorities and force firms to (re)consider their research and commercialization priorities in the two countries. Given that for a number of years there was increasing integration between the two markets, this gap may affect cross-border research collaborations and trade in new proprietary germplasm, leading to conflict. While Canada is obligated under the WTO TRIPs agreement to implement some form of protection for new varieties and biotechnologies, the more it diverges from the provisions in the U.S., the more there is potential for conflict. Second, even though the regulatory regimes in Canada and the U.S. are founded on similar principles (i.e. scientific risk assessment) and have extensive technical exchanges and mutual recognition of data and methods, there is significant potential for inconsistent or uncoordinated decisions (e.g. Mills' [2002] review of Canada's decisions related to rbST illustrate the challenges).[32] At the extreme, some companies have argued that where regulatory systems fail to conform to due process (as defined either domestically or through international agreement), they have the right to contest those decisions (i.e. via the WTO Sanitary and Phytosanitary or Technical Barriers to Trade Agreements) or to demand adjudication via the investment chapter (11) of the NAFTA, ultimately seeking redress for "expropriation without compensation."

3.4 Markets

Ultimately, the interaction of policies related to skills, finance and technology converge in the domestic and international marketplace. In the past, most of government effort was directed to make the markets more competi-

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[30] Seeds Act; Regulations; R.S.C., ch. S-8 (1985) (Can.).

[31] P.W.B. PHILLIPS, *supra* note 29.

[32] LISA MILLS, SCIENCE AND SOCIAL CONTEXT: THE REGULATION OF RECOMBINANT BOVINE GROWTH HORMONE IN NORTH AMERICA (McGill-Queen's University Press, 2002).

tive and "fair" to producers. Anti-competitive actions were discouraged either directly or indirectly by replacing the private market with a managed or public allocation system. Following the disastrous period of the 1930s, governments in both Canada and the U.S. adopted new institutions to manage agri-food markets. Product standards were established to reduce the ability of the supply chain to exploit individual producers and either formal supply management systems (e.g. for milk in both countries) or pooled marketing institutions (e.g. Canadian Wheat Board and farm cooperatives) were adopted to manage markets. The main goal was to treat all producers more equitably. In support of this policy stance, governments in North America and elsewhere sought to exempt agri-food trade from international oversight. Trade in agri-food products for the most part was beyond bilateral or GATT oversight. While this policy stance achieved some impressive economic and social results (e.g. farm productivity and income rose significantly over the past 60 years), these marketing institutions increasingly came into conflict with other domestic public priorities (e.g. cheap food for welfare recipients, non-food agro-industrial development, and deficit control) and some emerging private interests (e.g. food processors seeking to differentiate their branded products and handlers seeking economies of scale).

The policy continuum broke in the 1990s, with a decision in most major trading countries to finally include commodity agriculture within the international trading rules. The implementation of the WTO Agreement in 1995 signaled the beginning of a new era. While the full scope of the new market-based system is yet to be realized, the fundamental features of the system can be identified in the process of negotiating the agreement. In the first instance, agriculture is no longer treated as a self-contained silo. Farm policies—that is the rules related to skills, finance, technology and markets—are now nested into the larger geopolitical debate about how society wishes to manage the state-market interface. Rules related to skills specialization and labor mobility, finance, liability management, technological change and product diversification are embedded explicitly both in the Agreement on Agriculture and in a variety of technical agreements related to trade in services and financial regulation (GATS), intellectual property (TRIPs) and product and regulatory standards (Sanitary and Photosanitary[33] and Technical Barriers to Trade[34] agreements).

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[33] Agreement on the Application of Sanitary and Phytosanitary Measures, Apr. 15, 1994, Annex A, ¶ 1, WTO Agreement, annex 1A, in Results of the Uruguay Round of Multilateral Trade Negotiations, at 78.

[34] Agreement on Technical Barriers to Trade, Apr. 15, 1994, art. 1.5, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A, in Uruguay Round of Multilateral Trade Negotiations 1 (1994) 20, 138 (1994) 33 I.L.M. 1125, 1154.

The fundamental issue is how to deal equitably and transparently with new economic relationships in transnational supply chains developing and delivering proprietary, differentiated products for discrete, global markets. The new products entering the markets are increasingly global in their origin and use. The science and technology used to create them comes from a variety of public and private sources in an array of countries (sometimes even involving collective, traditional knowledge) and is assembled by multinational teams of scientists supported and located in multiple markets. These products are then assessed for commercial opportunity and safety usually in more than one market and, if approved for release, are generally targeted to satisfy specific producer or consumer demands in a discrete number of uses and markets. Most, if not all of these product supply chains require the ability to move people, money, knowledge and product between uses and markets around the world.

These new pressures pose a number of challenges for cross-border policy discussions. In the first instance, some historical institutions are being challenged. For example, there has been a cascading array of challenges launched against the Canadian Wheat Board as the monopoly state trading entity in the wheat and barley markets. While these types of disputes are important to those involved, they also serve as a signal of the changing of the policy debate. At one level, they highlight that most if not all of the issues related to new proprietary products involve questions of domestic policy and not simply management of border measures and general market access. While the agricultural talks in the Uruguay Round concentrated on gaining market access by lowering tariffs and non-tariff barriers and on reducing destructive international trade competition (by constraining domestic subsidies and restricting export subsidies), much of the post-WTO debate has focused on how the non-agricultural agreements affect agricultural production and trade. Market access is now seen less involving surmounting border measures and more as gaining access through more accommodating domestic policies. In that context, the TRIPs, SPS, and TBT agreements have become the battlegrounds for agri-food trade disputes.[35]

While disputes related to domestic policies are potentially more difficult, the unique Canada-U.S. relationship in the agri-food sector offers an opportunity to develop innovative and potentially precedent setting policies. In the first instance, our interests are both complementary and competitive, which provides both some areas of conflict but also some imperative to resolve those disputes. Both as major markets for each other's products, as collaborators in the development of new technologies and products and as competi-

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[35] Donald Buckingham & Peter Phillips, *Hot Potato, Hot Potato: Regulating Products of Biotechnology by the International Community*, J. OF WORLD TRADE, 2002, at 1-31.

tors in third markets, we have more to win than to lose from finding solutions to these problems. Furthermore, our legal systems are similar in origin and operation and, while the number and array of interested actors has risen, there are many common actors on both sides of the border with a vested interest in resolving rather than perpetuating disputes.

As two major developers and exporters of new technology-based products Canada and the U.S. offer valuable opportunities to test new policies. One example is the development of new standards for labeling of GM products. While a number of jurisdictions have opted for mandatory labeling,[36] both Canada and the U.S. have chosen to test voluntary labeling systems. While the U.S. offered guidelines for voluntary labels, Canada instead undertook a formal standards setting process, which has led to the first broad, market-based standard of GM content for marketing purposes (CGSB 2004).[37] All other labeling systems are driven by administratively established guidelines that do not adhere to the norms of a standard. Given that this is the first formal labeling standard developed anywhere in the world, it offers one potential solution to the increasingly contentious debate about trade and marketing of GM foods.

In addition, there is real potential for our mutual and complementary interests to providing a base for new rules of engagement. In the first instance, the Canada-U.S. Trade Agreement (esp. the investment, procurement and services chapters) in the 1980s provided the basis for the NAFTA agreement, which then led to an expansive and defining set of rules in the WTO Agreement. Ultimately, there is a close correlation between these three agreements. Second, Canada and the U.S. have been in the vanguard of developing rules, procedures and protocols for evaluating and regulating the risks of GMOs (Buckingham and Phillips, 2002).[38] Third, bilateral dispute settlement under NAFTA have led to some innovative risk management processes dealing with environmental and human health and safety (e.g. regional control of plant and animal pathogens rather than national embargoes). While there are numerous other examples one could cite, it is abundantly clear that the Canada-U.S. bilateral arrangements in the agri-food system have had and are likely to have significant influence on the economic circumstances in the two countries and on global rules. While some may dislike the nature of the rules that have evolved, no one can deny their influence on trade relations.

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[36] P. Phillips & H. McNeill, *Labeling for GM Foods: Theory and Practice*, AGBIOFORUM, 2001, at 4.

[37] Canadian General Standards Board, *Voluntary Labeling of Foods Obtained or Not Obtained Through Genetic Modification Discussions and Documents, available at:* http://www.scc.ca/forums/cgsb-ongc/dispatch.cgi/_T_BIOTECH_LABELLING_OF_FOOD_docshare/showFolder/101297 (last visited Nov. 1, 2004).

[38] P. PHILLIPS & H. MCNEILL *supra* note 36.

4. CONCLUSIONS

The past quarter century has seen a dramatic change in the agri-food policy system in North America. Whereas farm policies in the past were narrowly defined and closely managed by a narrow group of highly interested farmers, farm lobby groups, academics and farm ministries, now agri-food policy is highly integrated with non-farm policies and processes both domestically and internationally. Farm related issues can no longer realistically be managed in narrow local, national or sectoral terms.

The North American agri-food sector has become the point of convergence of all of the most contentious and difficult 21st century issues. Food offers one of the few markets that integrates the interests of knowledge-intensive producers with the needs and aspirations of poor people and lesser-developed countries. It is at the cutting edge of the debate about ownership and control of intellectual property—both in terms of what is morally and socially acceptable and what is economically and politically desirable. Food also provides insight into the changing and diversifying interests of citizens and consumers. Increasingly people are demanding more from the marketplace. They want environmentally sound production systems, socially responsive labor systems and a carefully defined and proscribed set of attributes from their food. Most require more, not less, governance. The challenge is that much of the governance will need to come from new actors and new institutions.

Canada and the U.S. are likely to be a testing ground for new solutions. Both are adapting, adopting and leading the transformation of agriculture into a complex, technologically advanced and highly integrated system. Comprising both the single largest bilateral market and the largest combined source of exportable surpluses of protein and fiber, Canada and the U.S. have the incentive and potential to develop new institutions to resolve many emerging problems. Any resulting solutions (in one or other of the countries or between the countries) offer the potential to be a template for the world.