



US- EU FOOD AND AGRICULTURE COMPARISONS

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Abstract: *This paper gives a comparison about how the United States and the European Union use different risk assessment processes for approving the use of biotechnologies in their food and by their agricultural industry, and how this has impacted their trading relationship over the last 27 plus years. Food and agriculture products are an important part of trade agreements because it allows countries to benefit from their comparative advantage, where they might be able to produce food products more effectively and efficiently and at lower costs compared to other countries. Effectiveness in food production can be achieved by increasing access to global research and biotechnologies, and efficiencies can be achieved by gaining access to global regions of the world where different climates allow crops to grow at different times of the year. Cost savings can be achieved from being able to produce crops in countries where farmland and labour costs are cheaper. The concerns with producing food and agricultural products more efficiently, effectively and cheaper are that some biotechnologies used in one country may not align with a trading partner's social values and religious beliefs, notwithstanding, the environmental and health concerns that may occur. There has been many trade disputes between the EU and the US about food and agricultural trade. This paper explores the reasons for these trade disputes from both the EU and US perspective, and goes into some detail about the EU's ban on growth hormone-treated meat and their moratorium on Genetically Modified Organisms (GMOs), and how they have worked through their differences. The main reasons for their differences are the inputs the US uses to produce their end food and agricultural products, which are growth hormones and GMOs. The paper ends with a review of how agricultural and food trade relations between the EU and US impact Canada's food and agricultural trade relationships with both countries. The key considerations are the impacts for using biotechnologies and how their use can impact trade relationships.*

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INTRODUCTION

Food and agriculture products are an important part of trade agreements because it allows countries to benefit from their comparative advantage, where they might be able to produce food products more effectively and efficiently and at lower costs compared to other countries. Effectiveness in food production can be achieved by increasing access to global research and biotechnologies, and efficiencies can be achieved by gaining access to global regions of the world where different climates allow crops to grow at different times of the year. Cost savings can be achieved from being able to produce crops in countries where farmland and labour costs are cheaper. The concerns with producing food and agricultural products more efficiently, effectively and cheaper are that some biotechnologies used in one country may not align with a trading partner's social values and religious beliefs, notwithstanding, the environmental and health concerns that may occur.

There has been many trade disputes between the EU and the US about food and agricultural trade. This paper explores the reasons for these trade disputes from both the EU and US perspective, and goes into some detail about the EU's ban on growth hormone-treated meat and their moratorium on Genetically Modified Organisms (GMOs), and how they have worked through their differences. The main reasons for their differences are the inputs the US uses to produce their end food and agricultural products, which are growth hormones and GMOs. This leads to a comparison between the benefits and costs associated with using growth hormones and GMOs. The issues around the regulation and labelling of biologically altered products have taken the international stage and are reviewed from a design to a monitoring prospective. To this point, bits have been shared about the different decision models used when approving the use of new biotechnologies; this is expanded by going into more detail about the Risk Analysis Framework (RAF) and what approach the EU and US have adopted when approving the use of new biotechnologies. The paper ends with a review of how agricultural and food trade relations between the EU and US impact Canada's food and agricultural trade relationships with both countries.

The key considerations are the impacts for using biotechnologies and how their use can impact trade relationships. Importantly, what are the human and environmental impacts, and why does the US and the EU have different views for using biotechnology to alter



foods? Finally, what international body should be responsible for regulating and monitoring their use?

TRADE DISPUTE OVER THE EXPORTING AND IMPORTING AGRICULTURAL PRODUCTS

There have been many improvements made over the last 27 plus years to improve trade liberalization for food and agricultural products among World Trade Organization (WTO) members. During the Uruguay Round, an agreement was signed by members to reduce export subsidies by 36%, import tariffs by 36%, and domestic subsidies by 20% for developed nations over a six-year period starting in 1995 (The World Trade Organization, n.d., *fair markets*). This laid the foundation for order, harmonized competition, and a less disorderly sector (The World Trade Organization, n.d., *fair markets*). The domestic agriculture subsidies that were to be reduced were those that had direct impact on production, such as price support and subsidized production. The focus was to reduce subsidizations that would have a direct impact by reducing the risk of overproduction or underproduction and possibly impact the flows of trade and prices. Domestic government support for things such as research, disease control, food safety, direct payments for income support, and regional assistance programs were not impacted (The World Trade Organization, n.d., *fair markets*).

EU And US Trade

In 2012 the EU imported US\$267.9 billion worth of goods from the US, of which US\$10.77 billion was in agricultural products; total exports to the US were US\$380 billion of goods from the EU, of which US\$19.66 billion were in agricultural products (European Commission, 2013). This gave the EU a US\$112.1 billion trade surplus for all goods and a trade surplus of US\$8.89 billion for agricultural products with the US. The trade surplus that the EU is benefiting from is, in part, because of the evolution of trade disputes to more favourable terms by reducing retaliatory tariffs on selected items and increasing the tariff quota allowing the US to export more hormone-free beef. The US and EU announced in June 2013 that they are reentering trade talks that could lead to the biggest bilateral trade deal (Transatlantic Free Trade Agreement) in history, with a focus on boosting exports and driving growth (BBC News, 2013).



Financial Impact

It is difficult to calculate the full financial impact that reduced tariffs and domestic subsidies had on agricultural trade flows. There could have been adverse effects if comparative advantage is not present, which may result in lower regional or bilateral trade barriers and could redirect the flow of trade (Ghazalian, Cardwell, 2010, p. 334). For example, countries with higher land prices may import from countries where production costs are less. Notably, The Uruguay Round Agreement on Agriculture (URAA) did successfully reduce trade barriers and converted non-tariff barriers to trade tariffs (Ghazalian, Cardwell, 2010, p. 332). Aligning tariffs has led to better and harmonized competition, but there is debate whether trade volatility has been reduced.

Sanitary and Phytosanitary Agreement

One of the agreements put into force on January 1, 1995 as a result of The Uruguay Round was the Sanitary and Phytosanitary (SPS) Agreement, which sets rules requiring scientific proof to restrict imports because of health or safety concerns (Johnson & Hanrahan, 2010, p. 4). There was concern that making decisions based on science alone does not give consideration to future potential risks that time could reveal. This has been the main reason the EU does not allow growth hormone treated meat to be imported or raised domestically and scrutinizes GMOs before they are approved to enter their food supply chain. In 1983 the US National Academy of Science developed the Risk Analysis Framework (RAF) with the purpose to find balance between progress and precaution (Viju, Yeung, & Kerr, 2012, pp. 2-3). There are two approaches within RAF, the Scientific Rationality Approach and the Social Rationality Approach, with the EU adopting the Social Rationality Approach and the US adapting the Scientific Rationality Approach (Isaac, n.d., as cited in Viju, Yeung, & Kerr, 2012, p. 3). Fitting SPS within RAF means SPS aligns to the Scientific Rationality Approach. This puts countries or trade regions that adapt the Social Rationality Approach at odds with the WTO's methodology for settling trade disputes about health and food safety concerns.

The EU has attempted to weaken the rules within the SPS agreement by supporting and encouraging other WTO members to support the Cartagena Protocol on Biosafety to the Convention on Biodiversity. "The Cartagena Protocol is an international treaty governing the movements of living organisms (LMOs) resulting from modern biotechnology from one country to another" (Convention on Biological Diversity, 2012). The EU's argument is that



there should be separate rules designed for governing GM products and they think The Cartagena Protocol on Biosafety's methodology aligns well. The challenge remains, with over 150 government signatures, the US, Argentina, and Canada have not ratified The Cartagena Protocol and they produce some 90 percent of GE crops in the world (Greenpeace International, n.d.). The EU has not been successful in persuading the major producers of GM products to switch to a more socialist view, so they have had to retaliate by banning hormone-treated meat and putting a moratorium on GM products. This has been costly for agriculture producers and resulted in many trade disputes being put before the WTO.

Isaac & Kerr (2003) argues that the consequences for the international community on how the WTO dispute panel ruled on the EU's ban for hormone treated beef and the moratorium put on the use of GMOs could be significant, as the WTO's obligations are consistent with the US and their co-complainants. The WTO decision could further weaken the level of consumer acceptance for the use of biotechnologies in the EU and potentially spread to the US. Ruling in their favour would support critics of the WTO about mingling in domestic policies preventing them from establishing regulations that meet their own political and economic situations. Any decision the WTO makes will require member countries to choose either a North American/WTO-style approach or an EU/Cartagena Protocol-style approach for the regulation of biotechnologies. (p. 4). A lack of consensus or an approval for trade liberalization on a multilateral deal for agriculture products put before the WTO could lead to other members questioning why they should follow WTO agreements and not just pick what works best for them. Furthermore, if WTO members do not agree with WTO rulings then they may revert to a regional approach to develop trade agreements. Regional Trade deals could lead to members of the Most Favoured Nations (MFN) looking to take part in the deal and they could put a dispute before the WTO if not given the same trade treatments.

EU'S BAN ON US HORMONE-TREATED BEEF

In 1989 the EU put a ban on the import of meat products treated with growth hormones because of their precautionary approach to food safety (Johnson & Hanrahan, 2010, p. 2). The EU's ban on hormone-treated meat for precautionary reasons was in violation of SPS, as they had no scientific proof that growth hormones pose health or environmental concerns.



As a result of the ban, the US retaliated by instituting tariffs (*100% ad valorem*) on EU imports valued at over US\$93 million per year, which remained in effect until May 1996 (Johnson & Hanrahan, 2010, p. 2). In April 1996 the US, later joined by Canada, New Zealand, and Australia requested the WTO put together a dispute settlement panel on the grounds that the EU's ban on hormone-treated beef was in violation of SPS (Johnson & Hanrahan, 2010, p. 28). The dispute settlement panel ruled in favour of the US, but the EU was given time to conduct further scientific investigations to prove their case about the potential risks for consuming hormone-treated meats. The EU failed to prove their case within the time given and on July 27, 1999 the US announced it would be imposing tariffs (*100% ad valorem*) on selected products (Johnson & Hanrahan, 2010, p. 12). The 1999 retaliatory tariffs caused EU export trades for the selected items to drop from US\$130 million to US\$15 million (Johnson & Hanrahan, 2010, p. 20). To further escalate matters, in 2003 the US looked to change the list of products subject to tariffs (*100% ad valorem*) and also updated the countries that were subject to the increased tariffs (Johnson & Hanrahan, 2010, p. 13). At this point, the US and EU were at odds on the issue, with the EU feeling that the tariffs were punitive and the US feeling the EU was trying to protect their domestic beef industry.

On May 13, 2003 the US and the EU entered into a memorandum of understanding that set out to resolve their long-standing dispute about agricultural, which consisted of three phases. Phase 1 was to expand access for US beef to the EU by 20,000 metric tons at zero duty, for non-hormone-treated beef ("High Quality Beef"); with the understanding that the US would delay instituting tariff changes announced in the January 2009 modifications for certain EU imports (Johnson & Hanrahan, 2010, p. 14). Phase 2 was to further expand EU market access by 45,000 metric tons, with the agreement that the US would reduce tariffs once phase 1 was completed (Johnson & Hanrahan, 2010, p. 14). Phase 3 would be executed upon the completion of phase 2, which was to maintain the Tariff-rate quota (TRQ) for High Quality Beef at 45,000 metric tons; and the US would remove selected EU import tariffs from certain products (Johnson & Hanrahan, 2010, p. 14). The memorandum raised questions from MFN asking to be part of the memorandum of understanding, which they felt should fall under WTO jurisdiction. It would appear that the EU's strong stance to disallow hormone-treated meat ended in success for them. The US successfully increased



their TRQ for beef exports to the EU; but in order to do so, they had to change their production methods to meet EU standards and remove tariffs that originated from the sanctions for banning hormone-treated meats.

For US beef farms to export beef to the EU it must be free of growth hormones. To ensure compliance, the USDA created the Non-Hormone Treated Cattle (NHTC) Program. In 1989 the US and EU established control measures that would allow trade within the TRQ for non-hormone treated bovine, including veal products (Johnson & Hanrahan, 2010, p. 18). There has been limited participation in the NHTC Program with only 13 farms, ranches, feedlots, and cattle management groups as of October 2010 who met the eligibility requirements allowing them to export beef products to the EU (Johnson & Hanrahan, 2010, p. 18). The creation of the NHTC program was evidence that the US and the EU were working towards a solution that allowed beef exports to the EU, but it appears with little concession on the EU's part.

In March 2012 the European Parliament approved increasing the amount of hormone-free beef exempt from tax from 20,000 tons to 45,000 tons for the US, to be in effect by August 2012, while the US already lifted import duties on all European luxury foods as of May 2011 (Reilhac, 2012). The US and EU are back at the table for trade talks and agriculture is expected to be a topic of great discussion, as there are concerns about the impact a free trade deal might have on the EU's heavily subsidized agricultural industry (BBC News, 2013).

THE EU'S DE FACTO MORATORIUM ON GENETICALLY MODIFIED ORGANISMS (GMOS)

Genetically Modified (GM) technology has been commercially used since 1995 with widespread use for maize, soybean, and canola, as well as cotton (Anderson, 2005). Until the commercialization of GMOs there were little concerns with their use. GM products became a major political issue in the EU and a vote was made on June 25, 1999 to stop approving the use of GMOs until a strict approval process was in place (Viju, Yeung, & Kerr, 2012, p. 1). This led to a de facto moratorium being applied to domestic and imported GM products, which created protest from trading partners who launched a formal dispute with the WTO in 2003 (Viju, Yeung, & Kerr, 2012, p. 1). The WTO dispute panel delivered their decision in September 2006 and ruled in favour of the complainants; the EU agreed to comply, but requested extended time to conform (Viju, Yeung, & Kerr, 2012, p. 2).



To comply with the WTO rules the EU developed a stern application process that firms must work through to get approval. To support the EU's favour for a strict Social Rationality Approach they codified the use of non-science criteria to justify SPS measures that were compliant to WTO standards (Viju, Yeung, & Kerr, 2012, p. 5). Firms that want to export GM products to the EU need to ensure that they are safe and provide all the required impact studies in accordance with the EU's burden of proof legislation (Viju, Yeung, & Kerr, 2012, p. 5). A deterrent for applicants is they bear all costs and must provide all required information at their own expense, while understanding the process could take from 1.5 to 8 years, depending on the type of application (Viju, Yeung, & Kerr, 2012, p.5). While firms are able to submit applications for GM products in the EU, the process is vigorous and lengthy; it will most likely discourage international businesses from trying to introduce GMOs into the EU marketplace.

Rigby (2004) states that the US was most impacted in their three most important field crops: Maize, soybeans, and cotton. These crops are used for food, animal feed, and derivatives of them are also used in processed foods. As of 2003, 81% of soybeans, 73% of cotton and 40% of maize in the US were genetically modified (p. 4).

The financial impact to the US on agricultural trade from 1998 to 2002 because of the moratorium was significant, with total agricultural exports dropping US\$1704.6 million or 22%, soybeans dropped US\$380 million or 25%, cotton dropped US\$44.5 million or 39%, and maize dropped US\$32.6 million or 92% (Rigby, 2004. p. 4). As evidenced, from the time the moratorium was implemented (1998) until the US requested a WTO dispute panel review (2003) there were great financial losses to agriculture trade for the US. The EU was successful in enforcing a strict approval process for the use of GMOs and managed to comply with the WTO decision (2006), while protecting their food supply chain from GMO products.

BENEFITS AND DISADVANTAGES OF GROWTH HORMONES AND GENETICALLY MODIFIED ORGANISMS

Benefits of Growth Hormones

Growth hormones are used in beef cattle to help them grow larger, quicker, and leaner, while consuming less feed. On average growth hormone-treated cattle experience daily weight gain ranging from 8 to 25% and their feed intake is on average 15% less; resulting in



cattle reaching market 17 days sooner and generating savings from CAD\$30 to CAD\$80 per animal, compared to non-treated cattle (Canadian Animal Health Institute, n.d.). The end product is leaner beef at lower prices for consumers. One kilogram of extra lean ground beef in Canada on June 27, 2013, as published in the Dominion flyer was CAD\$11 compared to €11 or CAD\$15 (EUR converted using Google currency converter on June 27, 2013) for lean ground beef in the EU as published in the Tesco flyer on June 27, 2013.

Disadvantages of Growth Hormones

Growth hormones have been approved for use in the US since the 1950s and it is believed that 90% of feedlots and two-thirds of cattle use growth hormones in the US (Johnson & Hanrahan, 2010, p. 1). The growth promoting hormones are given in the cattle's feed or as an implant in the animal's ear to induce the development of naturally occurring compounds or mimic them (Johnson & Hanrahan, 2010, p. 1). The six approved growth-promoting hormones can be divided into two classes, natural steroids and synthetic hormones. The natural steroids are estradiol testosterone, and progesterone; and the synthetic hormones are estrogen, zeranol trenbolone and melengestrol (Johnson & Hanrahan, 2010, p. 1). There has been much debate about how these growth hormones affect humans with questions being raised about the risk of elevating breast cancer, prostate cancer, or early puberty. Swan et al. (2007) conducted a study to determine if the amount of beef consumed by pregnant women impacted their grown son's sperm count. The findings suggest that maternal beef consumption impacts sperm concentration and they concluded that urgency should be given to further research (pp. 1-2). While there is no burden of proof that growth hormones negatively affect humans, society is becoming more conscious about what is in their food and is moving towards a social reality approach to assess risks.

Benefits of Genetically Modified Organisms

Genetically modified organisms (GMOs) are organisms that had their genetic material (DNA) altered from its original state to serve a purpose that the organism could not achieve in its original state. A few benefits to genetically modifying foods are: sturdier plants, better adaptation to climate change, better-quality foods, higher crop yields, higher nutritional value, reduced production costs, improved durability, disease control, and nutraceutical (Benefits Better Health Channel, 2011, p. 2). There is belief that the environment benefits from the use of GMOs because they reduce the need for farmers to use pesticides and herbicides,



reducing the release of chemicals into the atmosphere (Benefits Better Health Channel, 2011, p. 2). Genetic modifications gives the ability to enrich the nutritional value of food by increasing the amount of vitamins and remove proteins that cause allergies; potentially helping people get vitamins they would not have otherwise received or reduce allergens (Benefits Better Health Channel, 2011, p. 2). The main crops the US use GMOs on are maize, soybean, cotton, canola, sugarbeet, alfalfa, papaya, and squash and are grown on the some 69.5 million hectares of biotech crops in the US (Clive, 2012, p. 3). Clive (2012) states that five EU countries planted a record 129 million hectares of biotech *Bacillus Thuringiensis* (bt) – a natural occurring pesticide from the ground – on maize, which was approved for use before the EU's de facto moratorium was put in place. It is estimated that biotech crops contributed US\$98.2 billion to food security, sustainability, and positive climate change because of increased crop production (p.6). The use of GMOs continues to rise with advancements in biotechnology and the debate about the impact to humans and the environment continuing to be a great concern because the long-term implications are unknown.

Disadvantages of Genetically Modified Organisms

There has been great concern about the use of GMOs since they started being commercially used in 1995 (Viju, Yeung, & Kerr, 2012, p. 1). While there is no sound scientific evidence proving GMO products harm humans or the environment, there is the notion that time is needed to reveal the full burden of proof. The concerns for humans are that new allergens could be inadvertently created; for example a gene from a nut product could be introduced into soya beans, which may create allergenic issues for those with nut allergies - there has been no allergenic effects found with currently approved GM foods (Better Health Channel, 2011, p.2). Antibiotic resistance may develop because sometimes a marker gene is inserted to help determine if the new gene has been successful, but genes coded for antibiotic resistance could enter the food chain and possibly lead to humans developing resistance to antibiotics and infectious disease risk may increase - there is general consensus that use of these markers should be phased out (Better Health Channel, 2011, p.2).

Genetically Modified Organisms Environmental Concerns

A few of the environmental concerns are: cross-breeding between GMO plants and surrounding vegetation, which may increase the need for herbicides; Pesticide-resistant



insects may result from the extended use of natural products such as bacillus thuringiensis; biodiversity may be affected from growing large scale GM crops and affect the balance of wildlife and the environment; cross-contamination could result where plants bioengineered to produce pharmaceuticals may contaminate other food crops (Better Health Channel, 2011, p.2-3). Social and ethical issues become a concern, as there are risks that large multinational companies could control the distribution of GM seeds, GM foods may have traces of foods that are problematic for certain religious and cultural beliefs, and animal welfare could be adversely effected (Better Health Channel, 2011, p.3).

There has been much debate about how GMOs should be regulated and if GMO labelling should be used. Regulation for the use of GMOs varies by country with very tight regulations in the EU to wide use and adoption in the US and Canada. GMO labelling has been implemented in over 40 countries, like Australia. The US and Canada dispute the idea about GMO labelling because of the complexity of trying to trace GMOs from their original source to the finished product and the costs for implicating and monitoring.

GMO REGULATION AND LABELLING

There have been a lot of debate about how GMOs should be regulated, and what international agency should lead the development of the regulatory framework and who should mediate disputes for breach of agreed upon standards for GM foods (Premanandh, 2011). The challenge remains, who is to decide if a GM food is safe and what RAF should be adopted. Should it be the Scientist Reality Approach or the Social Reality Approach? An approach that has been widely adopted by many national governments for policymaking and has been introduced in some environmental treaties is the precautionary principle. The precautionary principle gives a general framework stating that in the absence of scientific consensus the burden of proof is used to determine if there will be harm to health or the environment (Powell, 2010, p. 502). Countries have used two procedures for the evaluation of GMOs: the case-by-case procedure that uses a mandatory scientific evaluation progress and the step-by-step procedure that progresses by measuring decreasing steps of biological containment (Powell, 2010, p. 502). The challenge is that not all countries using the same methods for determining and accepting risks associated with new biotechnology.



Who Should Develop and Mediate GMO Policies?

Premanandh (2011) states there are three potential international bodies that could be part of the development and the mediation process for resolving disputes from the use of GMOs: The Codex Alimentarius, The World Trade Organization, or The Cartagena Protocol on Biosafety to the Convention on Biological Diversity. The codex Alimentarius commission is an international agency created by the WTO and the Food and Agricultural Agency of the United Nations (FAO) to establish safe guidelines and codes of practice to protect consumers' health and ensure fair food trade practices. The World Trade Organization is an international organization that promotes fair trade that benefits all and works to maintain trade barriers that protect customers (p. 3). The Convention on Biological Diversity is "an international agreement which aims to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity, taking also into account risks to human health" (Convention On Biological Diversity, 2013).

The challenge is, there are two views for setting biotechnology standards among the three organizations. The Cartagena Protocol focuses on the process leading to the end product, which aligns with EU standards; while the WTO- Codex view is concerned with the end product and aligns with the US and Canada's standards for using GMOs. The US and Canada have not ratified the Cartagena Protocol. This is significant considering it has been estimated that 60-70 percent of foods in North America have been genetically modified (Premanandh, 2011, p. 2). This adds to the problem of getting global consensus on how to regulate, inform consumers, and monitor the use of GMOs.

Consumers view of GMOs

Consumers have been advocating for GM products to be labelled so they can make better choices and decisions about the GM foods or non-GM foods they choose to consume. Producers argue that the cost and complexity to implement GMO labelling would not help customers make better choices and decisions, but would result in increased food prices. Studies have shown that there is strong support for GMO labelling with solid consensus in the US, over 80% of Canadians, 83% of Taiwanese, 90% of Australians wanting GMO labelling; to add, consumers of industrialized countries have expressed that they want to avoid GMO foods (Premanandh, 2011, p. 2). A non-profit organization – Non-GMO Project –



was established in 1998 to ensure the availability of non-GMO products and to help customers make informed choices, and offer North America a third party verification and labelling process for non GMO products (Non-GMO Project, n.d.). On June 25, 2013 Jobs (2013) wrote an article announcing that the USDA Food Safety and Inspection Service (FSIS) recently approved voluntary non-GMO labelling of meat and liquid egg products, which will be marked with the verification seal of the Non-GMO Project. Consumers continue to show strong support for GMO labelling and now have accepted the standards of the Non-GMO Project to validate non-GMO products and look to their seal of approval when making purchasing decisions. The EU has developed a website – GMO Compass – to share information about the use of GMOs, regulation and labelling requirements. While the GMO Compass is funded by the EU, it is still a great portal for information on the use and regulation of GMOs in the EU.

Producers View on GMOs

Producers argue that GMO labelling would require extensive genetic testing; current DNA detection methods have limitations on highly processed materials because transgene remains undetected in final products, making it very difficult to make sure that products are in their purest form and no cross-contamination occurred (Weighardt, 2007 as cited in Premanandh, 2011, p. 2). Notwithstanding, the cost for the implementation and monitoring of a GMO labelling system is estimated to add 30 percent to production costs, basically eroding the initial cost saving from using GMOs (Bailey, 2001 as cited in Premanandh, 2011, p. 2). Cox & Peritz (2001) published a story about Loblaws ordering suppliers to remove GMO-free labelling from their products until there is a government or an industry definition for GMOs in Canada; this story was republished June 7, 2013. This further supports that industry in Canada is not supporting GM labelling and are pushing back until a regulating body gives clarification. Premanandh (2011) concluded that studies have indicated consumers prefer GMO-free food but do not want to pay a premium for such food (p. 3). Labelling has been implemented in 40 plus countries but there are concerns around the lack of consistency for what is deemed GMO free when comparing practices for countries that require GMO labelling.



MOTIVES FOR CHOOSING A SPECIFIC RISK ANALYSIS FRAMEWORK (RAF)

The RAF's goal was to put science behind public policy development and to establish a common framework when conducting risk assessments on new technology. The different views between the US and EU for utilizing RAF were mixed because they had different perspectives about regulating scientific developments. The US embraces the Scientific Reality Approach and the EU embraces the Social Reality Approach.

Isaac & Kerr (2003) outlines that the Scientific Reality Approach works on the notion that technology leads to innovation and increases efficiency, leading to development and growth, resulting in wealth creation, which should create demand for better food and environmental standards. The Scientific Reality Approach uses the precautionary principle to assess risks when there is limited data. Risks are evaluated using causal-consequence models and peer-reviewed scientific literature to make decisions. If there is not sufficient scientific literature then the precautionary principle is triggered and the technology would not be used. The Scientific Reality Approach is more product-based; the main concern is the end product (p. 2). Producers from different countries would compare the end product and not consider what went into making it; they would compare things such as appearance and proven nutritional information.

Isaac & Kerr (2003) explains that The Social Reality Approach is based on technology's role in society. Science and technology bring about change that disturbs the norm, which makes it important to consider all facets that the change will bring. It works on the precautionary principle built around the risk assessment tool and risk measurement tool, which means, it can work when scientific evidence is available and when there is insufficient scientific evidence. The Social Reality Approach is process-based and looks to understand what inputs went in to creating the product (p. 2). Producers from different countries would compare what inputs (seeds, fertilizers, GMOs, etc.) were used and steps were taken to get to the end product.

IMPACT TO CANADA

The EU and US relationship is important to Canada because the US is Canada's largest trading partner, while trade with the EU is showing strong growth. Because of Canada's trading relationship with the US, they usually show bias towards US social and political views when negotiating trade agreements. In part, this is because of the regional trilateral



trade agreement – The North American Free Trade Agreement (NAFTA) – between Canada, Mexico, and the US that essentially, constitutes the free flow of goods and services between the three countries. Canada's view towards the use of growth hormones and GMOs almost mirrors the US as noted throughout this paper, with the exception of a few GMOs and growth hormones.

Canada's total import trade with the US in 2011 was US\$219.32 billion of which US\$17.632 billion was in agricultural products; and total trade exports were US\$292.46 billion of which US\$18.545 was in agriculture (Agriculture and Agri-Food Canada, 2012). This resulted in a total trade surplus of US\$82.14 billion and a US\$0.98 billion agricultural trade surplus. Canada's total import trade with the EU was US\$39.85 billion of which US\$2.4 billion was in agricultural; and total trade exports were US\$40.86 billion of which US\$3.72 billion was in agriculture, resulting in a total trade deficit of US\$1.01 billion and a US\$1.31 billion trade deficit for agricultural (European Commission, 2013b).

The US is Canada's number one trading partner for both imports and exports, and the EU is third for imports, next to China, and a strong second for total exports (Industry Canada, 2011). This demonstrates the importance for harmonized trade agreements and understanding of each country's social and political views. A bilateral trade agreement between the US and the EU (Transatlantic Trade Agreement) could have very positive consequences for Canada.

Canada has recently been in talks with the EU to establish a bilateral trade agreement with one of the biggest issues being about getting increased access to EU agriculture, specifically, beef and pork (Mayeda & Aritits, 2013). The US is gearing up to start talks with the E.U. for their own bilateral trade agreement and there were initial concerns that Canada's talks could be stalled (Mayeda & Aritits, 2013). This recent activity demonstrates that Canada is aggressively working to expand trade and its relationship with the EU.

The CBC (2013) posted a story about a dispute between Canada and the US because the US announced new regulations requiring Country of Origin Labelling (COOL) for beef and pork. In response, Canada threatened retaliation measures, as a result of the dispute, because it said COOL is discriminatory under WTO standards (p. 1). While Canada and the US have a long history of trade, examples of disputes like this continue to arise. Some believe it is



because the US has been favouring a protectionist stance to what they think will help them better control their trade deficit.

CONCLUSION

With total agricultural trade reaching US\$19.66 billion in exports to the EU from the US and an agricultural trade surplus of US\$8.89 billion, it has become clear that the need for strong trade relations is fundamental. The EU's ban on hormone-treated meat had immediate negative impact on their trade with the US because of retaliatory tariffs valued at US\$93 million per year, which resulted in trade dropping from US\$130 million to US\$15 million. The EU held strong on their ban of hormone-treated beef and it still remains in effect today, but there has been significant negative impact to trade because of the retaliatory tariffs. Importantly, the EU successfully negotiated the removal of the tariffs, while blocking imports of hormone-treated beef. The moratorium that the EU put on GMO products resulted in trade disputes, but ended with the EU complying with a WTO order while successfully restricting GMOs from entering their food supply chain.

The benefits for using growth hormones in beef means that cattle grow 8 to 25% faster, reaches market 17 days sooner, which equals savings from CAD\$30 to CAD\$80 per animal. The end product is extra lean ground beef that costs CAD\$4 less per kilogram compared to the same product in the EU. While the cost savings are significant there are unknown risks about how growth hormones impact humans. There have been questions raised about the increased risk of cancer and starting premature puberty.

It has been argued that GMOs help produce sturdier plants, better quality food, higher crop yields, and lower food costs. The risks have been said to be increased chances to develop allergens, plant crossbreeding, and increase in infectious diseases. There is no sound scientific evidence to confirm the risks of using GMO; it is argued that because GMOs have only been commercially used since 1995 more time is needed to understand their full risks.

The main reason for the US and the EU's differences about the use of GMOs and growth hormones is because they have adapted different approaches to the RAF and to further complicate things the WTO has adopted a RAF that aligns with the US. This has made other MFN question why they should not just adopt policies that are most convenient, like it appears the EU has done.



While there is a need for some form of international regulation and possibly labelling system for the use of biotechnology this becomes very complex because of two different approaches to the RAF, achieving consensus seems to be near impossible. Furthermore, what international body should develop the governing rules and who will be responsible for monitoring and dispute resolution?

There are still ongoing trade negotiations between the US and EU and agriculture continues to a core element to establishing a cohesive bilateral trade agreement. There is no solution in sight to resolve the different views about how to use biotechnologies and to align their approaches to RAF. Time needs to pass to understand all the risks and benefits from using growth hormones and GMOs.

REFERENCES

1. Agriculture and Agri-Food Canada (2012, April). *Agri-Food Trade Service*. Retrieved January 7, 2013, from <http://www.ats-sea.agr.gc.ca/stats/stats-eng.htm>
2. BBC News (2013, May 6). *EU and US 'in biggest trade deal'*. Retrieved June 28, 2013, from <http://www.bbc.co.uk/news/business-22943170?print=true>
3. Better Health Channel (2011, June). *Genetically modified (GM) foods*. Retrieved June 27, 2013, from http://www.betterhealth.vic.gov.au/bhcv2/bhcarticles.nsf/pages/Genetically_modified_foods
4. Canadian Animal Health Institute (n.d.). *Hormones: A Safe, Effective Production too for the Canadian Beef Industry*. Retrieved June 28, 2013 from <http://www.cahi-icsa.ca/uploads/UserFiles/files/Beef-Hormones-Factsheet.pdf>
5. CBC News (2013, May 24). *Canada threatens retaliation over US meat-labelling rules. The Canadian Press*. Retrieved from <http://www.cbc.ca/news/business/story/2013/05/24/business-meat-labelling.html>
6. Clive, J. (2012) *Global Status of Commercial Biotech/GM Crops: 2012. ISAAA Brief No. 44*. ISAAA: Ithaca, NY Retrieved from <http://www.isaaa.org/resources/publications/briefs/44/executivesummary/pdf/Brief%2044%20-%20Executive%20Summary%20-%20English.pdf>
7. Convention on Biological Diversity (2013, June 13). *The Cartagena Protocol on Biosafety*. Retrieved July 1, 2013, from <http://bch.cbd.int/protocol/>
8. Convention on Biological Diversity (2012, May 29). *About the Protocol*. Retrieved



- June 26, 2013, from <http://bch.cbd.int/protocol/background/>
9. Convention on Biological Diversity (2012, September 10). *Parties to the Protocol and signature and ratification of the Supplementary Protocol*. Retrieved June 26, 2013 from <http://bch.cbd.int/protocol/parties/>
 10. Cox, K., & Peritz, I. (2001, June). Loblaws orders GMO-free labels removed. *The Globe and Mail*. Retrieved from <http://www.theglobeandmail.com/life/food-and-wine/loblaws-orders-gmo-free-labels-removed/article4149208/doi:10.1787/factbook-2013-en>
 11. European Commission (2013, May). *UNITED STATES: EU BILATERAL TRADE AND TRADE WITH THE WORLD* (TRADE G.2). Retrieved June 30, 2013 from
 12. European Commission (2013b, May). *CANADA: EU BILATERAL TRADE AND TRADE WITH THE WORLD* (TRADE G.2). Retrieved July 1, 2013 from <http://ec.europa.eu/trade/policy/countries-and-regions/countries/canada/>
 13. Ghazalian, P. L., & Cardwell, R. (2010). Did the Uruguay round agreement on agriculture affect trade flows? An Empirical Investigation for Meat Commodities. *International Advances in Economic Research*, 16(4), 331-344. doi:<http://dx.doi.org/10.1007/s11294-010-9278-8>
 14. Greenpeace International (n.d.). *Biosafety protocol*. Retrieved June 27, 2013, from <http://www.greenpeace.org/international/en/campaigns/agriculture/solution-ecological-farming/biosafety-protocol/>
 15. <http://ec.europa.eu/trade/policy/countries-and-regions/countries/united-states/>
 16. Industry Canada (2011, November). *International Trade - Canadian Economy (NAICS 11-91)*. Retrieved from http://www.ic.gc.ca/eic/site/cis-sic.nsf/eng/h_00029.html#it3
 17. Isaac, G. E., & Kerr, W. A. (2003). Genetically modified organisms at the world trade organization: A harvest of trouble. *Journal of World Trade*, 37(6), 1083-1095. Retrieved from <http://ezproxy.library.dal.ca/login?url=http://search.proquest.com/docview/217542369?accountid=10406>
 18. Jackson, L. A., & Anderson, K. (2005). What's behind GM food trade disputes? *World Trade Review*, 4(2), 203-228. Retrieved from



- <http://ezproxy.library.dal.ca/login?url=http://search.proquest.com/docview/211349812?accountid=10406>
19. Jobes, J. (2013, June). USDA approves voluntary GMO-free label. *CBS*. Retrieved from <http://wtvr.com/2013/06/25/usda-approves-voluntary-gmo-free-label/>
 20. Johnson, R., & Hanrahan, Charles E. (2010). The U.S. -EU Beef Hormone Dispute. *Congressional Research Service*, 1-31. Retrieved from <http://www.fas.org/sgp/crs/row/R40449.pdf>
 21. Mayeda, A., & Arhitis, T. (2013, June 18). 'A rather serious setback for Canadian trade': Harper ends EU trip unable to clinch deal. *Bloomberg News*. Retrieved from <http://business.financialpost.com/2013/06/18/a-rather-serious-setback-for-canadian-trade-harper-ends-eu-trip-unable-to-clinch-deal/>
 22. Myhr, A. I. (2010). A precautionary approach to genetically modified organisms: Challenges and implications for policy and science. *Journal of Agricultural and Environmental Ethics*, 23(6), 501-525. doi:<http://dx.doi.org/10.1007/s10806-010-9234-x>
 23. Non GMO Project (n.d.). *ABOUT*. Retrieved July 1, 2013, from <http://www.nongmoproject.org/about/>
 24. OECD (2013), *OECD Factbook 2013: Economic, Environmental and Social Statistics*, OECD Publishing.
 25. Powell, R. (2010). What's the harm? an evolutionary theoretical critique of the precautionary principle. *Kennedy Institute of Ethics Journal*, 20(2), 181-206. Retrieved from <http://ezproxy.library.dal.ca/login?url=http://search.proquest.com/docview/751301268?accountid=10406>
 26. Premanandh, J. (2011). Global consensus - need of the hour for genetically modified organisms (GMO) labeling. *Journal of Commercial Biotechnology*, 17(1), 37-44. doi:<http://dx.doi.org/10.1057/jcb.2010.24>
 27. Reilhac, G. (2012, March 14). Lawmakers approve rise in imports of hormone-free beef. *Reuters*. Retrieved June 26, 2013 from <http://www.reuters.com/article/2012/03/14/eu-trade-beef-idUSL5E8EE50620120314>
 28. Rigby, D. (2004, August). *GM Food, Risk, Regulation and the EU-US Trade Dispute*



- (Number 0410). Retrieved from The University of Manchester website:
http://www.socialsciences.manchester.ac.uk/disciplines/economics/research/discussionpapers/pdf/Discussion_paper_0410.pdf
29. Swan, S. H., Liu, F., Overstreet, J. W., Brazil, C., & Skakkebaek, N. E. (2007). Hormone Growth Promoters Fed to Beef Cattle Linked to Adverse Impacts on Male Sexual Development. *Human Reproduction*. Retrieved June 28, 2013 from http://www.organic-center.org/science.hot.php?action=view&report_id=94
30. The World Trade Organization (n.d.). *Agriculture: fairer markets for farmers*. Retrieved June 26, 2013 from http://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm3_e.htm
31. Viju, C., Yeung, M. T., & Kerr, W. A. (2012). The trade implications of the post-moratorium european union approval system for genetically modified organisms. *Journal of World Trade*, 46(5), 1207-1237. Retrieved from <http://ezproxy.library.dal.ca/login?url=http://search.proquest.com/docview/1112895703?accountid=10406>