Legally Containing the Uncontainable:
Establishing a Liability Scheme for GE contamination in Canadian Agriculture

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Foreword

This Major Research Paper (MRP) is the culmination of a course of study designed to provide a thorough understanding of the mainstream agricultural model with its focus on efficiency. The focus of my plan of study is to understand and analyze the flaws within this system so as to understand the emerging alternatives. I wish to see how to overcome the failures of the industrialized food system and fears of food insecurity through a sustainable agriculture model.

The subject of the MRP will require that I lay out the current dominant regulatory framework that governs liability within the agriculture sector which is one aspect of understanding the present mainstream agriculture model based on efficiency.

I will be presenting an approach that promotes equitable liability, which in turn can help alleviate the economic uncertainty that many farms face with the advanced corporatization of the farming industry. The approach would address some of the weaknesses in the industrialized food system and directly comports with my Alternative Approach Component, particularly learning objective 2.3, an alternative food security model that is grounded in social justice. A liability regime could be a component of such an alternative model. Learning objectives 3.2 will be explored as I must first understand other approaches to liability that have been pursued in the name of sustainable farming, both in Canada and abroad, before identifying the gaps that need to be addressed.

My third component, environmental economics, places a heavy emphasis on preserving natural capital, which it is believed cannot be substituted by human-made capital. Establishing a regulatory framework for liability could affect the way in which producers and users approach their business so that natural capital ie. diversity in seeds enjoys greater protection.

Abstract

An increasing amount of litigation has been seen to address the spread of genetically engineered (GE) genes; however the focus has largely been on patent infringement to protect the seed developers. Farmers that lose profits due to the contamination of their fields by the (unintentional) flow of gene drift however are often overlooked. This paper tries to address this gap by asking how the current Canadian legal framework deals with the matter of recourse for GE contamination. Finding this system deficient, the paper then looks toward the common law procedures to mediate a solution. An overview of how other jurisdictions have dealt with the matter gives a basis of what opportunities may be available in the Canadian system. I use a socio-ecological framework as well as a more traditional policy analysis to assess the effectiveness of the Canadian regulations in coping with the issue of liability due to contamination. The paper concludes by recommending managing contamination through a compensatory fund on a strict liability basis at the provincial level. The funding ought to come from a seed tax paid by those who benefit financially from the introduction of the GE seeds so as to ensure that both the polluter's pay principle is respected as well as allowing for a type of ecological monitoring of the ecosystem.

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1. Introduction to Topic

Despite technical and physical protocols in place to separate genetically engineered (GE) crops from conventional or organic crops, there is mounting evidence that containment does not appear to be the current reality. The dispersal of GE pollen to unintended areas has the potential to create a great deal of environmental disruption.[1] This paper, however, deals with the economic disruption that such contamination could cause, specifically, for the farmers that suffer financial loss due to contamination. Non-GE farmers and in particular organic farmers are in danger of losing out on their price-premium revenue due to de-certification or sales loss due to trade barriers on the grounds of contamination. For farmers that have spent a great deal of time and resources developing their business to capture the non-GE market, such loss could be significant or even the end of their business completely. On the other hand, implementing a robust liability system that addresses contamination can potentially allow for greater market predictability and economic sustainability, particularly in overseas markets where GE products are still regarded with scepticism.

This paper first asks how the current Canadian legal framework deals with the matter of recourse for GE contamination? Finding that the system is deficient, the paper then seeks to answer the question of what regulatory scheme ought to be put in place in Canada in order to allow for a fair and equitable liability framework. I include an overview of the common law approaches to liability to gauge their suitability in the GE context. By reviewing what other countries have done to construct a regulatory framework for liability, I identify dimensions of these systems that would be useful to the Canadian context which helps inform my final recommendations section.

[1] Bjorkquist, S. & Winfield M., (1999). "The Regulation Of Agricultural Biotechnology In Canada." Canadian Institute of Environmental Law and Policy, p 6.

Embedded in many of these questions is how to determine damage for fair and equitable compensation as well as practical or policy considerations to determine who bears the ultimate burden of compensating for the damage. Such questions will be answered within my objective to establish a framework that is equitable in terms of both environmental sustainability and access to justice for traditionally underrepresented populations.

My research moves from the industry's current presumption that GE crops can be contained, to the explicit acceptance that transference will occur. The research assumes that there is a willingness on the part of the government to address the implications of cross-contamination and that the issue at hand is thus how such shifts ought to be facilitated. The final regulatory framework should be one that allows for a type of equitable outcome where the duty-bearer is held liable due to a set of ethical or moral considerations. The final objective then is to design a framework that allows for farmers that have suffered financial loses to recoup those damages through the conviction of a responsible party that has or could potentially benefit in some way from the contamination.

1.1 Methodology

A few broad analytical frameworks will help guide my research. Following a Socio-Ecological Systems Analysis, I will make the connections between ecology, economic, social and institutional systems that have fostered unsustainable trends in the use of natural resources.[2] Elinor Ostrom's Socio-Ecological Systems framework focuses on the interactions of humans and institutions within particular common pool ecosystems in order to determine the level of cooperation needed amongst the users to develop a long-term sustainable resource strategy.

[2] Otto, I. (2004). "Advanced Empirical Methodology for Socio-Ecological Systems Analysis." *Multiple Methods, Game Theory and Behavioural Experiments.* Thaer-Institute Resource Economics.

Legal theory will also assist me in conceptualizing my paper. Analytical jurisprudence, instead of legal formalism (which posits that there is a type of mechanical analysis that can produce 'correct laws'), attempts to use a neutral point of view and a more narrative dialogue when discussing aspects of the legal system in question. The OECD's approach to assessing policies allows for a systematic method while remaining flexible enough to be adapted to the paper's needs, in this case in incorporate a more nuanced ethical analysis.

The textual design of the project involves a broad overview of the current regulatory system and competing theories from Europe. There is a small sample of people who are familiar with this area of work who have acted as confirming or disconfirming informants (I have circulated to them drafts of my ideas for feedback). Using this feedback I have redesigned the hypothesis to align with their suggested norms of legal theory.

I have gathered and organized the research using tools taught by Prof. Liora Salter in Applied Research Methods (ENVS 6312). I relied less on newspaper clippings and instead gathered information from journal articles and farm magazines, highlighting and indexing key concepts, laws and actors. The material was organized in categories of 1) research theories and 2) one field for each type of statutory law that appeared applicable. In order to answer my research question I sought information on how specific legislative drafting can impact the economic and social outcomes of a claim. I gathered this by looking at environmental statutes that incorporate liability (even if only for public rights). I gathered information on how regulations under the federal jurisdiction differ from those implemented under provincial jurisdiction in order to recommend using one or both jurisdictions.

2. History of GE Plants

The art of plant manipulation for agricultural purposes has an extensive history, most often triggered by pests or droughts; human intervention has also had a featuring role. Farmers have often sought to better their yields, initially through natural selection and after the 1865 discovery of the basis of heredity, hybrids, through breeding, were being created with more predictable characteristic outcomes.[3] In the 1930s, corn became the first hybrid crop to be widely marketed and an economic success in North America.[4] The more recent introduction of genetic engineering however has been a drastic trajectory shift. While earlier manipulation would be done by combining varieties of the same species, mechanical genetic engineering (using rDNA technology) is done instead by inserting genes from one specie, to a different/foreign specie.[5] To date the most prevalent GE manipulation involves creating plants that are able to survive weed-killing pesticides or plants that generate toxins to ward off specific insects (pests).[6]

Research on rDNA technology to genetically engineer plants accelerated through the 1980s and by 1996 the first commercial biotech crops were planted.[7] By 2013, plantings had risen to over 175 million hectares, a significant increase from the 1.7 million planted in 1996.[8] This equates to roughly 12% of the annual global crop.[9] The majority of those crops are planted in 5 countries: the United States, Brazil, Argentina, India and Canada.[10]

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[3] Repp, R. "Biotech Pollution: Assessing Liability for Genetically Modifies Crop Production and Genetic Drift." 36 Idaho L. Rev. 585, 2000. P 588.
[4] Reinhardt, C and Bill Ganzel, (2003). "The Science of Hybrids." The Ganzel Group.
[5] *Ibid.*
[6] Strauss, Debra. (Fall 2012). "Liability for Genetically Modified Foods: Are GMOs a Tort Waiting to Happen?." TheSciTechLawyer. p 9.
[7] James, Clive. (2013). "Global Status of Commercialized Biotech/GM Crops: 2013." ISAAA Brief-46 s. Top Ten Facts.
[8] *Ibid.*
[9] *Ibid.*
[10] Listed in descending order with USA plating over 70 million hectors. *Ibid.*

Canada's total GE crop area decreased slightly in 2013 to 10.8 million hectors.[11] While 12 different crops have been approved for unconfined release in Canada only four are currently being cultivated significantly within the country; namely, corn, canola, soy and sugar beet. A few additional GE products are imported into Canada including cotton seed oil, papaya, squash and milk products produced using a GE veterinary drug. Despite the seemingly small number of GE plants in Canada, because of their pervasive inclusion in food production, as much as 80% of all processed food sold on Canadian shelves now may contain some form of GE material.[12] As of 2012, over eighty-one genetically modified foods had been approved by the CFIA.[13] This has led some to claim GE is the fastest growing crop technology in recent history.[14]

Proponents of GE use in agriculture point to outcomes such as reduction of insecticide use, increased yield, drought resistant plants and potential increased nutritional value.[15] On the other hand, many scientists question these conclusions and point to the possible allergenic effects that such manipulation can create[16] and the potential long term negative ecological and health consequences. Some studies have indicated that animals fed with GE plants may have increased rates of liver and kidney problems.[17] Organic farmers have complained that the plants inserted with the Bacillus thuringiensis (Bt)[18] toxin gene aimed at repelling certain pests has resulted in

[11] This was a decrease from 11.6 million the previous year due to an increase in wheat crop rotation and decrease in GE Canola. *Ibid.*
[12] Non-GMO Project. (2014). "GMO Facts."
[13] (2012). "Frequently Asked Questions - Biotechnology and Genetically Modified Foods", Health Canada,
[14] *Supra* note 7.
[15] *Ibid.*
[16] Bernstein JA, Bernstein IL, Bucchini L, et al. Clinical and laboratory investigation of allergy to genetically modified foods. Env Health Perspect. 2003;111:1114-21.
[17] Séralini GE, Cellier D, Spiroux de Vendomois J. New analysis of a rat feeding study with a genetically modified maize reveals signs of hepatorenal toxicity. Arch Environ Contam Toxicol. 2007;52:596–602.
[18] Bt is a naturally occurring soil bacterium. Part of the bacterium, when isolated can produce a protein called Bt delta endotoxin which is able to kill of European corn borer, a pest affecting many corn farmers. Farmers are able to plant these Bt corn to avoid having to use insecticides to manage the pest. Bessin, R. (2004). "Bt-CORN: WHAT IT IS AND HOW IT WORKS." University of Kentucky College of Agriculture.

Bt resistant pests.[19] Since Bt is one of the few insecticides permitted for organic farmers, this may result in additional hardships or reduced yields for them.

However, cross contamination, through gene drift, is an even bigger issue for organic farmers. The term describes the process of cross-pollination between biotech and non-biotech fields that results in tainting the organic crop. Besides the potential that gene drift could result in a net reduction in biodiversity, the economic consequences for farmers could be dramatic; loss of certification (organic standards do not permit GE technology), loss of an entire year's profits or even one's complete livelihood.

Early indications of GE technology's economic benefits encouraged the government to facilitate research and fund a task force on biotechnology.[20] Establishing whether the industry was commercially viable was the initial concern and attention to risk assessments and regulation were implemented after trial testing and small releases had begun.[21] The risk assessments and their underlying assumptions (discussed below) were thus geared towards this initial smaller scale operation. While the scale of commercialisation has rapidly increased, the regulatory framework has not been adapted to this change and rests on the assumption that the results found in performing the small scale operations can simply be replicated in the larger, industrialized context with the same predictability and effects.[22] This has meant present regulations do not take into consideration certain concerns associated with scale that are becoming increasingly pressing as production expands.

[19] Gassmann AJ, Petzold-Maxwell JL, Keweshan RS, Dunbar MW. Field-evolved resistance to Bt maize by Western corn rootworm. PLoS ONE. 2011;6:e22629. doi:10.1371/journal.pone.0022629.
[20] Berrett, K and Elisabeth Abergel. (February 2000). "Breeding Familiarity: Environmental Risk Assessment for genetically engineered Crops in Canada." *Science and Public Policy*, vol 27, no 1, p 6.
[21] *Ibid.*
[22] *Ibid.*

One such concern is the issue of co-mingling. Initial assumptions were that such co-existence could be managed and, whatever gene drift occurred would be minimal. This may indeed have been true under the smaller limited release proposals. Ever increasing documentation on the inadequacy of this assumption, even on the part of agricultural officials,[23] indicates that some type of reform is necessary to deal with the foreseeable consequences of contamination.

The procedures in place to prevent contamination appear problematic given the overreliance on industry efforts. For instance, the official procedure for commercial segregation and quality management for flaxseed transportation is to rely on the companies to employ *internal quality management systems* to guard against cross contamination.[24] No further oversight by an independent body is contemplated. Contamination testing protocols may also be inadequate. Current testing requires a 2 kg sample of any flax shipment going into the system and presumes a 95% probability of detecting GM seeds. Low levels of contamination within a lot however are indistinguishable from a clean seed lot test result given the rate of false positives.[25] Gaps such as these, along with the inevitability of cross-pollination in the natural environment indicate that effective co-existence is and will not be a reality. The reproductive characteristics of the plants affect the rate and probability of contamination to neighbouring farms. Corn and Canola pollen is carried by the wind while alfalfa pollen is carried by insects. Other crops are not as susceptible to wind at all like wheat and barley, which are self-pollinating instead of outcrossing.[26] In wind reliant pollinating plants like corn, environmental conditions –

[23] Kling, J. (1996). "Could transgenic supercrops one day breed superweeds?" Science 274:180-181.
[24] Canadian Grain Commission. (2014). "Sampling and testing protocol for Canadian flaxseed exported to the European Union."
[25] Booker, H., & Lamb, E. (2012). Quantification of low-level GM seed presence in Canadian commercial flax stocks. *AgBioForum*, *15*(1), 31-35.
[26] http://cls.casa.colostate.edu/transgeniccrops/croptocrop.html

temperature, wind speed, and wind direction – can all impact the likelihood of cross-pollination. Despite corn pollen grains being rather large and heavy, transportation through air is possible for several kilometres.[27] The likelihood of pollination however has been measured at significantly shorter distances, with cross-pollination dropping by 99% by 12-15 matters.[28]

3. Overview of the Canadian GE Regulatory Framework

GE products can be regulated in a number of ways depending on at what stage they are in the commercialisation process. Much of the current GE risk assessment regulatory framework falls within the purview of federal Ministries. The Canadian Food Inspection Agency (CFIA), which is overseen by the federal Minister of Agriculture and Agri-Food, is mandated by several acts to ensure that GE *plants* or seeds are safe to be imported and grown in the open environment.[29] Health Canada, under its authority in the *Food and Drug Act*, is authorized to perform assessments to ensure that GE plants used in foods are safe for consumption; that they can be sold to Canadians.[30] Finally, Environment Canada can regulate products that have not been addressed by other federal laws, through their powers under the *Canadian Environmental Protection Act* (CEPA).[31] *CEPA* aims to prevent pollution by monitoring air and water quality. Environment Canada, through several Acts is also able to regulate animals and plants in order to ensure ecological biodiversity.

CFIA's objective is to allow safe GE plants to be released into the environment, on a commercial level. In doing so, the agency assesses the safety of the GE product, not the process

[27] Jemison, J.M., & Vayda, M.E. (2001). Cross pollination from genetically engineered corn: Wind transport and seed source. *AgBioForum, 4*(2).
[28] *Ibid.*
[29] Moran, T., et al. (2009). "A Cause of Action for Regulatory Negligence? The Regulatory Framework for Genetically Modified Crops in Canada and the Potential for Regulator Liability." 6:1&2 UOLTJ 1; p 5.
[30] *Ibid p 6.*
[31] *Ibid.*

by which it was genetically modified.[32] For example, the *Seeds Act*, administered by the CFIA, does not distinguish between plants with natural genetic mutation, which occurs over long periods of time through traditional farming practices, and genetic modifications in a laboratory through rDNA technology.[33] This approach differentiates Canada's regulatory framework from that used in Europe. By focusing the risk analysis on the final product, the Canadian system is assuming that because the final creation, say an alfalfa sprout, is essentially the same in composition as an alfalfa sprout grown from a conventional seed, that the different design, manipulation and use of genetically modified seeds is irrelevant to the safety analysis.[34] All that needs to be assessed then is the relative safety of the final product in relation to comparable marketable products. In Europe, however, during the 1990s, the European Council adopted Directive 90/220/EEC on the Deliberate Release of Genetically Modified Organisms.[35] The framework established from this directive was grounded in the precautionary principle which requires that risk assessment procedures for the *development* of GMOs (the process by which the organism will be modified), be approved before any test trials can take place.

What is at issue in Canada then, is the novelty of the final product. The notion of novelty has been embedded in all the core GE regulations. The CFIA defines a novel plant as "a new variety of a species that has one or more traits that are novel to that species in Canada".[36] A *novel trait* is then defined as an element that "is new to stable, cultivated populations of the plant species in Canada, and it has the potential to have an environmental effect".[37] Both elements, the

[32] Berrett, K and Elisabeth Abergel. (January 2002). "Defining a Safe Genetically Modified Organism: Boundaries of scientific risk assessment" *Science and Public Policy*, vol 29, no 1, p 50.
[33] *Seeds Act, RSC 1985 c. S-8.*
[34] Lynch, D and David Vogel. (2001). "The Regulation of GMOs in Europe and the United States: A Case-Study of Contemporary European Regulatory Politics." Council on Foreign Relations.
[35] Council Directive 90/220/EEC on the deliberate release into the environment of genetically modified organisms.
[36] CFIA, Canadian food Inspection Agency. (2014). *"Novelty" and Plants with Novel Traits*.
[37] *Idid.*

introduction or the specie *and* the potential threat, must be present before the plant is considered novel. Health Canada defines novel foods as: products that do not have a history of safe use as a food; foods resulting from a process not previously used for food; or foods that have been modified by genetic manipulation.[38] Genetic manipulation here again refers to both genetic engineering and genetic alternations that occur naturally or through traditional farming techniques. Once a plant or food is determined to be novel, a thorough risk assessment is required.

The concept of novelty is operationalized through an analysis determining whether the final product in question is deemed to be 'substantially equivalent' (SE) to other products that are safe within the Canadian market. Substantial equivalency is a statutory concept more so then a scientific model to determine safety. SE is defined by CFIA as "the equivalence of a novel trait within a particular plant species, in terms of its specific use and safety to the environment and human health, to those in that same species, that are in use and generally considered as safe in Canada, based on valid scientific rationale."[39] When measuring the 'use and safety to the environment' what is actually being asked for is whether the proposed GE specie will 1. increase the potential for weediness, 2. become a "plant pest," 3. negatively affect non-target organisms or biodiversity, 4. transfer to related species and 5. have a negative effect on biodiversity.[40] This is then a statutory concept given that the parameters of what is meant by environmentally safe are clearly defined in narrow terms to accommodate the dominant policy objectives. The issue of crop contamination due to gene flow could potentially come into play under sections 3, 4 or 5. However, as these questions are posed to the applicants themselves based on their initial field

[38] Health Canada (2013). "Genetically Modified (GM) Foods and other Novel Foods."
[39] AAFC, Agriculture and Agri-Food Canada (1994), *Assessment Criteria for Determining Environmental Safety of Plants With Novel.Traits*, Regulatory Directive 94-08 (AAFC, Ottawa).
[40] *Supra* note *33*.

tests (aimed at producing a commercially viable product), the answers rely more on a decision-making process rather than a scientific analysis of their actual effect on the environment.[41] Once these questions are answered in the affirmative, the proposed GE plant's safety is *assumed* as they are substantially similar to other plants that are 'generally considered as safe', and their unconfined release into the environment is permitted. It is only when the legal test of Substantial Equivalence has not been met that a product will be deemed to be 'new' and in need of an individualised risk assessment. However, in Canada no submitted product has yet failed this test and subsequently been submitted for further assessments.

Once a product has been flagged as one that requires a full science-based risk assessment, the Plant Biosafety Office must be contacted to initiate the evaluation. The process itself is virtually identical to that of determining SE[42] since the same 5 questions posed above are used to assess the level of risk. The difference now is instead of determining how these factors compare to other commercial plants, the question turns to whether the noted differences pose an *unacceptable* level of risk to the environment. How this level is determined is difficult to gauge since much of the data submitted for the review is owned by the corporations who may opt to file the application as confidential and thus deny access to the public for peer review. [43] *Some* risk within the Canadian regulatory system is permitted but if and how much risk in the form of crop contamination is deemed acceptable by the regulators has not been made clear. The type of data submitted may include; public variety trials; in-house research previously conducted by the developers; published literature; and developer led private experiments.[44] The assessment is then

[41] *Supra* note 29 p 7-8. Explaining that the ambiguity of the concept of SE has led to various threshold definitions but that CFIA has opted to use the weaker "decision-threshold" grounded in assumptions opposed to a scientific-threshold.
[42] *Supra* note 39.
[43] Sierra Club of Canada National Office. Regulation of Genetically Engineered Foods: A 'Novel' Idea.
[44] *Supra* note 32 p 50.

based entirely on what the developers themselves submit as there is no requirement for the government to conduct an independent study or seek third party input.[45] The few times that the government has sought independent advice, their actions were usually preceded by a great deal of external pressure, e.g., recombinant Bovine Growth Hormone.

3.0.1 Division of Power

The Federal government is able to regulate GE under a number of the constitutional authorities. Health Canada's legislative powers under the *Food and Drug Act* are ratified under subsection 91(27) of the Constitution Act which gives Parliament exclusive authority to enact laws that concern 'criminal law.' The offences need not be listed in the Criminal Code; it allows Parliament to create criminal legislation if it is relevant to a public health mischief.[46] For example, the *Food and Drug Act* makes it a criminal offence for any manufacturer to knowingly sell GM food that has not completed the pre-market notification and safety assessment process. CFIA on the other hand administers the majority of their GE regulatory power through the *Seeds Act* (environmental release and variety registration) and the *Plant Protection Act* (importation). These acts have been authorised under section 95 and 91(2) of the *Constitution Act* respectively. Section 95 allows for the management of agriculture, jointly with provincial governments and s. 91(2) gives Parliament exclusive jurisdiction over 'trade and commerce' matters. [47]

The current lack of provincial oversight is presumably due to the desire to not interfere or duplicate the federal government's efforts. In an email responding to a request for a provincial review, Kate Jordon, a spokesperson for the Ontario Ministry of Environment, stated that there are no plans to incorporate GE review into the provincial "*Environmental Assessment Act* as

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[45] *Supra* note 43.
[46] Jackman, M. (2002). "Constitutional Jurisdiction Over Health in Canada," Health Law Journal 8:99-102.
[47] Gabler, Melissa. (2008). "Intergovernmental Relations in Food Biotechnology Governance: Complementary Disentanglement in Regulation with Collaboration in Food Safety and Inspection." Institute of Intergovernmental Relations School of Policy Studies: Queen's University, issue 5. p 13.

these activities are already regulated by the federal government."[48] The provincial government could regulate GE under a number of constitutional heads of power. Provinces can enact food inspection legislation under their s. 92(13) "property and civil rights," powers which have been understood as intra-provincial trade and commerce powers.[49] Provinces also have sections 92(16) (matters relating to a local or private nature) and 95 (agriculture) at their disposal to legislate food safety.

If a provincial government did decide to pursue this avenue, their jurisdiction could be limited by the rules that govern Canadian federalism. The doctrine of Paramountcy stipulates that if a provincial and federal law conflict, the federal law must prevail. This is particularly pertinent to potential laws enacted under the jointly held authority of agriculture (s. 95). However, this case presents itself only when the provincial law "frustrates" the purpose of the federal law.[50] Duplication alone is not enough to trigger this doctrine.[51] Inter-jurisdictional immunity can also act as a bar to provincial regulations if it is found that the statute significantly encroaches on a core function that belongs to the federal government.[52] However, instituting a stricter or more comprehensive assessment would not prevent the federal government from pursuing its own goals. In fact, the Prince Edward Island, Standing Committee on Agriculture, Forestry and Environment went so far as to state that current regulations do not prohibit the banning of GM organisms by provincial legislation.[53] Provincial governance could however be restricted to oversight within their particular province, as inter-provincial matters (s. 91(2)) are

[48] Mann, Susan. (2013). "Province steps aside in GM alfalfa debate." Better Farming.
[49] *Supra* note 47 p 21.
[50] *Bank of Montreal v Hall*, [1990] 1 SCR 121.
[51] *Multiple Access Ltd v McCutcheon*, [1982] 2 SCR 161
[52] *Canadian Western Bank v The Queen in Right of Alberta*, [2007] 2 SCR 3
[53] (2005a, 6) http://www.queensu.ca/iigr/WorkingPapers/PublicHealthSeries/gablerpaperfinal.pdf

dealt with by the national government, potentially limiting the effectiveness of GE containment regulations.

3.1 Critiques of the Current Regulatory Assessment Process

A push for more oversight has been voiced by the Ontario Environment Commissioner who urged the Ontario government "to play a more active role in regulating the sale and use of GE crops in the province, rather than simply following federal decisions that may not encompass provincial environmental goals and interests."[54] One contribution that such regulation could provide is the inclusion of economic and social cost considerations in the risk assessment process. Currently the federal "regulatory system is designed simply to approve products for commercial introduction if they are judged to be "safe" - there are no explicit questions asked about ethics, social and economic impacts, or social need."[55] Expanding the definition of risk assessment to include social and economic impacts would likely incorporate the concerns that organic and integrated pest-management farmers have about gene flow contamination.

As has been demonstrated by Elisabeth Abergel, a fundamental concern of the federal risk assessment process is the limits that the statutory concept of SE puts on the scientific analysis.[56] Since the legislative requirement for a risk assessment is only triggered if a product is found to be novel, many GE plants are simply entered into the environment on the assumption that there will be no negative repercussions, despite their difference in composition. Indeed CFIA registers many varieties of GE plants as substantially equivalent on the bases that they are derivatives of other SE applications, thus bypassing analysis completely.[57] Abergal et al. tested the strength of this assumption by looking at the 1994 environmental assessments for GE

[54] Miller, Gord. (2014). *Managing New Challenges: Annual Report 2013.2014*. ECO, Environmental Commissioner of Ontario. p 62.
[55] Sharratt, Lucy. (2002). *Regulating Genetic Engineering…for Profit*. Polaris Institute Report.
[56] *Supra* note 32.
[57] *Idid* p 53.

herbicide-tolerant canola which was determined to be "substantially equivalent to canola currently approved as livestock feed".[58] The fact that there were added bacterial genes for herbicide resistance was not in itself enough to affect its status as 'substantially equivalent'. This is despite evidence that the "rDNA methods used to introduce [the] new traits may affect some ecological interactions among the crop and other organisms."[59]

Evaluating the equivalence of a GE plant may not be entirely unreasonable so long as it did not impede proper scientific analysis. In fact, when the concept of SE was first introduced by the Food and Agriculture Organisation of the United Nations and the World Health Organisation in the early 1990s, the consultants stressed the point that SE should not be accepted as a substitute for risk assessment.[60] Instead, SE was meant to simply "provide reassurance that the new food or food component is comparable in terms of its safety to its conventional counterpart".[61] Familiarity is the preliminary step before conducting a SE assessment and refers to the knowledge of crops, their traits, the environment and how they interact, which is used as a comparator to understand how GE crops may function in relation to a non-GE *control.* 'Familiarity' with crop characterisation as used in regulatory protocols is also "not a safety conclusion, but rather it encompasses the information available at a given point in time and serves as a basis from which the risk assessment should proceed."[62] In the Canadian context however, it appears that the test for SE and familiarity have eclipsed the actual review process. The AAFC have gone so far as to claim that the "principle of familiarity may provide an accurate

[58] AAFC, Agriculture and Agri-Food Canada (1995), *Determination of Environmental Safety of Agrevo Canada Inc.'s Glufosinate Ammonium-Tolerant Canola*, Decision Document 95-01 (AAFC,Ottawa).
[59] Bergelson, J, Purrington, C and Gale Wichmann (1998). "Promiscuity in transgenic plants", *Nature*. 395, p 25.
[60] NAS, National Academy of Sciences (1989), *Field Testing Genetically Modified Organisms. Framework for Decisions* (National Academy Press, Washington DC).
[61] WHO, World Health Organisation (1995), *Application of the Principles of Substantial Equivalence to the Safety Evaluation of Foods or Food Components from Plants Derived by Modern Biotechnology* (WHO, Geneva).
[62] Nickson, Thomas and Michael J. Horak. "Assessing Familiarity: The role of Plant Characterization." Ecological Technology Center, Monsanto Company, St. Louis, MO, USA.

idea of the relevant risks in the novel product in the absence of direct experience with it."[63] Despite the contention surrounding the scientific process of familiarity, knowledge within this context is used to justify the scaling-up of GE development projects.[64]

If SE is to be the measuring stick used to determine the threshold of acceptability, one would imagine that a clear and thorough analysis would occur at this point. However, "the concept of substantial equivalence has never been properly defined; the degree of difference between a natural food and its GM alternative before its "substance" ceases to be acceptably 'equivalent' is not defined anywhere, nor has an exact definition been agreed by legislators."[65] Such ambiguity undermines the regulatory model's effectiveness and erodes consumer trust in the system.

Another institutional flaw is the developers' ability to self-test their products. The government relies on the companies to notify them if they suspect an adverse effect. The information submitted is gathered by the developers themselves who have a clear financial interest in having the proposal succeed. This relegates the government's role to one of reviewer, - ensuring all documents have been properly submitted and required protocols followed - rather than an actual investigator.[66] Factoring in the lack of transparency, due to the company's work being kept confidential and thus hidden from the public, the process looks more like a filing system rather than an actual assessment.

The assessment protocols themselves appear to have some weaknesses as well. For instance, the developers need not explicitly test the product on animals and if they choose to do so, a toxicology assessment is not required. A chemical analysis of the seed is often deemed

[63] AAFC, Agriculture and Agri-Food Canada (1996a), *BioInfo* (AAFC, Ottawa).
[64] *Supra* note 20.
[65] Millstone, E, Brunner E and Sue Mayer. (1999). *Beyond 'Sustainable Equivalence'*. Nature Vol 401: 7
[66] *Supra* note *43.*

enough to assess its equivalence and feeding tests are only mandated in cases where some suspicion has been raised.[67] Potential health concerns are thus overlooked as a chemical analysis, even if similar to traditional compositions, cannot predict fully how they will interact once consumed by individuals. Another example of a weakness is that the data requirements do not necessitate the developers to monitor trait stability over a sufficient number of sites or over a long period of time.[68] This means that environmental interactions that do not appear immediately or are inconsistent based on geographic locations are not documented or considered.[69] This is also a concern for contamination since the establishment of a trait and the possibility of a gene transfer in the open environment depends on "agricultural practices, viability of pollen, and availability of out-crossing partners."[70] These are not necessarily present during the testing and assessment phases.

Furthermore the current model does not align with the standards enumerated within Part 5 and 6 of CEPA. Given that CEPA mandates that *all* products of biotechnology be assessed for environmental, human health and biodiversity impacts before they may be manufactured, imported or put on sale,[71] it may appear as an alternative model to assess GE plants for their potential harmful effects. Under this approach it is likely that measurements for long-term, unanticipated or accidental side-effects (like gene flow) would be taken into consideration.

[67] GMO Compass. (2006). "Evaluating Safety: A Major Undertaking."
[68] Clark, Ann E. (2000). "Comments to the Senate Committee on Energy, The Environment and Natural Resources Regarding the Canadian Food Inspection Agency (CFIA)." University of Guelph.
[69] Numerous concerns relating to the parameters set on the assessment protocols have been raised. For an outline of a proposed expansive assessment process that incorporates ecological and health concerns please see. Bock, Anne-Katrin (2002). "Bock Genetically Modified Plants and Risk Analysis." Scenarios for co-existence of genetically modified, conventional and organic crops in European agriculture.
[70] *Ibid* p 95.
[71] *Canadian Environmental Protection Act*, 1999, Schedule 2 and/or 4.

Unfortunately, CEPA does not hold much clout in the current framework as legislators often demarcate most acts and regulations related to GE policy as taking precedence over the CEPA.[72] These demarcations are clear legislative decisions, to downplay CEPA's role and would require a change in legislative intent to regulate GE from a more ecological perspective.

3.2 Regulating GE through Patent law

In order for GE plants to become commercially viable, most companies protect their GE creations with patents, thus creating another potential area to regulate GE contamination. According to the Organic Consumers Association, as of August 2013 Monsanto alone has registered over 1600 patents worldwide for plants, plant parts and seeds.[73] In order to be issued a patent under the *Patents Act* in Canada, the applicant must demonstrate three things. First the invention must present something new; 2) the invention involves some sort of inventive step; and 3) the invention is useful.[74] Here 'useful' is interpreted to mean that the proposed 'invention' operates or functions as predicted by the inventor,[75] eg. does the GE herbicide-resistance seed create a herbicide-resistant plant? This is clearly not a difficult threshold to meet for any GE developer. The patenting of higher life forms such as seeds and plants were rejected in a controversial case called *Harvard Collage v Canada*[76] where the plaintiff was seeking a patent for a mouse that had its genome genetically altered for research purposes. Unlike in the USA, where the plaintiffs won the right to patent both the genome as well as the mouse, the Canadian Supreme Court made a distinction between lower life (the altered genes) and the higher life forms (what the altered gene was programed to grow into), stating that the line is "defensible on

[72] *Supra* note *43.*
[73] Zack Kaldveer, Z. (2013). "U.S. and Monsanto Dominate Global Market for GM Seeds." Organic Consumers Association.
[74] *Canadian Patent Act.* RSC1985, c. P-4. S. 2.
[75] *Consolboard v. Macmillan Bloedel (Sask.) Ltd.* [1981] 1 S.C.R. 504.
[76] *Harvard Collage v Canada*. 2002 SCC 76, 219 D.L.R. (4th) 577.

the basis of common sense differences between the two."[77] Justice Bastarache also highlighted some serious concerns that would need to be addressed by legislation before such a ruling on patents could be made, listing among them the agricultural impact on farmers who wish to save and reuse seeds. Seed patents in Canada should then be meant for the altered genes within the seed but not for the eventual plant containing the altered gene. However in the *Schmeiser*[78] case, the court held that using the second generation seeds of the original patent constituted patent infringement. Therefore, the patent applicants in this case were able to effectively secure their right to patent protection of higher life forms by claiming the entire organism as their product. This paradox has yet to be explicitly recognized in patent law.

In gene flow or contamination, unwanted GE material is transferred to non-GE crops, which is relevant to the patent scheme as it creates a potential situation of patent infringement. This can occur since this type of patent carries over to the next generation of seeds and "any plants resulting from a hybrid of genetically engineered plants and non-GMO plants"[79] Indeed, in early 2014, the US Supreme Court ruled that biotechnology companies with patented seeds are permitted to sue farmers that are inadvertently contaminated by the GE material.[80] Several organic and farming organisations had sought to have a pre-emptive ruling precluding such lawsuits but were denied this on the grounds that Monsanto promised not to pursue legal action on those farms that were found to contain traces of the company's biotechnology. A trace in this context refers to farms that are affected by less than 1% by the GE material.

To prevent such misuse of patent rights, legislators have two main alternatives at their disposal. First they could rewrite the patent laws pertaining to GE material to allow for explicit

[77] *Idid* Section C, para 1.
[78] *Monsanto Canada Inc. v. Schmeiser* [2004] 1 S.C.R. 902, 2004 SCC 34.
[79] Hilary, Preston. (2003). Drift of Patented Genetically Engineered Crops: Rethinking Liability Theories. 81 TEX. L. REV. 1156-7.
[80] *Organic Seed Growers and Trade Association, et al., v. Monsanto Company, et al*. SCC No. 13-303

protection of the breeder rights by providing protection to the plant itself but not to the offspring or hybrids, leaving "plant buyers free to keep, to reproduce, and to sell seeds."[81] This would essentially balance the rights given in the *Patents Act* with the farmer's privilege originally promised in the *Plant Breeders Act, 1990.*

However, Canada being a member to the International Union for the Protection of New Varieties of Plants[82] (UPOV) regime, has recently codified the rules borne out of the UPOV convention by amending the *Plant Breeders Act*.[83] The UPOV aims to protect and encourage the creation of new varieties of plants by codifying intellectual property rights for plant breeders. The pant must be novel, distinct from other varieties, uniform and must be stable but the convention does not distinguish between plants that have been created through conventional breeding techniques or genetic engineering.

The amendments to the *Plant Breeders Act* affords breeders an expanded set of rights. There is the cascading right which allows plant breeders to collect royalties beyond the seed itself. Royalties can be collected on the harvested crops and even processed products. Meaning when the farmer goes to sell their crop they will be required to give over a portion of their profit to the original seed breeder, making seed saving uneconomic.[84] Furthermore, the current practice of protecting the breeder's exclusive right to sell seeds will be expanded to include the right to control cleaning and storing. A farmer's right to reseed will be moot if their access to storage and cleaning is removed.[85] All of this amounts to eliminating the farmer's privilege to

[81] *Pioneer Hi-Bred v. Commissioner of* Patents [1989] 1 SCR. 1623 Dissent at para 151.
[82] International Convention for the Protection of New Varieties of Plants. of December 2, 1961, as Revised at Geneva on November 10, 1972, on October 23, 1978, and on March 19, 1991.
[83] *Plant Breeders' Rights Act*, S.C. 1990, c. 20 amendments enacted on ***feb 27, 2015***
[84] Boehm, Terry. (2013). "Farmer's Privilege and UPOV '91." The Union Farmer: Quarterly (Spring).
[85] *Ibid.*

replant seeds initially envisioned in the *Plant Breeders Act* and along with the IP rights under appetent law allows a type of double protection for breeders ie. Biotechnology corporations.

Alternatively, legislators could include another element to an infringement lawsuit, that of intent. As it stands now, plaintiffs in infringement suits do not need to demonstrate that the defended intended to infringe; the infringement itself is enough proof of wrongdoing. But as Hilary Preston points out, none of these earlier patent infringement cases dealt with *self-propagating* organisms.[86] Legal reform in this manner would allow farmers, who are found to inadvertently be in possession of GE plants on their property, to have a sound defence. Similar wording can be found in the UK *Patent Act 1977* section 62(1).[87]

However, these suggestions are still focused on the narrow issue of protecting innocent farmers from *being* sued rather than addressing the larger problem of the lost revenue stream for those seeking to benefit financially by avoiding GE plants. In the current context of patent law, what is being protected are the rights of developers to make a commercial profit, rather than any protection on grounds of safety or lost biodiversity.

3.3 Regulating GE Products through Labelling

Another potential point of regulation for GE products is at the end use point by labeling products that contain GE plants. Food labeling is governed by two departments: Health Canada and CFIA. Both are mandated under the *Food and Drugs Act* but their responsibilities differ in that Health Canada is responsible for managing labels in order to safeguard consumers from health and safety concerns, while CFIA's role is broader and aims to create common food labelling policies and regulations that protect buyers from misrepresentation and fraud.[88] CFIA

[86] *Supra* note 79 p 1167.
[87] *United Kingdom Patents Act 1977* C. 37.
[88] Health Canada. (2012). "The Regulation of Genetically Modified Food."

aims to ensure products are not misrepresented by managing food labels as well as packaging and advertising requirements.[89]

GE products are largely considered a consumer preference or choice and at the present time, labeling is only mandatory when health or safety concerns are at issue. The threshold to trigger labeling for safety and health concerns are not triggered for GE products because they have already passed the SE and familiarity tests. This leaves GE labelling as a voluntary measure. In 2004 the Standards Council of Canada adopted the *Voluntary Labelling and Advertising of Foods that Are and Are Not Products of Genetic Engineering.* This policy allows a food to be *labelled as a GE product* when more than 95% of its source is genetically engineered.[90] If a food source is between 5 and 95% genetically engineered it may be labelled as *"*a mixture of products of and not of genetic engineering".[91] A food with less than 5% genetically engineering cannot be labelled in a way that indicates that it contains any GE.[92] The words 'free', '100%' and 'all' are not permitted in labeling in relation to GE.[93] This may be relevant for those wishing to label their products as GE-free. Labelling foods as not containing GE is also not permitted for those items which there have no corresponding GE product,[94] as the possible economic advantage of labeling something as not containing GE, when there is in fact no threat of GE in any such items, could be interpreted as fraud.

While developers have the option to label their foods as GE, for consumers that are concerned, there is still a significant gap in the legislation. Leaving labelling as voluntary has meant that most food products in Canada have not been labeled as containing GE, effectively

[89] *Ibid.*
[90] Public Works and Government Services Canada. (2014). "*Voluntary Labelling and Advertising of Foods that Are and Are Not Products of Genetic Engineering." s. 5.1.2.*
[91] *Ibid* s. *5.1.3.*
[92] *Ibid* s. *5.1.4.*
[93] *Ibid* s. 4.1.1(k).
[94] *Ibid* s. 6.1.4.

shifting the onus of responsibility of labeling onto those producing foods that do not contain GE. There are those, such as the Saskatchewan Organic Directorate that argue that costs associated with the segregating and labelling of genetically engineered food should be paid by those who are responsible for bringing in this new element, and who consequently benefit financially the most from its introduction, "rather than being off-loaded onto others, such as organic producers who must bear the expense of being able to certify that their food is non-genetically modified."[95]

The labelling system as it stands in Canada allows for contamination without it being labeled as such on the final packaging. There is an obvious imbedded financial advantage for the biotechnology industry but moreover, there are also long term liability implications. Not only is the financial burden shifted to those wanting to farm without GE to create their own certifying system, but also shifts the burden of proving damages in a contamination case. At what point/percentage can damages be calculated if a proper labeling system is not recognized? If damages only accrue when an organic certification is lost, a large number of farmers that choose to avoid GE would be neglected. Calculating their damage would be more difficult given that on the face of it, the current labeling regulations do not allow for a financial advantage to GE-free farming, despite the fact that many seek out their own avenues of achieving a GE-free premium price. The current label system does not allow for a good "triggering" system to measure when liability for damages due to contamination is owed since the thresholds do not correlate with the realities of marketing.

3.4 Further Liability Regulations Needed

It is clear that the regulatory framework is geared towards fostering a commercially viable industry and not primarily concerned about curbing the financial risk that some farmers –

[95] Glenn, Jane. (2004). *Footloose: Civil Responsibility for GMO Gene Wandering in Canada.* 43Washburn L. J. p 572.

that do not account for the bulk of the export market – might be exposed to. While important factors such as the environment and health effects are considered to a certain degree under some of the above acts, it appears that many crucial factors were left out of the regulatory framework, either as an oversight or intentionally in order to diversify the agricultural market.

What is clear, however, is that as more evidence accumulates indicating an actual market loss for many farmers and overall market depression, due to the ban on some exports to European and Japanese markets, there is a need for some form of restructuring to incorporate concerns about contamination. There are the more visible examples of profit loss such as when GE Starlink corn, which had not been approved for human consumption, was found in taco shells.[96] Despite implementing a 'buy-back' program, farmers still suffered costs, debt-repayment delays and face possible civil action.[97] Increased scrutiny of GE products has led some countries to ban various agriculture imports from Canada for fear of contamination, resulting in considerable investment losses for farmers engaged in that market. The question then becomes how ought Canada incorporate these financial risks into the GE regulatory system. If the existing assessment framework doesn't include explicit consideration of economic harm, it effectively shifts the responsibility to those threatened and as such it may be appropriate to look at what the possible avenues for redress are through a more direct or individual basis.

4. <u>Traditional Tort Liability</u>

In the absence of proper, or specific legislation governing the liabilities of GE contamination within the pre-market regulatory framework (an examination of possible post-market liability schemes currently available is discussed below), farmers who have suffered economic lose due to gene flow may attempt to recoup those losses through traditional lawsuits

[96] Moelle, David. (2001). "Legal Issues Surrounding the Planting of Genetically Modified Crops." Farmers' Legal Action Group, Inc. St. Paul, Minnesota.
[97] *Ibid.*

using tort law. The three areas most applicable to such claims would be Negligence, Nuisance (private and strict liability) and trespass. The section that follows will outline how these areas of law function and how they may apply to the case of GE contamination. The section will conclude with an explanation of the unlikelihood of success using this route due to the nature of the judiciary forum. This inference strengthens the argument that a proper legislative model needs to be in place to facilitate the protection of vulnerable farmers.

4.1 Negligence

When the court is presented with a case that does not have clear guidance from the legislature by way of a statute, the judiciary system has at its disposal common law rules. These rules have been developed and refined over several decades by the judges themselves and build upon themselves through analogous precedents. The majority of common law tort suits fall within the category of negligence; and along with nuisance also make up the majority of agriculture property damage applications.[98] For a successful case of negligence, the plaintiff must clearly point to a wrongdoer who owed the victim a *duty* to exercise care. That is, there must have been some form of relationship in which the defendant's actions put the plaintiff in a position of *foreseeable* risk.[99] Secondly, the defendant then fell below the standard of care that the duty entailed, or in other words, they did not do what a reasonable person would have done in the circumstances. Finally there must be a causative link between the defendant's actions (those that fell below the standard of care) and the (tangible) damages claimed. This causation resulting in damages must also have been reasonably foreseeable to occur to the plaintiff.[100]

[98] J.W. Looney, *Rylands v. Fletcher Revisited: A Comparison of English, Australian and American Approaches to Common Law Liability for Dangerous Agricultural Activities,* 1 DRAKE J. AGRIC. L. 149, 150 (1996)
[99] *Cooper v Hobart* [2001] 3 S.C.R. 537, 2001 SCC 79.
[100] *Wagon Mound (No. 1)* [1961] 1 All E.R. 404 (P.C.).

In the context of GE contamination, there are a number of issues that would need to be resolved by the courts before a negligence case can succeed. Determining whether a farmer using GE seeds has a duty to neighbouring farms, the court would first look to see if it fits within one a previously established category. At first glance the case appears to fit with the basic rule that anyone who causes harm to a person or their property is deemed to have owed that individual a duty of care.[101] However, this will depend on how the courts define property damage: does the fact that the plants are simply altered and thus still useable rather than physically damaged or ruined mean they are excluded from this category? The notion of useable is also contentious since the plant may no longer be 'usable' for organic farmers for their original purpose; they are still nevertheless usable as commercial products, albeit at a reduced market value.

If it is deemed that the plants are not damaged in the traditional sense, the courts do have the ability to establish new categories of duty by asking: is it reasonably foreseeable that the defendant's actions would cause harm to the particular plaintiffs?[102] It seems clear that this should be answered in the affirmative as there is, and has been, a great deal of coverage of this particular risk to non GE farmers. Moreover, the fact that many GE seed user agreements mandate that farmers institute practices to reduce the likelihood of cross pollination should be taken as proof of reasonable awareness of the risk of harm. The larger hurdle in such a case will likely be in establishing that the GE farmer has fallen below the standard of care reasonably expected of them. While *Ryan v Victoria (City)* made it clear that "mere compliance with a statute does not, in and of itself, preclude a finding of civil liability" [103], it may prove difficult to show there was actual negligence when much of the contamination may occur due to natural

[101] *Supra* note 99.
[102] *Supra* note 99.
[103] *Ryan v Victoria (City)* [1999] 1 SCR 201 para 27.

processes like wind and pollination. This would create a situation that would need to be analyzed on a case-by-case basis which could require a significant amount of resources. Each plaintiff would need to establish that a neighbouring farmer failed to take adequate precautions; for example, if a farmer were to improperly set their buffer zones. There is still the issue of causation which will be addressed later on as this is a concern shared by the other forms of civil law lawsuits referred to in this paper.

4.2 Nuisance

Nuisance is defined as: an unreasonable interference with the use or enjoyment of land, causing either physical damage to the land or injury to the health, comfort, or convenience of the occupier.[104] Unlike a negligence claim, there is no fault requirement when claiming nuisance. That is, a defendant can be held liable even if they have acted in a reasonable, prudent manner because the law is concerned about the reasonability of the action's *consequences*, not one's state of mind. Some prime examples of nuisance cases involve: barking dogs, noise, smoke, or obnoxious odors. No actual property damage is required, rather the claimant must demonstrate that they have lost some ability to use and enjoy their property. The court will only intervene when one's excessive use of property causes inconvenience beyond what those in the area can withstand. This requires the court to assess the standard of comfort generally enjoyed or expected in the area at that time.[105]

Before a farmer wishes to pursue a nuisance claim against a GE grower, they must first decide if they should seek a private nuisance claim or one of public nuisance. Public nuisance claims are designed for issues that hold a common interest for multiple parties; when the defendant's conduct interferes with the rights or enjoyment that are common to the community.

[104] *340909 Ontario Ltd v Huron Steel Products Ltd* (1990), 73 OR (2d) 641 (HCJ).
[105] *Ibid.*

Organic and conventional farmers might wish to pursue this action together when the GE contamination is so widespread that it becomes unreasonable to expect one person to take proceedings on their own to stop it. However, there are two major caveats that might make a public nuisance claim problematic. First a public nuisance claim must be brought forward by the provincial Attorney General (AG). Putting forward a lawsuit of this nature can be quite political and requires the AG to balance multiple policy concerns, leaving many with limited access to the courts.[106] Ontario is an exception in that the Environmental Bill of Rights allows a person who has suffered a direct or economic loss due to a public nuisance to the environment to sue without permission from the AG.[107] Secondly, if the public nuisance were to succeed and the GE farmer were required to either cease their activity or compensate for the public nature of their damage, the individual farmers would not be able to seek compensation as a private matter. This is despite the fact that one farmer may have suffered to a greater degree than another farmer, because what is being remedied here is the damage to the 'public resource': crop biodiversity. The farmer would need to demonstrate that they suffered a "peculiar and particular" damage rather than a difference in the *extent* of damage.[108]

A nuisance claim may be plausible if the court determines that the use of GE had an unreasonable effect on the use of the land based on the factors enunciated in *340909 Ontario Ltd v Huron Steel Products Ltd.* This amounts to a type of balancing act that the adjudicators make by weighing the utility of the offending action (proposed benefits such as an increased yield due to the use of the GE trait) against the severity of the interference (how significant are the damages suffered by the GE contamination). It is pure speculation in which direction the courts might go on this issue, given the sensitive policy considerations involved. Is it more important to

[106] Environmental Commissioner of Ontario. (2012). How to Sue over a Public nuisance.
[107] *Supra* note *Ibid.*
[108] *Hickey v Electric Reduction Co of Canada.* (1970). 21 DLR (3d) 368 (Nfld SC).

preserve ecological and farming diversity or is it more important that in an ever increasing population, the agriculture community seek out all available means of increasing crop yield?[109]

In determining unreasonableness the courts must also look at the 'ordinary use of the land'. Some commentators have suggested that, because of the complex nature of organic farming, such use may be deemed "too sensitive" to be considered ordinary use of the land (in this case the use is meant for agriculture in general), to expect that the offending party (GE growers) to take responsibility for the ensuing damages caused to the organic farmers.[110] However I would point to the fact that organic farming is simply the natural form of agriculture and has always been around, albeit updated with new understanding of agroecology. The issue of sensitivity is reserved for cases that would not be accepted as the norm by the broader community, for example, claiming the fumes of a factory interferes with one's ability to raise sheep when in fact the area is zoned for industrial use. Additionally, organic practices are now an accepted form of farming throughout Canadian society.

4.3 Rylands v Fletcher

A common law rule closely related to that of private nuisance is the strict liability expressed in *Rylands v Fletcher* (1868).[111] Judge Blackburn wrote that the rule of law is "that the person who for his own purpose brings onto his lands and collects and keeps there anything likely to do mischief if it escapes … is prima facie answerable for all damage which is the natural consequence of its escape."[112] This is often used in cases where toxic material has escaped, making those who brought the material onto their land in the first place liable. However, the regulators of GE material require biotechnology companies to submit data on the

[109] *Supra* note 3 p 612.
[110] *Ibid.*
[111] *Rylands v Fletcher* (1868) L.R. 3 H.L. 330.
[112] *Ibid.*

chemical and other effects of their product, similarly in nature to the protocols in the toxic chemical industry. Therefore, a simple analogous case can be drawn between the two industries given that the government itself has established the parallels.

There is no defence of due diligence with this common law decree. The rule has been refined somewhat however in that liability will not be found if the mischief that escapes is of an ordinary purpose for which the owner can reasonably expect to use their land.[113] This idea that the escaped substance must be of a 'non-natural use' to the land does not yet have a clear definition at law. Farmers wishing to file a Rylands type of suit would then need to show that the use of GE seeds is not a natural use of the land. The debate has two polarising stances, on the one side that GE is a natural extension of conventional farming while on the other hand genetically engineering has taken agriculture on a fundamentally new path. When faced with such politically charged policy questions, the courts often reserve judgment, declaring that a clear intention from legislation is needed. Given, however, the government's stance since the inception of GE in farming and the institutionalisation of SE, it may very likely be that GE would not be defined as unnatural within the farming context. Legislative intent normalising GE farming can also be read from the fact that there has been no explicit or separate GE legislation established to date. Instead, only regulatory amendments to existing legislation have been adopted to incorporate the expected needs of GE farming.

4.4 Trespass

Unlike nuisance, where the issue is unreasonable interference, trespass can be found on interference alone. As a judge declared in a1978 case of unwanted pesticide spraying; "to throw a foreign substance on the property of another, and particularly in doing so to disturb his

[113] *Gertsen v Municipality of Metropolitan Toronto.* (1973). 41 DLR (3d) 646 (Ont HC))

enjoyment of his property, is an unlawful act. . . . [114] Ultimately the claimant in a trespass case needs to demonstrate that there has been a physical invasion of, or interference with, their exclusive possession of property. Some cases have gone so far as to declare that the fact that the invasion was done by an invisible element, does not bar a successful trespass case.[115] The point is that one's use of exclusive possession of the land has been affected, though courts have stressed that the interference needs to be more then minimal irritation.

Appling this law to the case of GE contamination then, it would seem likely that a farmer could succeed. Though the claimant would want to show some form of damage in the way of lost market access or lost certification in order to recoup their losses; at law, trespass need not end in direct damages. An intruder onto ones land constitutes trespass even if the only damage be as little as "bruising the grass and even treading upon the soil.".[116] In another case, unwanted mail constituted trespass.[117] While Canada does have a cause of action for unintentional trespass, in which the farmer would need to point to some sort of negligence on the part of the GE farmer, most cases involve intentional trespass. This, however, does not have a high threshold as demonstrated when the Alberta Supreme Court held in 1976 that the saw dust from a lumber company amounted to trespass when it interfered with the use of a neighbouring motel.[118] Intentional, then, may not be for the intention to trespass but rather the intention to perform the particular action that subsequently constitutes trespass, for example, intentionally hang electrical wires which subsequently pass over one's property, spaying pesticides that migrate, or growing GE crops that drift.

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[114] *Friesen et al.* v. *Forest Protection Limited* (1978), 22 N.B.R. (2d) 146 at 162 (S.C.Q.B.).
[115] Heuston, *Salmond and Heuston on the Law of Torts*, 46; "Deposit of Gaseous and Invisible Solid Industrial Wastes," 879-80;
[116] *Entick v. Carrington* (1765), 19 St. Tr. 1030 at 1066 (C.P.).
[117] *Mather* v. *Columbia House* (6 August 1992), 10315/91 (Ont. Ct. Gen. Div.).
[118] *Kerr et al.* v. *Revelstoke Building Materials Ltd.* (1976), 71 D.L.R. (3d) 134 (Alta. S.C.).

4.5 Causation

The larger issue with the above mentioned civil remedies is the problem with establishing causation. With the right technology, it is possible to determine that a crop has been contaminated by GE plants, but the farmer may still need to demonstrate that they are not themselves responsible for the contamination.[119] This is particularly relevant for framers who may have had prior contracts with GE developers. Establishing that the GE plant in the claimant's field originated from a particular neighbouring field may prove to be the most difficult hurdle. If there is only one such land using that exact GE crop, the court can determine on the bases of probability where the contamination originated from. What happens when there are multiple farms using GE crops in a region?

In the case of negligence, the Canadian courts have recently made changes to allow for a more just application of the law. In a 2001 SCC case, it was determined that the inability to conclusively determine causation should not be a bar so long as the plaintiff is able to show that the defendants made a *material contribution* to the plaintiff's loss, at which point it is up to the defendant to show that they in fact did not cause the damage.[120] This would allow a claimant to implicate all GE growers reasonably located in the area without having to meet the otherwise overly difficult causation burden.

In the case of Trespass or nuisance however, the claimant will likely have to rely on circumstantial evidence such as expert testimony on wind patterns and agricultural practices that would make it more likely that the contamination originated from a particular field. Such evidence is difficult to establish and Canadian courts are reluctant to give such information much weight, particularly if it were the deciding point in a multi-million dollar lawsuit.

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[119] *Supra* note 3 p 603.
[120] *Walker Estate v York Finch General Hospital*, 2001 SCC 23, [2001] 1 SCR 647

Add to this that "for new life forms released into the environment, it may be decades after the release before any impact on the ecosystem and humans is detected or fully understood," [121] it may be impossible to pinpoint the source to establish causation beyond an immediate and concrete case.

A final but crucial point on the matter of causation is the issue that contamination may in fact be ecologically inevitable. If there are situations where there is no way to prevent gene drift, either through buffers or other planting practices the entire notion of causation would be undermined. Such a case would mean that simply farming GE seeds itself establishes your liability; a form of strict liability comparable to the *Rylands v Fletcher* scenario above. However in this case there is no one that has 'allowed' the mischief to escape in the strict sense of the word. This brings in questions of fairness since farmers have received approval from government officials to use the product in question, establishing its legality. It would be imprudent for the courts to then turn around and deem the same governmental approved act responsible for inevitable damage. This problem instead may point to a more fundamental problem with regulation and support the notion of regulatory liability or government negligence. Barriers to this cause of action are however discussed below.

If the only farmer versus farmer commingling case in the world – *Marsh vs Baxter* (Sup. Ct. of Western Australia)[122] – is to be taken as an indication, causation will not be found in such situations. The court found that the GE farmer was not negligent as his planting was a lawful agricultural practice. Furthermore, because narrowly speaking the economic loss was due to the de-certification of the plaintiff's organic status, not due to the particular harvesting practice that left the GE canola open to the weather, causation was not established. The decision of the

[121] Valiante et al., (1985). "Biotechnology and the Environment: A Regulatory Proposal." 23 Osg. H.L.J. 359, p 381.
[122] *Marsh v Baxter* (2014). WASC 187.

certification agency to decertify parts of the plaintiff's yield was deemed the legal cause of his loss and not the conduct of the defendant.

As a side note of (troubling) interest, the courts found that the decertification due to contamination was a 'gross overreaction' on the part of the agency. The organic farmer was told he should instead sue the organic certification body for the lost revenue as he would be "better served directing his concerns in that contractual quarter."[123]

4.6 Changing Behaviour

One aspect that the above rationalisations have in common is that the cases are all directed towards a neighbouring *farmer* that has used GE seeds, not the developer or regulatory bodies themselves. While not necessarily relevant to a successful verdict, if the object is to recoup the lost market revenue due to contamination, as a private citizen, a farmer may not have the "deep pockets" necessary to make good on the damages. However, in an attempt to indirectly alter behaviour there may still be a legitimate reason to pursue a civil remedy against neighbouring farmers. If the level of risk that individual farmers take on when purchasing GE seeds significantly rises, there may be a point at which the cost outweighs the potential benefits enough to either induce a noticeable drop in GE purchases and/or motivate the development of alternative farming practices that reduce potential gene flow.

4.7 Biotechnology Developers

Initiating a claim against the developers of GE products may be appealable given the practical reality of their financial situation puts them in the best position to compensate for the economic damage that gene flow creates. For purposes of equity, this approach may also be appropriate as it would entail that those who benefit the most from the introduction of the new technology take steps to ensure that the costs of that invention do not disproportionately burden a

[123] *Ibid.*

few individuals. Finally, seeking redress against the biotech companies may allow the plaintiff to bypass the cumbersome issue of causation. Indeed it is precisely the inherent problem of successfully proving a GE contamination case with the use of circumstantial evidence that has led farmers to join together in class action lawsuits against developers and the government.[124]

The same four cause of actions discussed above could be pursued against biotechnology companies and, in fact, an attempt to do so can be seen in the recent *Hoffman v. Monsanto Canada Inc.* case.[125] Here, organic farmers represented by the Saskatchewan Organic Directorate sought to litigate against both Monsanto and Bayer for the economic damage caused by their introduction of GE varieties of canola. The case before the court was a preliminary ruling seeking to be certified as a Class Action (allowing all those harmed by the defendant's actions to be named as plaintiffs). Given this preliminary nature, the Saskatchewan Superior Court had to rule on whether or not the claimants had an *arguable case*, whether there was *any* merit to their claims (not if that merit could amount to a successful verdict). Unfortunately, the court ruled that there was no such merit to their claims for civil liability against the biotechnology companies. The Saskatchewan Court of Appeal agreed and in 2007 the SCC denied leave to hear their case.

In coming to this conclusion, the court felt that the defendants could not be held to owe a duty to the farmers in a case of negligence because they had gained all requisite government approvals before the release of their product;[126] shifting any possible blame of negligence to the regulators and away from the manufactures. Furthermore, the damage claimed in their negligence suit was not deemed suitable. The organic farmers sought to have their lost revenue,

[124] *Supra* note 3 p 604.
[125] *Hoffman v. Monsanto Canada Inc.* (2007), 2007 SKCA 47, Cameron J.A., Gerwing J.A., Sherstobitoff J.A. (Sask. C.A.)affirming (2005), 2005 SKQB 225
[126] *Ibid*

due to Europe's ban on GE canola, acknowledged, however the court felt that any EU policy directed at GE imports was directed at the biotechnology itself not against organic farmers inadvertently contaminated and thus the policy was not relevant in the present situation.[127]

The court left alone the issue of GE drift as a 'dangerous substance' or that it is an "unnatural" use of land as required under the *Rylands v Fletcher* rule because again the court felt the biotechnology companies are shielded by the fact that the 'escape' of the contaminants was done through lawful commercial practices approved by the government.[128]

In both the nuisance and trespass cause of actions, the commercial or marketing nature of the biotech company's role was emphasised. The courts deemed that while their role as 'marketers' or 'sellers' is needed for the damage to occur, it is ultimately the neighbouring farmers that put the nuisance *in play*.[129] This seems like a particularly troubling finding if it were to become a precedent as it essentially holds that the biotechnology companies can absolve their actions in creating a hazard by relying on their end use role as a business; shifting the burden of responsibility to individual farmers.

However, the case is not entirely closed as there may still be some avenues to explore. While the court dismissed the manufacturers' duty to non-GE farmers due to their fulfilment of regulatory obligations, other courts have made it clear that this ought not to be a decisive factor.[130] Negligence in product design could still be found if one were to show that the product was designed negligently and in Canada such an approach often takes on a 'risk-utility' balance analysis. Some factors the court may look to in answering this question "the usefulness or desirability of the product; the availability of other and safer products to meet the same need; the

[127] *Ibid*
[128] *Ibid*
[129] *Ibid*
[130] *Willis v. FMC Mach. & Chems. Ltd*., (1976) 68 D.L.R. (3d) 127 (P.E.I.S.C.)

likelihood of injury and its probable seriousness; the obviousness of the danger" among others.[131] Whether this balancing act weighs in favour of the organic farmers is not at issue when deciding if a case has merit, instead the court would need to ask whether it is possible to make this argument of negligent design. Furthermore, the negligence claim in the *Hoffman* case was also dismissed because the plaintiffs sought pure economic damages due to their inability to use canola in their crop rotations and their inability to partake in the certified organic market. Generally speaking, courts do not accept claims for pure economic losses (though Canadian courts have acknowledged some exceptions to this category and have left open the possibility that other forms could be recognized in the future).[132] However damages framed as a loss of revenue due to damaged crops (ie. damage to property) should be acceptable to the courts as it follows the traditional pattern of common law damages. This would cover the amount of money one losses when an organic farmer is forced to sell their crop at a loss to the general market due to contamination.

The *Hoffman* ruling on trespass is also questionable in its thoroughness, given that the Schmeiser case itself inadvertently showed that it is possible to trespass on one's intellectual property after one's role as marketer has ended. If a biotechnology company can acknowledge that they own and can protect their property *subsequent to its release to the original purchaser*, they likewise owe a duty to ensure that such property does not unintentionally find itself in a position to claim trespass. One ought not to be able to claim ownership of property in order to satisfy one form of trespass (patent infringement) but relinquish claims of ownership in the trespass case at hand.

[131] *Supra* note 95 p 563.
[132] *Martel Building Ltd. V Canada SCC* 60, [2000] 2 SCR 860.

4.8 Governmental Negligence

Finding a government body negligent is particularly difficult as only the 'operational' aspects of their work rather than any 'policy' component is open to judicial review.[133] Defining something as operational or policy can then become very contentious. The issues most likely to be attacked as negligent behaviour by the government are the lack of economic and social considerations in the assessment process and the adoption of SE over a more precautionary principled approach. Both of these are likely however to be deemed as policy decisions.[134] Jane Glenn however claims that the undue influence the biotechnology companies have on the regulatory system, as described above, and the lack of transparency, are far more operational in nature and may be cause for a negligence claim.[135] However, as pointed out by Thomas Moran, these claims are stymied by the fact that they can only be recognized when there is a sufficiently close (proximate) relationship established between the individual claimant and the regulator.[136] Assigning statutory responsibilities and determining how to report on those responsibilities would unlikely garner this type of relationship.

Lawsuits against GE regulators in the US have been successful in finding that the USDA failed to address "environmental risks, including the risk of GM crop contamination and potentially the eventual destruction of organic alfalfa in the region."[137] The USDA was deemed to not be incompliance with statutory regulations. Similarly one might argue that the Canadian regulators have not complied with the *Seeds Act* with their particular methods of data collection and review process. However this would not likely result in a finding of negligence but rather a

[133] *City of Kamloops v. Nielsen*, [1984] 2 SCR. 2, 12-13
[134] *Supra* note 3 p 569.
[135] *Supra* note 95 p 571.
[136] *Supra* note 29 p 20.
[137] *Ibid* p 12.

successful judicial review application[138] which at most would allow for an injunction until a proper assessment is completed.

4.9 Final thoughts on Common Law Remedies

Despite the fact that the Canadian government has proclaimed that the private classical tort remedies will suffice, and thus new legislation determining a new cause of action for contamination is unnecessary, there seems to very little room for a plaintiff to successfully pursue a suit, let alone recoup his lost earnings.[139] If we are to take the court's ruling in *Hoffman* as a sound precedent, the most successful brought will likely be to seek a nuisance or trespass claim against a neighbouring farmer that has used GE plants. A significant number of successful claims like this could, however, also wreak havoc on individual farmers seeking out a living by using this new technology or on the wider agricultural community if this expense is to be absorbed by farmers alone. While other areas of negligent suits, such as in the course of transport, may be feasible as well, the same issue of redress is present. Finding a defendant with 'deep pockets', who can also address the pervasiveness of the issue of contamination, is challenging.

There are other reasons, other than the mere complexity and resource draining process of seeking out individual court case remedies, why legislation should be drafted to contend with the issue of gene drift. The courts have a great deal of expertise, particularly in terms of constitutional rights, however, there are some cases that are simply not judiciable or are better left to parliament. Courts often recognise the highly politicalised and policy driven nature of a particular matter and in turn withhold judgment until clear parliament intent is received. GE contamination appears to be such a case. The policy implications of a successful civil suit

[138] *Ibid* p 18.
[139] Migus, Michael. (2004). "GMO Statutory Liability Regimes: An International Review." CIELAP.

against a biotech company would be tremendous and unlikely the appropriate venue for the independent, unelected judiciary to step in. Furthermore, given the contentious nature of this matter, what is actually sought is some form of compromise which is not the objectives of an adversarial judiciary system. Instead, parliamentary debate relying on an evidently biased analysis process would be more suitable for such an initiative.

5. Analysis of Liability Laws in other Jurisdictions

Before analysing what the most appropriate system would be in the Canadian context, this paper will give an overview of the type of regulatory and liability frameworks already in play or under review internationally, regionally and domestically. The rationales for these different approaches will be briefly addressed in relation to their designers, but a more thorough analysis of the ramifications of the various considerations in a liability scheme will be addressed later. While most countries have enacted some form of statute that addresses the regulation of genetically modified material, most have done so from a health and safety perspective to address public concerns.[140] Although actions to address these concerns are valid and necessary, it can pose difficulties when determining if these acts and regulation will also apply to private economic losses. Some states have attempted to address these private financial issues with specific legislation, while others have tended to use broad language that may encompass these claims when the charge arises.

Multilateral *environmental* agreements mostly deal with the issue of liability through a specific coordinated civil regime. Some past models include: the Paris and Vienna Conventions on nuclear liability; the 1992 Protocol amending the International Convention on Civil Liability for Oil Pollution Damage; and the 1999 Basle Convention. These regimes still allow for claims

[140] *Ibid.* p 13 lists: Bulgaria, Estonia, Indonesia, Slovakia, Slovenia, and South Africa all countries that have enacted public law liability regimes that address GMOs.

to be brought to the national court system, however, the rules and substantive standards applied are the same for all signatory countries.[141] The national and international legal tests for redress are harmonized amongst the countries. However, as will be seen below, this trend has yet to carry over to GE liability regulations. The biggest barriers to a harmonized approach appears to be the fear that such regulations will impact additional domestic indemnity laws that could have significant financial repercussions as well as undermine national sovereignty.

5.1 International Liability Schemes

At the international level, the most prominent regulatory framework has been the *Cartagena Protocol on Biosafety* to the Convention on Biological Diversity that entered into force in September 2003. With the support of the EU and a majority of developing nations, the *Cartagena Protocol* aims to manage the transboundary movement, transit, handling and use of all living modified organisms that pose an adverse effect on the sustainable use of biological diversity, while factoring in risks to human health.[142] While some have commented that this avenue promises to be the best option for those in developing nations to address their concerns over GE commercialisation,[143] the biggest GE producers and exporting nations have yet to fully incorporate the protocol into national regulatory schemes. The USA has declined to sign the protocol. While Canada has shown initial interest by signing it, steps towards ratification have not begun.[144]

The protocol makes it clear that overseeing the use and transit of GE products should be done "in accordance with the precautionary approach contained in Principle 15 of the Rio

[141] Singh Nijar, Gurdial. (2009) "Liability and redress for damage arising from genetically modified organisms: Law and policy options for developing countries." *Biosafety First*. Terje Traavik and Lim Li Ching (eds.) p17.
[142] Article 4 of the Protocol, SCBD 2000
[143] Cullet, Philippe (2007). "Domestic Policy Options: International Trends in Liability and Redress." *Asian Biotechnology and Development Review*. Vol. 9 No. 3. p 5.
[144] Parties to the Protocol and Signature and Ratification of the Supplementary Protocol, Convention on Biological Diversity.

Declaration on Environment and Development".[145] Principal 15 explains that in cases where *threats* of serious or irreversible damage are evident, the lack of full scientific certainty should not be used as an excuse to avoid cost-effective measures in order to prevent environmental degradation. Articles 10.6 and 11.8 of the *Cartagena Protocol* explain the implementation of the precautionary principle in relation to handling GE, stating that insufficient relevant scientific information on a GE product, concerning the *exten*t of the *potentially* adverse effects on biodiversity, should not stand in the way of a party to the protocol rejecting or otherwise affecting the importation of such a product.

During agreement negotiations, one of the more contentious issues involved the type of liability and redress system the protocol would endorse in the event that a GE product, moving across boundaries, did indeed trigger in the importing nation some damage to the environment or to human health.[146] Article 27 allowed for the initiation of negotiations on this issue; to determine the international rules concerning liability and redress. To this affect, the Nagoya-Kuala Lumpur Supplementary Protocol was adopted on October 15, 2010.[147] While this may be a good initial framework for liability, there are some potential concerns and legislative gaps that may need to be addressed to allow for a comprehensive framework for private economic loss.

Given the protocol's focus on biological diversity, it isn't even clear if personal economic damage is specifically contemplated. The rules pertaining to redress include response measures to reduce or prevent damages and to restore biological diversity, either "to the condition that existed before the damage occurred or its nearest equivalent."[148] However, no mention of

[145] Article 1 of the Protocol
[146] *Supra* note 141 p 1.
[147] Nagoya-Kuala Lumpur Supplementary Protocol, Oct.15, 2010, UNEP/CBD/BS/COP-MOP/5/17, Report of the Fifth Meeting of the Conference of the Parties to the Convention on Biological Diversity Serving as the Meeting of the Parties to the Cartagena Protocol on Biosafety, Decision BS-V/11, 62-71.
[148] *Ibid.* art. 2(2)(d).

compensation for the loss in market value or livelihood is mentioned. In fact, no financial securities were agreed upon. Secondly, damage would be assessed only in cases where it involves GE products in cross-border exchanges (thus not covering containment disputes born from domestic initiatives). Moreover, the test establishing contamination liability mandates that the claimant prove a *measurable* and *significant* adverse effect on biological diversity or risks to human health.[149] How 'significant' is defined has yet to be determined. This lingering ambiguity is no doubt due to the difficulty of negotiating such terms with such a large and diverse number of parties, which is perhaps why the ad hoc committee has encouraged those states party to the protocol to address liability through existing national civil liability frameworks.[150]

5.2 Multinational Liability Schemes

As briefly mentioned above, the EU works under the precautionary principle when assessing GE products. After accepting this principle in 1991, the EU placed a *de facto* moratorium on GE approvals, but in 2013 the EU General Court determined that delay tactics within their approval process amounted to a violation of the law. With mounting WTO pressure due to perceived violations of international trade laws, the moratorium was lifted.[151]

There are a number of regional conventions designed to address damage due to GE release, most introduced by the EU. The Directive on Deliberate Release into the Environment of GMOs establishes rules for risk assessments and procedures for cultivating crops to decrease the likelihood of contamination, but stops short of introducing a liability regime, instead

[149] *Ibid.*
[150] Telesetsky, Anastasia. (2011). The 2010 Nagoya-Kuala Lumpur Supplementary Protocol: A New Treaty Assigning Transboundary Liability and Redress for Biodiversity Damage Caused by Genetically Modified Organisms. *Insights*. Vol 15 no. 1.
[151] Brussels Office weblog. (2013). EC legally obliged to pass on a 12-year old GMO cultivation request. Newsletter 377.

encouraging seed suppliers and farmers to inform themselves about applicable national liability laws.[152] The *EU Liability Directive* deals with product liability, including agricultural products, however this would only apply in situations where the seeds planted were deemed not 'fit for their purpose"[153]. This would not be the case if sold in accordance with state regulations. Land contamination would also only be considered if it adversely affects human health or is within a protected habitat.[154] The European parliament initially advocated for the inclusion of private liability through a *Coexistence Report* which aimed to create "Community-wide civil liability and insurance in respect of possible financial damage in connection with coexistence"[155] but this was not included in the final EU Liability Directive. Germany and the United Kingdom, in particular, opposed the language as it could impact their domestic insurance and compensation schemes.[156]

The Council of Europe Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment, or "the Lugano Convention", would have overcome many of the above issues as it specifically included risk to property and allows for a strict liability framework; however the protocol is not legally binding because of a lack of signatories.[157]

The Organization for African Unity (OAU), now the African Union (AU), along with the Ethiopian Environmental Protection Authority, created an African Model Law on Safety in Biotechnology in 2001. Not strictly a regional framework, it was designed to help establish

[152] *Supra* note 141 p 10.
[153] *Ibid.*
[154] Article 2(1)(a) and (c)
[155] Friedrich - Wilhelm GRAEFE zu BARINGDORF (Greens/EFA, D) (2003). "*Report on coexistence between genetically modified crops and conventional and organic crops"* Motion for a European Parliament Resolution. 2098(INI).
[156] The United Kingdom's response to the White Paper in *Supra* note 139 p 12.
[157] *Supra* note 141 p 9 and *Supra* note 139 p 11.

consistent national laws on biotechnology.[158] The initial model included a strict liability regime "for any harm caused by such a genetically modified organism".[159] Harm specifically included damage to the economy, social or cultural practices of the indigenous communities which extended to "damage to agricultural systems, reduction in yields and damage to the economy of an area or community."[160] Several African national governments have subsequently established biosafety laws based on the model but have not adopted its strict liability regime.

5.3 Regulating Liability on a National Level

When examining regulatory frameworks developed by national governments, it becomes clear that many have recognised the uniqueness of GE claims, and this has prompted discussion about special liability regimes.[161] Many European states are, however, electing to establish minimum protection through the more traditional tort law system. This approach may be due to the fact that GE farming, at least until recently, has been more of an exception in Europe rather than the norm, as it is in North America. This less frequent use of GE farming can ultimately affect the number and nature of claims brought forward and consequently means that there is not as great of a need or pressure on the EU governments to institute a robust system at this time.

There are multiple ways assessment regulations can impact liability and contamination; however, civil liability remedies, particularly for economic lose due to contamination, have largely been dealt with outside the assessment framework through stand-alone statutory instruments. How these instruments operate will be reviewed below (Section 5.4).

[158] Boadi, Richard. (2007). "Managing Liability Associated with Genetically Modified Crops." *Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices* (eds. A Krattiger, RT Mahoney, L Nelsen, et al.). MIHR: Oxford, U.K., and PIPRA: Davis, U.S.A.
[159] African Model Law on Safety in Biotechnology (2001) Art. 14.
[160] *Supra* note 143 p 6.
[161] Kosch, B (ed). "Liability and Compensation Schemes for Damage Resulting from the Presence of Genetically Modified Organisms in Non-GM Crops." Research Unit for European Tort Law, 2007. p 8.

5.3.1 Approval Process

Through the assessment process countries can address issues of liability by limiting cultivation and thus comingling; factoring in what level of risk/hardship due to contamination is beyond acceptable for an application to be approved; diversifying the type of regulatory bodies permitted to make decisions on the approvals and expanding the scope of what is regulated and thus monitored for contamination.

The approval and use of GE products is of great public concern in many countries and several governments have consequently established strict risk and permit regulations limiting cultivation. The assessment process differs from state to state. Some countries, such as New Zealand, have an Environmental Protection Authority that is required to take into account environmental, economic, social, cultural, and public health considerations[162], while in South Africa, the decision to include an assessment of the socio-economic risks is a policy decision made by the Executive Council on a case-by-case basis.[163] Countries that have adopted the European regulations may find themselves constrained, as they are not permitted to ban GE crops all together. The EU mandates that all laws passed by the member states be subordinate to the EU's regulations regarding consumer and environmental protection.[164] Russia, exempt from such restrictions, had in fact implemented a ban on the commercial cultivation of GE products all together, though this has was changed as of 2013 with the adoption of a resolution to allow for an approvals process.[165] Though most countries have not gone so far as to ban the cultivation of GE plants, the actual plantings remain low. This may be in part due to the more stringent application of assessment requirements, but also a result of heightened political sensitivity

[162] Buchanan, Kelly (2014). "Restrictions on Genetically Modified Organisms: New Zealand." Library of Congress.
[163] The African Centre for Biosafety. (2007). "Overview of GMO Regulatory Regime in South Africa."
[164] Consolidated Version of the Treaty on the Functioning of the European Union, arts. 2 & 4, 2012 O.J. (C 326) 50.
[165] Flake, Levin & Vassilieva, Yelena. (2013) "Russian Federation: Government Resolution on GMO Registration for Environmental Release." USDA Foreign Agric. Serv., Gain Rep. No. RS1366. 1–2.

surrounding the issue in many countries. For example, Japan permits the cultivation of GE crops, but other than ornamental flowers, no GE crops have been planted due to the public's wariness of its safety.[166]

Despite the variances in containment practices, most national governments still oversee the assessment rules for conducting experiments of GE. This allows them to take into consideration factors and risks that directly lead to contamination in the granting or not granting of approval. Italy, for example, includes the consideration of possible abandonment or replacement of crops that are no longer economically viable due to GE, or a change in market patterns due to the product release or damage to the image of local products.[167] France is another example of an EU country that has chosen to implement more stringent regulations on the release of GE that may include issues of containment. The government's approval process includes looking at risks to the environment and public health, by soliciting the opinion of the Haut Conseil des biotechnologies. The Conseil has both a scientific committee and one addressing economic, ethical, and social matters.[168] When considering risks to the environment, the Haut Conseil looks to the Environmental Code which includes a provision that GMOs be used "in a manner that respects the environment and public health, agricultural structures, local ecosystems".[169] By explicitly factoring in how the introduction of a new GE plant will impact agricultural arrangements and local ecosystems, the state is suggesting that if the current diversity is threatened too much, an approval should be withheld, thereby eliminating the opportunity for co-mingling.

[166] Umeda, Sayuri. (2014). "Restrictions on Genetically Modified Organisms: Japan." Library of Congress.
[167] Legislative Decree No. 224 of July 8, 2003, Implementing Directive 2001/18/EC arts. 8, 15, 19 & 22.
[168] Code de l'environnement art. L531-3. As found in : Boring, Nicolas. (2014). "Restrictions on Genetically Modified Organisms: France" Library of Congress.
[169] *Ibid.*

While GE regulations are often implemented by the central governments, where there are strict federalist rules that govern agriculture, as in Italy, a more diversified approach can emerge. The Italian Constitutional Court declared unconstitutional the Federal 2005 law that required "equality between different types of agriculture" and imposed on the "autonomous provinces a 'plan of coexistence' to prevent the commingling of GE and non-GE products.[170] The twenty regional governments have the freedom to impose their own rules concerning containment so long as they remain bounded by the European rules. In Sweden, some *municipalities* have gone so far as to declare themselves GMO-free regions. However because the licences for GE cultivation are given out by the Swedish Board of Agriculture at the national level, there is no legal basis for these municipal claims.[171] Instead the municipality must reach a voluntary agreement with their local farmers to maintain GMO-free status. As a result, these multi-tiered approaches mean that liability can be addressed at multiple points and contexts.

The definition of GE within a country can have an effect on how or what gets assessed. As mentioned above, Canada (and the USA) have chosen to streamline their assessments based on the notion of 'novel traits', thus capturing some products that were not manipulated using rDNA technology while performing a superficial assessment on some that have been created with the technology. Sweden defines a GMO as "an organism where the genetic material has been altered in a way that does not happen naturally through mating or natural recombination."[172] This would capture all first generation rDNA technology products. Germany goes one step further in defining a GMO as also one that has "come into existence through

[170] Figueroa, Dante. (2014). "Restrictions on Genetically Modified Organisms: Italy." Library of Congress.
[171] Hofverberg, Elin. (2014). "Restrictions on Genetically Modified Organisms: Sweden" Library of Congress.
[172] Environmental Code 13:4. As found in *Ibid.*

mating or natural recombination between a GMO and a non-GM organism".[173] This is particularly important for co-existence as it means that accidentally contaminated plants will also become subject to the *Genetic Engineering Act*. These contaminated plants would then be deemed to contravene this act as they do not hold a valid permit which has led the court to order that such crops be destroyed.[174] These different approaches to defining GE allow for differences in what is regulated and therefore captured in the monitoring process, including monitoring for contamination risks.

5.3.2 Labeling and Thresholds

Imported GE products are often not captured by these assessment regulations, as the acts tend to focus on domestic release. Even countries that have the most stringent policies, like Germany and Japan, continue to be significant importers of GE foods and feed. The regulatory frameworks in these countries are focused on plants rather than foods and feed which are the processed results of plants.

Instead of assessment regulations, rules pertaining to labeling and testing tend to be firmly in place in these countries to ensure that contaminated products are not inadvertently sold as natural. The EU has set a threshold of GE material in a food item at 0.9% and anything below this point need not force the food to be labelled as containing GE. Germany has a voluntary measure that allows producers to label their products as GE-free if there is no trace of GE material.[175] Japan requires labeling of all GE products, whether they are substantially equivalent or not; whether they have the same compositions or nutritional value as their conventional

[173] Genetic Engineering Act § 3 no. 3. As found in: Palmer, Edith. (2014) "Restrictions on Genetically Modified Organisms: Germany" Library of Congress.
[174] *Ibid.*
[175] *Ibid.*

counterparts or not.[176] Products in South Korea must have an "eye catching" label stating that it does or possibly does contain genetically modified food.[177]

What this means in terms of liability is that damages can be more readily calculated, at least for pure economic loss. Loss for alterations to the land itself or clean up fees should also be fairly easily calculated as separate heads of damages and do not rely on regulatory compliance. Russia recently implemented a monetary liability for violating labeling laws that are too vague or misleading on GE foods.[178] Canadian farmers that are exporting contaminated products to these countries may induce GE labeling and lose their price premiums. This financial loss is not just for organics because, unlike in Canada, these labelling frameworks put the onus of identification and marking on GE producers. This head of damages can be significant in nations where labeling is mandatory. Such inconstancy may also leave open the issue of how to calculate damages since a contaminated crop will be valued differently if it was for export versus domestic, local sale.

Technical requirements to reduce the risk of contamination also differ between countries, however, the basic requirement of keeping a distance or 'buffer' between GE and non-GE crops is found in most countries, albeit at different measurements. Sweden requires fifty meters between GMO and non-GMO corn and three meters between GMO and non-GMO potatoes,[179] whereas Germany mandates that GE maize be grown at least one hundred fifty meters from conventional maize and three hundred meters from organic maize.[180] These figures may be based on individual crop contamination vulnerabilities and specific wind patterns in the country.

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[176] *Supra* note 166.
[177] Labeling Guideline for Agricultural Products as found in: Umeda, Sayuri. (2014) "Restrictions on Genetically Modified Organisms: South Korea" Library of Congress.
[178] Sarich, Christina. (2015). "GMO-Free Russia? Government Approves Bill that Would Ban GMO Cultivation, Breeding and Imports." Centre for Research on Globalization.
[179] Precautionary Measures for Cultivation of Genetically Modified Plants] (Statens jordbruksverks föreskrifter [SJVFS] 2008:34) as found in *Supra* note 171.
[180] GM Crop Production Regulation, Apr.7, 2008, BGBl. I at 655 as found in *Supra* note 173.

However these vulnerabilities are calculated by the assessors, based on their interpretation of the field study data which is then correlated to the land use conditions.

5.4 Post-Assessment Regulatory Instruments

Pre-release risk assessments may take into consideration the difficulty of co-existence in various forms but despite the technical requirements and 'best agricultural practices', it is recognized that some contamination will occur once cultivation begins. Generally in these circumstances, the EU aims to espouse the principle that the polluter must compensate for the damage they create but ultimately the national governments can chose if and how to implement a specific liability scheme for damage caused by GE contamination. Below is a summary of some of the main model types or features that a nation can contemplate when establishing a framework that encapsulates the unique qualities of GE cultivation. These statutory instruments are post-assessment, meaning that they are contemplated and implemented outside the approvals regulatory framework. At times the framework may appear as though it were an afterthought by the regulators; a system to manage an oversight during the assessment process. Of those who have established some mechanism, some states have elected to pursue an entirely private, market solution which sits outside the GE regulatory regime, but more often, states have made an attempt to integrate the finding of liability within the overall administration of GE management.

Many countries, particularly in the EU, have found their traditional tort liability case law inadequate in dealing with GE claims. This has prompted several countries to put forward a combination of traditional tort liabilities, along with a specific GE civil liability statute. Governments have generally opted for either a strict, no-fault, insurance or compensatory fund scheme; the latter two have been contemplated both as state run and as (at least partially) privately run systems. A brief description of each of these options follows.

5.4.1 Civil Liability Statutes

Those choosing a system of strict liability are making a clear indication that they are sceptical or concerned about the new biotechnology.[181] Strict liability eliminates the need for a claimant to prove that the one releasing the GE material has done so negligently or in error. Irrespective of following proper segregation protocols or any other wrongdoing, strict liability holds those in possession of the material causing mischief as the culpable party simply for *initiating* the 'consequences'. Traditionally the tort liability framework was based on the notion that an individual who played some part in falling below the expected standard of care should be held accountable for the consequences: fault based liability. This left those who could not point directly at a wrongdoer for their particular loss, either because of technical difficulties or because there was no one to point to, in the case of unfortunate accidents lacking remedy, without recourse. The idea of finding individual or subjective fault has since shifted to a more objective standard of care: an acceptance that there can be an "objective duty to compensate the unwanted consequences of one's conduct."[182] This duty is grounded on the basis "that responsibility has to be assumed as a counterpart of the privilege to create (and maintain) a situation of increased risk."[183] By reducing the causation burden, this approach then would obligate a party to the act of GE development to compensate the loss suffered due to contamination, a significant burden which may discourage the use of GE in the first place. The level of compensation would be based on how the damage is defined in legal terms. In a case like Nigeria, where the strict liability Act specifies that the compensated damage shall include: personal injury, damage to

[181] *Supra* note 161 p 83.
[182] *P. Widmer* in *European Group on Tort Law*, Principles of European Tort Law (2005) Introduction to Chapter 4, no. 3. In *Supra* note 161 p 52
[183] *Ibid.*

property and financial loss, one can imagine the type of chill effect this can have on the biotechnology industry.[184]

The magnitude of the compensatory duty may be mitigated by allowing certain defences. Common defences include human, third-party or natural interventions. If the defendant is able to demonstrate that the actual harm was suffered because of an intervening factor, like the claimant themselves or natural forces[185], then their own liability can be reduced.[186] If it was not possible to ascertain that an actual risk was present at the outset of the technology's use, the defendant would likely be able to use the 'development risk' defence. However, given the scientific uncertainty of biotechnology, such a defence should not have much merit in a GE contamination claim. This is particularly true if one is applying the precautionary principle. Finally a statute of limitations is a common defence to strict liability rules; barring a claim after a certain time has passed in order to allow for there to be some predictability in the legal system and future business dealings. The level of one's compensatory duty can further be limited if the state sets a cap to the amount of damage one can recover.[187] In Austria, the applicant and defendant must attend a conciliation body for settlement negotiations before court proceedings may be initiated.[188] While not a direct limit on compensation, such steps can act to reduce overall costs and procedural burdens.

Who ultimately is responsible for the compensation payments can also vary depending on where the state decides to draw the line along the fault-based/strict liability spectrum. In the traditional model, those who are deemed blameworthy will be responsible. Strict liability

[184] *Supra* note 143 p 8.
[185] While wind *is* considered natural, for a GE case, a proper strict liability defence would have to be qualified for cases where the wind carried the gene beyond a reasonable limit as may happen in an unforeseeable storm. *Supra* note 161 p 61
[186] United Kingdom (Annex I/27) no. 51. On the notion of an "unavoidable event" in the Czech Republic see Annex I/4 no. 45.
[187] See *B.A. Koch/H. Koziol* (fn. 61) no. 109 ff. and infra no. 95. Found in *Supra* note 161 p 55
[188] Austria (Annex I/1) no. 21. Found in *Supra* note 161 p 84

statutes tend to set the neighbouring GE farmers as liable for the consequences of gene drift; however, there are cases, such as the Swiss liability system, where those who have received *authorization to release the GE products, are* responsible for payment; leaving the GE farmers off the hook.[189] This came about from a lengthy legislative debate that resulted in a compromise between the biotechnology companies and the consumer NGOs who agreed that there would be no moratorium on GE crops but to go with the privilege, there would be a strong liability regime.[190]

5.4.2 Insurance Schemes

An insurance scheme also acknowledges the objective duty to compensate for loss suffered but allows those involved to pool their resources and then to be spread amongst the individuals affected by the risk. Given this pooling, it may be that the claimant can secure a larger sum of money then if one were to pursue a claim directly against the individual duty-bearer.[191] However, given the uncertainties with a GE-specific insurance scheme, there appears to be a lack of such insurance products readily available.[192] Private insurance schemes are still in their infancy as the research for creating a marketable portfolio is limited by difficulties in 'testing' the product. Due to these unknown variables, those that have included GE insurance claims in their portfolios (state run or private) have set clear limitations as to the types and amounts of damage that can be claimed and who qualifies as a legitimate claimant. At a

[189] *Supra* note 161 p 87.
[190] *Supra* note 143 p 6.
[191] As the individual defendant found to be liable may become insolvent before the claim is fully paid. *Supra* note 161 p72 and 75.
[192] "At this point, GMOs present more unknown than known variables for insurers. Sufficient loss history is not available to underwrite GMO exposures. The technology used to create GMOs and the varieties of available GMOs are perpetually advancing. Thus, evaluating the risks inherent to particular GMO techniques or GMOs is of little value from a risk-bearing standpoint, especially since the long-term impacts of GMOs are totally unknown. Obviously, unknown variables are difficult, if not impossible, for an actuary to evaluate." [*M. Davenport*, Genetically Modified Plants and Foods – Brave New World or Brand New Headache for Insurers? 35 [2006] The Brief 56, 65.] Found in *Supra* note 161.

minimum, an insurance scheme in Europe would exclude damages of contamination below the 0.9% labeling threshold,[193] as measurable damage below this point would be extremely difficult. Certainly this system has the potential to reduce the adversarial nature of a traditional GE tort/statutory liability system since the claimants could make a direct application to the insurance body rather seeking out neighbouring farmers.

Though limited as of yet, private insurance schemes have been developed to either be purchased by the GE-farmers themselves, or as a type of 'pre-emptive-loss' insurance that is available for the farmers that feel they may be in jeopardy (similar to crop insurance for say drought). There are however, insurance schemes that the state gets involved in as the guarantor, as seen in Germany. Given the above mentioned significant financial penalties involved, GE farmers are required to purchase government-backed insurance coverage.[194] Either way, the ultimate payer is arguably the consumer as these premiums would be passed on in food prices. Despite the fact that the cost of establishing and facilitating an insurance scheme such as this would be substantial, the GE farmers would likely pay less overall than if they are directly liable since the cost is spread across all users of the technology.

5.4.3 Compensatory Fund

Allowing victims to draw money from a common compensatory fund would also have similar benefits to that of an insurance scheme. Analogous legal limits would also need to be applied to ensure the resources were utilized in an equitable or efficient manner. Here the question becomes focused on objectively qualifying the damage rather than establishing a causal link to liability. Defining the damage to be covered becomes crucial. This approach should utilize the least amount of administrative work since the victims and procedural limits are

[193] *Supra* note 161 p 74.
[194] *Supra* note 173.

defined at the outset.[195] There is also the option to form such an arrangement from a bottom-up approach as has been done in Denmark where those who risk liability have negotiated a type of contract compensation agreement with surrounding neighbours.[196] In the Netherlands, this voluntary scheme has become a nationwide program that involves the state as regulator and stakeholder.[197]

A compensatory scheme could also be envisioned with multiple payees, even more so than an insurance scheme. There is the state-run compensation fund as seen in Slovenia which uses general tax dollars to alleviate farmers' loss due to contamination.[198] However, more common is to have the GE farmers and related stakeholders pay into the fund in order to indemnify themselves. In the Netherlands, even the potential victims - the organic farmers - contribute to the fund.[199] Portugal has levied a type of green seed tax on all GE seed producers which is added to the overall endowment.[200] The unknown risk level, however, makes the fund vulnerable in that the funds may run out before all claims can be settled. This is particularly so in cases where the compensation arrangement is set up as a temporary solution to a larger liability scheme.

5.4.4 Penalties

A final note about how the schemes can envision different types of repercussions for those that do not abide by the rules. There have been a number of different approaches countries have taken in regards to the punishments; a few going so far as to impose criminal penalties for contravening their national GE Act. For example, the French Minister of Agriculture can impose

[195] *Supra* note 161 p 77.
[196] *Ibid* p 89.
[197] *Ibid* p 93.
[198] *Ibid.*
[199] *Ibid* p 94.
[200] *Ibid* p 90.

technical requirements, such as distances between crops, which are punishable with fines and penal sentences of up to two years if they are not adhered to (though specific distances have yet to be established).[201] The Netherlands allows for a criminal penalty of up to six years if someone is found acting in violation of the licencing agreement.[202] However, what is important to note is that these penalties are not for the contamination itself but the seemingly negligent practices that increase the risk of contamination. Penal sanctions for the occurrence of contamination itself, while one has followed all regulatory procedures, would undoubtedly be an unjustified infringement on ones liberty as the 'offence' involves natural wind and pollination cycles. Though as discussed in an earlier chapter, this is a huge weakness of the regimes themselves.

Some states have, however, allowed for monetary penalties for the contamination of neighbouring farms irrespective of the cause. Germany may have one of the most stringent systems in place, placing significant financial risks on any GE farmer; inciting the German Farmer's Association to recommend against the cultivation of GM plants altogether given the significant risk of liability.[203] GE farmers can find themselves liable for the loss of an entire harvest due to contamination, as it must be destroyed and cannot even be sold at a reduced rate on the market. If the contamination is not detected until it has been converted into food, the producer that is presumed to have caused the contamination will be responsible for the reduction in commercial value owing to its mandated 'GMO' label. [204]

[201] Code Rural art. L671-15. *Supra* note 168.
[202] Zeldin, Wendy. (2014) "Restrictions on Genetically Modified Organisms: Netherlands" Library of Congress.
[203] *Supra* note 173.
[204] Genetic Engineering Act §§ 36a as found in *Ibid.*

An injunction against the 'offending' party is also a common penalty that an applicant can seek. In Austria a framer can petition to have the cultivation of GE crops in an adjoining land stopped if they can show that the area is not normally used in this manner.[205]

6. <u>Setting out Applicable Assessment Criteria for Canada's GE Liability Model</u>

Government regulation of GE development and its subsequent release into the environment has been done in accordance with its "public interest" status, that is, the regulation is seen as essential for the effective functioning of the Canadian society and economy. Issues pertaining to health and safety, the environment, social policy and the economy are generally categorized as constituting a public interest mandating that the government intervene, most often through traditional regulation but increasingly, through other policy instruments. It has been Canada's objective to take advantage of the economic opportunities or efficiencies that biotechnology makes possible but the government (can) also intervene on other grounds "to achieve citizens social, environmental and cultural objectives".[206] Despite the claim that the Canadian Food Inspection Agency regulates GE production according to strict scientific evidence, the GE regulatory system is already embedded with a number of normative, non-scientific considerations.[207] Determining if this subjective analysis meets the needs of a robust GE liability scheme will be the focus of the following section.

In order to assess if the government has fulfilled its obligation to effectively govern in accordance with public interest commitments, I seek an assessment framework that includes elements of both ecological integrity and policy management with a particular focus on ethical considerations. The ideal framework will be one that ensures a type of equitable obligation

[205] Austria (Annex I/1) no. 4. As found in *Supra* note 161 p 59
[206] Hepburn, Glen. (2002). "Alternatives to Traditional Regulation." *Regulatory Policies in OECD Countries: From Interventionism to Regulatory Governance*. Annex II, p 9.
[207] Du, Dorothy. (2012). Rethinking Risks: Should Socioeconomic and Ethical Considerations be Incorporated into the Regulation of Genetically Modified Crops?" Harvard Journal of Law & Technology: Vol 26, No 1.

which is based on ethical or moral concerns. The Environmental Commissioner of Ontario has also stated that the absence of ethical considerations would be a major oversight in the pursuit of appropriate agricultural governance.[208] Equitable liability is a term often associated with tax law where policy considerations are used to create a type of 'safety valve' in the tax system. It is meant for people who have struggled with the system and despite legally obligations to pay a liability; the actual, or justifiable liability, has no relation to what is being demanded at law.[209] The most basic level is when someone owes more due to their inability to submit their return on time due to extraneous circumstances. In such situations, the governing equitable system would determine the scope of scenarios that are permitted for an exception from the black letter of the law. Indeed, courts of equity were established as far back as the 1400s for the sole purpose of determining policy rationales deemed important enough to allow for alternate or more discretionary judicial outcomes that respond to changing social contexts. In the current context, the term 'equitable liability' will be referring to policy concerns that ought to be taken into consideration when determining what an effective and sustainably managed GE liability system may look like.

The second branch of equitable liability, as used in my research, would look at ecological concerns. While public liability should manage this issue, there may be opportunities to include ecological concerns within private liability as well. Using an ecological lens, particularly a socio-ecological approach, is important given the impact that the changing environment ought to have on decision makers' notions of management. Ecological indicators that quantify or explain complex systems in a manner that demonstrates how the environment is changing can have important implications on the policy review phase of policy management.

[208] Dowling, Dianne. (2014). "Groups Welcome Ontario Environmental Commissioner's Call for Action on GE Alfalfa." National Farmers Union.
[209] Tax Faculty Team. (2009). "Equitable liability is here to stay." ICAEW.

6.1 Principles

Two main principles will ground the following analysis, namely, the precautionary principle and the polluter pays principle. Both of these are grounded in Canadian law and need to be taken into consideration when dealing with regulating the biotech industry. The recent case of *Castonguay Blasting Ltd. v. Ontario (Environment)*[210] reaffirmed the precautionary principle, going so far as to state that a precautionary reporting approach is necessary in cases where there is no obvious environmental damage but instead potential property damage. In situations where contamination does not result in physical damage tied to known categories of environmental liability, but may pose a loss to property (one's marketable crop), the precautionary principle insinuated in this case would suggest that one is still obligated to compensate, or at a minimum report, for that potential loss. The precautionary principle obliges the government to "consider not only the information that it has on the risks involved in commercialisation but also the absence of information and the potential consequences of proceeding where the implications are uncertain or unknown".[211] In terms of a liability scheme, this may mandate a robust system if uncertainties relating to co-existence exist.

The polluter pays principle is likewise enshrined in Canadian case law. In 2003, the Supreme Court of Canada endorsed the Polluter Pays principle as nearly universal in Canadian jurisdictions in *Imperial Oil v Quebec*.[212] Applying this principle to the case of GE crop commercialisation, the IFOAM put forward that "those who benefit from their commercialisation cannot pass the risk or burden of contamination on to non-GM agriculture or to citizens at large. If costs are incurred through the pollution of non-GM crops or the environment or through

[210] *Castonguay Blasting Ltd. v. Ontario (Environment)*, 2013 SCC 52, [2013] 3 S.C.R. 323.
[211] IFOAM EU Group. (2003). "Co-existence between GM and non-GM crops Necessary anti-contamination and liability measures." p 7.
[212] *Imperial Oil v Quebec* 2003 SCC 58 at para 23.

unforeseen threats to human health, those financially benefiting from the commercialisation of the GM crops should meet those costs."[213] The polluters pay concept here suggests that those who benefit (i.e. developers and producers) from GE seeds are responsible for costs not because they are polluting in the strict definition of the term but rather are contributing to a harm, or at least the risk of harm, that is born by other parties. The polluters pay concept at the core is about fairness: one ought not to levy the costs, either individual or societal, on those who do not manifestly benefit by the introduction of the new technology.

6.2 Assessment Criteria

To determine if the current regulation allows for a liability system that holds those who benefit from the release of GE seeds accountable for damages, and that the framework delineating how compensation can be accessed embodies a precautionary approach, a nuanced assessment framework must be established. Experiences of various scholars have led to the insight that complex environmental problems like climate change and biodiversity loss cannot be analyzed with singular disciplinary approaches alone. They have to be dealt with in an integrative, interdisciplinary way that considers the interaction between social and ecological systems.[214] Since I am looking at both the economic efficiency of the liability model and the public interest that the system espouses to uphold, the assessment criteria will need to include both an ecological approach as well as a policy assessment framework. The ecological assessment criteria used in this paper will be the social-ecological systems framework designed by Elinor Ostrom. This framework attempts to determine what type of organisational arrangement allows for a sustainable outcome in complex systems involving social and

[213] *Supra* note 211 p 7.
[214] Binder, C. R., J. Hinkel, P. W. G. Bots, and C. Pahl-Wostl. (2013). Comparison of frameworks for analyzing social-ecological systems. *Ecology and Society* 18(4): 26.

ecological systems.[215] Assessing the liability framework from a policy perspective, I will modify the model proposed by the OECD regulatory policy division aimed at assessing alternative methods to traditional regulations.[216] The SESF will be more suitable for and directed towards reviewing how the GE approvals regulations meet the needs of a sustainable liability framework while the OECD policy assessment will help identify recommendations for the type of liability system that should be enacted.

6.2.1 Social-Ecological Systems Criteria for Analysis

Elinor Ostrom's framework focuses on the interactions of humans and institutions within particular ecosystems in an attempt to maintain long-term sustainable resource yields. The various stewardship practices analysed with this framework recognize how societies have developed different formal or informal arrangements to managing various natural resources and have found many cases that have succeeded in avoiding ecosystem collapse.[217] The natural resource management in these situations refers to the management of natural resources such as irrigation systems, soil, plants or animals, while focusing on how the institutions affect both the quality of life and the ecological integrity for current as well as future generations. Her studies demonstrated the importance of viewing these social-ecological systems from a multidimensional point of view, focusing on the interactions between humans/policy and the environment. She advocates against any singular remedy for all social-ecological system problems.[218] Instead she puts forward a polycentric approach, where the primary or essential key

[215] Ostrom, Elinor. (2010). "Beyond Markets and States: Polycentric Governance of Complex Economic Systems." *The American Economic Review*, Vol. 100, No. 3, p. 662.
[216] *Supra* note 206.
[217] Anderies, J. M., M. A. Janssen, and E. Ostrom. (2004). A framework to analyze the robustness of social-ecological systems from an institutional perspective. Ecology and Society 9(1): 18.
[218] Ostrom, Elinor. (2009). "Beyond the tragedy of the commons". Stockholm Whiteboard Seminars.

management decisions are made relatively close to the actual socio-ecological occurrences and involving the actors as often as possible.[219]

This approach has been largely used to examine *self-governing* systems of *common pool* ecosystems such as the management of forestry or fisheries. However, this approach should also be suitable for the current context, to explain the level of sustainable management in GE/non-GE farming. Instead of the traditional common pool scenario where one is removing resources, here the actors are inputting material (but still exploiting a resource) in a manner that almost inevitably affects the overall supply of crop plants across a range of production systems. The common pool aspect is invoked because of the shared airways that connect all of the individually owned fields. And for most of human history (and still in some cultures), food itself was thought of as a common resource. Most contamination documented thus far has been through the air – pollination, wind, etc. – with a smaller percentage due to errors in the handling system. The individual property rights are superseded by the need to cooperate in keeping the air from adversely affecting yield, diversity and profitability. Common-pool resources include two basic principles. First, there must be partial or total non-exclusivity; meaning no individual has exclusive rights thus allowing the resource to be exploited by any one individual or community.[220] No one, nor the government, has exclusive rights to the air, though some actors may regulate it in various ways. Second, the idea of indivisibility is important as it allows for one individual or group to subtract the amount available to others, when they choose to use part of the resource.[221] While the absolute total amount of air remains the same for all actors involved, the quality of air as it relates to the sustenance of a diversity of practices may be diminished with the introduction of GE material.

[219] Vedeld, Trond. (2010). "A New Global game – And How Best to Play It." *The NIBR International Blog.*
[220] Ostrom, Elinor. (2008) "The Challenge of Common-Pool Resources". *Environment*. 50 (4) 9-20.
[221] *Ibid.*

Moreover, the outcome here would similarly attempt to determine how the actors ie. producers and developers, are managing, and in turn how they can manage, the agricultural crop resource in a way that ensures the long term self-governing sustainability of crop diversity. Once the level of self-organisation is determined, it becomes possible to identify which combination of variables can be associated with a certain outcome which in turn allows one to make reasoned recommendations for pre-determined end use objectives, in this case, an equitable system to allocate liability for loss of revenue due to GE contamination. Case studies using the SES framework have looked at what conditions are present and what the users develop in order to create a sustainable system of managing the resource. The studies that Ostrom and others have conducted indicate that when the rules do not match the attributes of the resource system, resource units, and users, long-term sustainability is not possible.[222]

"SESF includes variables that depict the dynamics of the ecological system that are relevant to humans, such as growth rate, equilibrium properties, and productivity."[223] The first level of examination is the resource system, resources unit, government systems and actors to determine the ecological and social interactions and eventual outcomes. Here the resource systems and units pertain to the localised air channels and the GE material respectively. The government systems include the regulatory bodies described in section 3 and the actors include both GE and non-GE growers as well as the seed developers themselves. A broader set of contextual variables related to the attributes of the social-ecological system must then be established to determine the system outcomes. The following list (Table 1) was constructed by previous researchers as a possible second tier of variables in Ostrom's SESF.[224]

[222] Ostrom, Elinor. (2009). "A general framework for analyzing sustainability of social-ecological systems." Science 325:421.
[223] *Supra* note 214.
[224] *Supra* note 222.

Table 1: Second-tier variables of a social-ecological system.[225]

Resource Systems (RS)	**Governance Systems (GS)**
RS1 Sector (e.g. water, forests, pasture)	GS1 Government organizations
RS2 Clarity of system boundaries	GS2 Nongovernment organizations
RS3 Size of resource system*	GS3 Network structure
RS4 Human-constructed facilities	GS4 Property-rights systems
RS5 Productivity of system*	GS5 Operational rules
RS6 Equilibrium properties	GS6 Collective-choice rules*
RS7 Predictability of system dynamics*	GS7 Constitutional rules
RS8 Storage characteristics	GS8 Monitoring and sanctioning processes
RS9 Location	
Resource Units (RU)	**Users (U)**
RU1 Resource unit mobility*	U1 Number of users*
RU2 Growth or replacement rate	U2 Socioeconomic attributes of users
RU3 Interaction among resource units	U3 History of use
RU4 Economic value	U4 Location
RU5 Number of units	U5 Leadership/entrepreneurship*
RU6 Distinctive markings	U6 Norms/social capital*
RU7 Spatial and temporal distribution	U7 Knowledge of SES/mental models*
	U8 Importance of resource*
	U9 Technology used

*Subset of variables found to be associated with self-organization.

By applying these variables to several different case studies, Ostrom was able to established eight "design principles" of stable common pool resource management.[226] Some of these principles will be applicable for the current study and will help shape the recommendations.

6.2.2 Policy Criteria for Analysis

To complement the above assessment approach which views the "ecological system from an anthropocentric perspective, that is, they look at the ecological system from the point of view of its utility to humans",[227] a policy assessment framework goes further by viewing the regulatory system explicitly for its costs and benefits to society. The OECD developed an assessment framework aimed at measuring and comparing the usefulness of traditional

[225] Modified from *Ibid.*
[226] Ostrom, Elinor. (1990), "Governing the Commons. The Evolution of Institutions for Collective Action," Cambridge: Cambridge University Press.
[227] *Supra* note 214.

regulation with that of potential alternative measures, keeping in mind the political constraints in policy making while achieving public objectives. Given that the most common response to a governance issue has tended to be traditional 'command and control' regulation, this model allows one to determine if this is indeed the appropriate mechanism or if instead a non-traditional policy approach would be more suitable. In the current context, this approach is suitable as it allows for a comparison of Canada's liability regime with those used in other jurisdictions (see section 5).

This approach requires that the traditional model aimed at addressing a public objective be assessed by its effectiveness, efficiency and fairness. Here effectiveness is meant to determine if the policy approach does indeed resolve the problem it was introduced to solve. Defining the state's objectives become crucial at this point. Determining efficiency requires asking whether the policy approach minimises "both the direct compliance costs borne by those subject to the regulation, and other, often more indirect, costs which may be imposed on the public."[228] The fairness component of the OECD model asks about the distribution of those costs and benefits, which will ultimately have an effect on the level of actor compliance, and in return the overall effectiveness of the policy. However, given the importance of the fairness element to my analysis, because of the lack of explicit attention to this topic in the current regulatory framework, I wish to alter this section to enhance its illustrative power. I will use the ethical matrix proposed by Ben Mepham[229] designed to assess the ethics of introducing novel foods. Mepham's conditions for an ethical design are to look at the regulatory effects on the 1) wellbeing, 2) autonomy and 3) justice (in trade and law) of both the a) actors and the b)

[228] *Supra* note 206 p 4.
[229] Mepham, Ben. (2000). "A Framework for the Ethical Analysis of Novel Foods: The Ethical Matrix." *Journal of Agricultural and Environmental Ethics;* 12, 2.

environment. Similarly, this paper will ask how the current liability framework affects the wellbeing, autonomy and justice of the producers, the environment and the industry.

7. Assessment

The following section is an application of the principles and criteria outlined in the ecological and policy assessment frameworks above to GE crop management. Where possible the assessment is related to the norms and rules of Canadian regulatory context. While many observations can be made regarding the GE regulatory framework within these parameters, the recommendations that fallow in section 8 will narrow in on a few key points.

7.1 Assessment Results: Principles

Zoë Robaey has taken the polluter's pay notion of fairness and applied it to the GE context, finding that instead of attaching responsibility to those who 'pollute' the environment with GE, which can become a difficult test to use given that natural elements, like the wind, plays a significant role, it is one's ownership in the material that creates a type of duty. Ownership can be defined in many ways but given that "Monsanto is releasing a new version of its modified soy and putting a lot of efforts in writing up contracts that will uphold their economic rights,"[230] and there is no doubt that the Canadian courts are going towards acknowledging the seed developers as the rightful intellectual property owners of both the seeds and the subsequent plants, it suggests that the developers are at a minimum part owners. Ownership can however be shared my multiple parties and the growers of GE plants can easily be regarded as part owners as well, at least from the planting to harvesting stages. Through ownership, one becomes in charge of making decisions regarding how to utilize the material, in a way that is not possible for those who do not take part in the ownership. "From the perspective

[230] Robaey, Zoë. (2015). "Looking for Moral Responsibility in Ownership: A Way to Deal with Hazards of GMOs." *Journal of Agricultural and Environmental Ethics.* Vol 28, Iss. 1, p 47.

of fairness, moral responsibility should be assigned to those who make these decisions",[231] that is, the decision to release and/or profit from the GE crops. A further note to this is that Monsonto's decision to settle Schmeiser's subsequent 2008 claim for seed contamination by paying for the clean-up costs,[232] suggests that the company is aware of their ownership as well as their responsibility to keep it from drifting. A liability scheme that allows for moral responsibility should then be shouldered by the developers and or the growers. However strict liability schemes could also mandate that the decision makers be financially responsible for ensuing damages since the responsibility is tied to the *ability to make decisions*, not the system's imbedded ideas of morality.

7.2 Assessment Results: SESF

Looking at the SESF factors it is easy to see that establishing an appropriate level of self - organisation for sustainable co-existing GE farming will be a difficult feat. The Resources System (RS) size and lack of defined boundaries will make it problematic to manage as these are often noted as key factors in organisational outcomes.[233] Even if/when the RS boundaries can be defined (perhaps by different agricultural regions and the reasonable area in which gene flow is expected to reach) the Governance System (GS) is not set up to accommodate these boundaries. As mentioned above, the constitution delineates the responsibilities by interest areas between the provinces and the federal government, each government striving for some or primary control over an issue. This means that boundaries are drawn up for political purposes, not necessarily for ecological or social needs. The Resources Unit (RU) is highly mobile, in fact, that is one of its basic characteristics. The RU's interaction with other resource units is at the heart of the issue and creates a very unpredictable system. The lack of scientific data on how the gene

231 *Ibid* p 48.
232 Hartley, Matt, (2008). "Grain Framer Claims Moral Victory in Seed Battle Against Monsonto." *Globe and Mail.*
233 *Supra* note 222 p 420.

modifications will respond or alter when interacting with other natural elements, heightens the chance of resource depletion (both airspace and crop diversity) and limits the ability to self-govern as the users are unable to define collective rules. The number of Users (U) also makes it difficult to define collective rules as the participants are not obvious, limiting the excludability factor. The number may also be very large which hinders effective leadership necessary for organisational productivity. Add to this the long history of unwillingness of firms and farmers to share business information in order to keep a competitive edge, suggests that organisational work that may require the relinquishment of short term gain for long term sustainability will be challenging.

7.2.1 Self-Organising

There is evidence of self-governing attempts (mostly by non-GE users) but this gets trumped by industry influence and the promise of increasing industry wide wealth (RU4). Users that implement buffers or groups that advocate the use of tracking programs may facilitate co-existence through the use of human-constructed facilities (RS4). Areas that collectively agree to zone/practice a particular agricultural model within their region (Haliburton Community Organic Farm)[234] also exhibit a type of collective choice to establish rules to encourage co-existence. However, the biotechnology industry has been able to take advantage of the socioeconomic attributes of users (U2), given the ever increasingly dependency of farmers to seek marginal economic gains. It is this individualisation of choice than that allows the industry influence to promote its agenda above other alternatives. Further, the biotech industry's heavy emphasis on the economic importance of the resources (U8) incentivises the Governance System to ensure expedited market access. As a result, the GS has designed the GE regulatory system to support

[234] Community Farms Program. (2009). "BC's Farming and Food Future Local Government Toolkit for Sustainable Food Production." The Land Conservancy of British Columbia.

the expedient commercialized approach and restricted public involvement in the rule making phases, again limiting the awareness of the collective impact of individual choices.

Although more adversarial in nature, some self-organising can be seen by the individuals and groups that are attempting to use the courts to create a new set of rules on GE liability. Whether it be through traditional trespassing claims or new ways of approaching property rights, users are taking advantage of non-governmental approaches to creating shared rules on how to establish a system of co-existence. However this approach has again favoured industry by relying on corporate law principles and being deferential to the legislature.[235]

7.2.2 Common Pool Management

The current system reinforces common pool resource depletion. The lack of appropriate recourse for financial losses caused by GE contamination encourages greater use of the RU and disregards long term effects of the common pool resource. Given that contamination of an organic or conventional field means that the soil will not be GE free for several years, depriving the land of its former use, the equilibrium properties (RS6) of the RS weigh heavily in favour of a principled, precautionary approach. The lack of recourse despite the reality that almost all organic canola in Canada is now contaminated to some degree that partnering countries no longer accept it as a viable organic crop, means there is no deterrent to future resource exhaustion. Since GE seed's natural ability to contaminate and the inability of "re-populating" the resources, crops and the airspace, as one might do in fisheries, a precautionary approach is needed.

The system also needs to be adaptive and reactionary. Not all GE crops cross-contaminate via the same methods (eg. some use wind while others rely on insects) and such differences need to be taken into consideration when establishing the framework. Several

[235] *Supra* note 79.

common pool resource studies have indicated that the "lack of recognized property systems have led to one-size-fits-all recommendations to impose particular policy solutions that frequently fail."[236] An adaptive approach that can react to changing dynamics would be particularly important in this case given the resource system's unpredictability. An ecosystem policy approach that looks at smaller areas that can be made accountable for contamination and allows for regional differences may be a more effective management strategy. Some areas may want to collectively sign off on organic-only terms while other areas that see more benefit in GE can then regulate accordingly in their region. This really speaks to the need for provincial or regional oversight powers.

"Since GM seeds are perceived as bad by some, and good by others, and as we saw earlier, regulation does not seem to solve this issue, we can infer that there is a gap in dealing with hazards of GM seeds." [237] This gap may be corrected in part by increasing the self-organisation of the affected actors. To encourage self-organisation and thus sustainable management of the resources, greater knowledge of the SES (U7) may prove beneficial. "When users share common knowledge of relevant SES attributes, how their actions affect each other, and rules used in other SESs, they will perceive lower costs of organizing."[238] This reiterates other findings from this analysis that suggests greater actor participation is necessary for a fair and effective liability regime. This participation, if done transparently can also advance one of the main design principles, that of trust building. Common pool resource depletion has been found to occur less often where there is high degree of trust among the actors.[239] Where the actors re known to each other and feel some kind of duty towards each other, born out of that

[236] *Supra* note 222 p 419.
[237] *Supra* note 230 p 47.
[238] *Ibid.*
[239] *Supra* note 222 p 421.

trusting relationship, it is less likely that one will act in a way that will be detrimental. Again this may suggest the need to regulate on a smaller, regional or ecosystem basis in order to establish a sustainable organisational outcome of this complex system.

7.3 Assessment Results: OECD Policy

7.3.1 Effectiveness

Measuring the effectiveness of the current GE policies requires a clear defining of the government's official objectives. Health Canada, for instance, works to protect the health and safety of Canadians.[240] The "CFIA is responsible for regulating both the performance (or efficacy) and the environmental safety of the product in question."[241] The government asserts that their aim is to pursue a science-based risk assessment of GE products to unsure Canadian's are not exposed to unnecessary health and other risks but similarly pursue economic gain, which can be seen by their focus on accommodating pre-market assessments.[242] A recently proposed domestic policy framework for the detection of low level presence of GE in imported goods reflects this dual aim. The policy's listed objective is to "minimize disruptions to trade while protecting the health and safety of humans, animals and the environment."[243] It is clear then that the objective is to develop a (safe) robust agriculture sector which could only be done through a form of co-existence between GE and non-GE crops.

The current policies may be considered effective in this regard depending on how one defines what a robust agriculture sector looks like. In terms of maximizing gross exports, the government has successfully created policies to manage this objective. Policies that place the

[240] *Supra* note 88.
[241] CFIA, Canadian food Inspection Agency. (2014). "Regulating Agricultural Biotechnology in Canada: An Overview." Government of Canada.
[242] *Ibid* and *Supra* note 55.
[243] Heminthavong, Khamla. (2013). "Low-level Presence of Genetically Modified Crops in Imports: Proposed Domestic Policy" Library of Parliament Publication no. 2013-79-E.

onus on biotechnology companies to alert the government of possible novel traits, and the weak investigative role of the agency, help ensure an expedient market approvals process. However, in the long term the liability framework appears unsustainable given the persistent pushback on GE products among Canada's major trading partners. Moreover, the rapid increase in recognition of a wider scope of damages, including pure economic loss, within liability models overseas suggests Canada's pre-market focused model will be ineffective in dealing with impending concerns. "In 2009, contamination from GM flax found in Canadian flax exports to Europe cost Canadian farmers millions of dollars and lucrative markets,"[244] for which GE farmers, developers and even government authorities alike may find themselves legally responsible r as more robust liability concepts become established.

The inherent inevitability of contamination due to natural forces such as the wind and pollination further complicates the traditional policy approach that the Canadian government has established. Add to this the inevitable human errors in the handing process and it is apparent that co-existence is not in reality possible, which will have detrimental effects on maintaining a diverse agribusiness in the long run. The regulatory system is not set up to cope with these scenarios nor is it likely to by continuing to build on existing laws and institutions as has been the aim since 1993.[245] Traditional command and control policies as is used in the current situation are aimed at telling one what to do or not to do. This of course is not possible with such things as nature and as such a more appropriate approach to liability is required that can accommodate and *adapt* to changes at a much faster rate.

[244] Canadian Biotechnology Action Network (CBAN), (Farmers Protest "Industry Spin" Designed to Facilitate Licensing of GM Alfalfa in Ontario.
[245] *Supra* note 241.

7.3.2 Efficiency

Efficient policy implementation is primarily concerned with curtailing costs. As far as direct administrative costs are concerned, the current system allows for lower administrative expenses relative to a more interventionist system, given that the gathering and monitoring duties are largely delegated to industry. However, "true risk management policy needs to be based on resiliency, not a corporation's desire to make money on its own patented technology."[246] The lack of expenditures on service delivery costs, which results in the efficient policy, is also responsible for the lack of investigative oversight power and, consequently, a downloading of both costs and responsibility to non-users. While CFIA does provide a great deal of energy and money on ensuring that the data submitted by industry is reviewed, the more apt service delivery in this context would be one that actively pursues co-existence; at a minimum providing similar reviewing services to submissions by possible affected parties other than industry.

However, this is counter to what the OECD considered appropriate since the *most* efficient policy instrument is also supposed to maximise community welfare.[247] Given that the policy to achieve co-existence is virtually impossible, the expenses of its failure are then shifted to farmers and society at large. This second component, public costs, is then potentially very high in terms of health, consumer choice and environmental diversity. The extent of these costs is yet unknown but even preliminary estimates of "cleaning" up GE contaminates is very high. Farmers have already had extensive costs in order to test their seed supply for contamination, clean up and in other cases have had to forgo planting certain (lucrative) crops in order to maintain seed purity.[248] Since the regulatory system does not incorporate a clear means of

[246] DeVore, Brian. (2014). "Crop Insurance: Good Enough for Monsanto-Good Enough for Conservation Farming". Land Stewardship Project.
[247] *Supra* note 206 p 19.
[248] GM Watch. (2013). "Farmers vs Monsanto: Farmers file brief to protect crops against contamination."

accountability for managing the economic fallout of GE drift, it means that the costs become privatised and the burdened parties are forced to find contractual or market based solutions. While market solutions may not be inherently flawed, there is certainly a power dynamic present in the current situation that must be taken into consideration.

In minimising these indirect costs, the precautionary principle suggests that in light of the inherent uncertainties, state action should be taken to mitigate risk (despite the organizational costs). The lack of direct recourse mechanisms for these risks adds to the high public costs because parties are forced to spend money negotiating or litigating for rights that are as of yet undefined or overlapping with each other. Therefore, there ought to be some government branch that is empowered with investigative properties and mandated to create a scheme that allows for an efficient distribution of service delivery that also encourages risk reduction. An element of flexibility should still be included to allow for those regulated to find the lowest cost point of compliance as this can encourage greater effectiveness,[249] but not at the expense of reducing social wellbeing. One avenue of flexibility might be to allow a range of choice in how remedies are to be paid or possibly a funding structure that allows for indemnification is certain situations.

7.3.3 Fairness

"The perceived fairness and political accountability of different instruments can influence the public's acceptance of the instrument."[250] The two main instruments ensuring this accountability, according to the OECD report, are the government's apparent level of operational transparency and the maintenance of appropriate appeal mechanisms. Much has already been

[249] *Supra* note 206 p 20.
[250] *Ibid.*

written on the lack of transparency in the regulatory system; from the gathering of information to how it is applied to assessing safety standards.[251]

7.3.3a Transparency

In terms of liability, there is much confusion on what the appropriate method for redress is and conflicting messages from the authoritative bodies adds to this perceived lack of transparency. Statements by government officials affirming that the common law approach is an adequate one for redress for organic farmers and that a separate cause of action would not be necessary to address issues arising from contamination conflicts with what the courts have suggested.[252] In fact, one court has gone so far as to put forward that rather than allowing redress for economic loss, the organic certification process ought to be altered to allow for greater GE contamination so as not to impose hardship on biotech users.[253] Adding to the confusion and perceived weak accountability is the fact that damages, particularly in terms of financial impacts, have not been properly defined in the regulatory process. While concerns about weediness are taken into consideration, whether the economic consequences of these environmental alterations are factored in remains unclear. None of the applicable statutes clearly allow for recouping on pure economic loss nor do they incorporate language that contemplates the financial repercussions of losing one's organic or other certification.

7.3.3b Appeal Mechanisms

Appropriate appeal mechanisms to an independent body help ensure institutional legitimacy, however, those that are currently regulated (biotechnology developers) do not have access to an autonomous appeal board or similar institution. Nor, is one arguably needed given that the regulatory framework is already largely setup to the advantage of the regulated parties.

[251] *Supra* note 32 and 68.
[252] *Supra* note 139.
[253] *Supra* note *80.*

Instead, it may be more appropriate to inquire about the appeal mechanism for those *not* directly regulated but nevertheless affected. There are not only limited opportunities for non-regulated parties to participate in the approvals process, there is no chance to appeal to an independent body for an objective assessment given CFIA's conflict of interest in the matter.[254] The courts are the only conceivable route at the moment but that takes us back to the weaknesses described above. Courts are also expensive, inaccessible and given the time lag to see a case through, the remedy may occur too late. Ultimately the courts do not appear to be an appropriate tool that can be used by non-regulated parties to objectively question the approvals process.

7.3.3c Wellbeing

Taking a more thorough ethical analysis of the liability regime, according to Ben Mepham, requires one to question the overall wellbeing that the system has on the environment, producers and the industry.

Ecological wellbeing is severally undermined by the use of substantial equivalence (SE) as the threshold test since this is largely a policy decision, rather than a scientific assessment. "Substantial equivalence is not intended to be a scientific formulation; it is a conceptual tool for food producers and government regulators." [255] However, in Canada SE is used as an explicit rule codifying the assumption that the "new crop poses no more risks than a counterpart that is already considered safe."[256] The issue that arises is that many newly introduced GE seeds are not considered novel which then allows them to bypass a fuller analysis. Even if the assessment framework were to include an explicit fairness analysis, many of the GE seed varieties would not be required to undergo such a review. Therefore, the concepts of novelty and SE need to be altered so as to integrate the unknown ecological and economic risks. Instead of focusing on the

[254] *Supra* note 55.
[255] Miller, H.I. (1999). "Substantial equivalence: its uses and abuses." Nat. Biotechnol. 17:1042-43.
[256] *Ibid.*

SE or novelty of the final GE product, the regulatory apparatus could instead be focused on the uniqueness of the process of *introducing* the GE seed into the marketplace. "In most countries, [GE crops] call for special measures [even if SE], whereas conventionally bred seeds do not."[257] If the seed requires special applications in getting to or into the marketplace (eg. buffer zones) then this points to a need for a heightened level of responsibility due to its uniqueness. This should then trigger a wider assessment process since the idea of finding uniqueness itself acknowledges a suspicion of risk.

While one might argue that the suspicion of risk is too low of a threshold to trigger further assessments (given that these special measures are in place precisely to manage this risk), at a minimum the different industry practices would suggests that they are not SE to conventional products, at least in terms of process. This undermines the current assessment method since it is this idea of equivalency that the regulatory system is based on. Add to this that the precautionary principle espoused in *Castonguay Blasting Ltd. v. Ontario (Environment)*[258] affirmed that in cases of suspected risk there is a responsibility to include a precautionary reporting methodology.

The system also is not good for the wellbeing of the farming community at large. The one-sided participation and the lack of institutional recourse means that farmers are pitted against each other in an adversarial process, creating heightened tension in a community that is feeling the increasing pressure to compete on an industrialised scale. The ecological and financial uncertainty that the introduction of GE brings to non GE growers creates a wider rift between the two sectors. Furthermore, the uncertainty in how to claim for financial loss due to contamination, because of the overlapping proprietary rights between GE farmers and GE

[257] *Supra* note 230.
[258] *Castonguay Blasting Ltd. v. Ontario (Environment)*, 2013 SCC 52, [2013] 3 S.C.R. 323.

developers, leaves many GE growers uncertain of their future monetary liability,[259] again heightening the tension and division between different farming sectors.

The GE regulatory framework does not allow for a great deal of autonomy. The freedom of the actors is hampered due to the limited scope of interaction between the institutions regulating GE development and the affected parties. The regulations set out a very standardised path for approval, building on existing laws and expertise rather than accounting for possible nuanced approaches and effects. There does not appear to be leeway to allow for adaptability in governing within contextualized situations; for example, allowing for the introduction of GE seeds in ways that permit negotiated agreements or localised regulations. This limitation is in large part due to the division of powers within the constitution: delegating matters to either the national or provincial governments. Municipal/regional powers are a privilege granted by the provincial governments and do not have their own stand-alone constitutional rights. Some level of provincial interest is likely a precondition to localised arrangements. However, cases such as *114957 Canada Ltée (Spraytech) v. Hudson (Town)*[260] demonstrate that it is possible for municipalities to implement local laws, at least within the scope of protecting human health.

The contracted agreements that go along with the seed's sale stipulating how to plant and harvest GE seeds, are meant for the purchaser alone and do not take into consideration the agri-industry wide effects or regional ecology. The current approach is very much top down and given the lack of recourse available to non-GE farmers, growers can be forced out of their preferred farming practice by for example, losing their organic certification. This is a significant limitation on their autonomy, particularly in terms of their freedom to sell and market as they wish. Self-organising rules to protect the common pool for sustainable farming would need to

[259] *Supra* note 6.
[260] *114957 Canada Ltée (Spraytech) v. Hudson (Town)* 2001 SCC 40, [2001] 2 SCR 241.

incorporate procedures that negotiate the restrictions of either group of actors and the repercussions of not abiding by those limits. That may be in the form of designating different zoning by-laws for autonomous type regions or financial consequences that allow for some form of equilibrium.

The final ethical quandary is if a scheme is fair in trade and law. There is evidence that trade distortions are affecting non-GE farmers due to Canada's system. Given the different thresholds for contamination in various countries, Canadian farmers can be disadvantaged or barred from trading opportunities due to the lax regulatory requirements such as traceability. This was the case with canola when the EU put a blanket restriction on its import from Canada because of their lack of faith in the scheme's ability to contain contamination.[261] Further, the farmers have no recourse for these financial loses within the regulations, because, under contract law individual farmers could be held liable for the not delivering on the original agreement/shipment.[262] Another example would be the Bt seed developed by Monsanto which reduces organic farmer's ability to effectively practice their pest control program and ultimately reduces their competiveness in the marketplace.[263] The regulatory system does not account for these effects on other farm populations within the approval process. In achieving the objective of a robust export industry, trade has been defined broadly as gross export profit rather than a more nuanced approach that looks at the disparate domestic effects that such a policy has.

Competing property laws are at work with GE-farming that are not taken into consideration in the regulatory framework which can also be inequitable. There are the intellectual property rights of the developers and the traditional seed saving rights of farmers. The judicial trend of acknowledging intellectual property rights above other rights is a clear

[261] Pratt, Sean. (2010). "EU taking Canadian canola again." The Western Production.
[262] *Supra* note 6.
[263] *Supra* note 19.

undermining of initial legislative intent of the acts in question. 'Fairness in law' has often been understood to mean that a particular law is fair when it has been enacted by the appropriate jurisdiction. The current scheme, however, has shifted much of the responsibility of determining liability to the judiciary, instead of the appropriate jurisdiction which is parliament. The courts have consequently relied on their vast knowledge of IP law which looks at infringements (violations) rather than the unfamiliar area of positive obligations to not impose that property on others. The unfairness occurs at two places then. Once, when the law is being decided in the inappropriate authority and a second time, when the party's rights are viewed unequally given the narrow field within which the courts must define the issues.

8. Recommendations

Using the results from the above analysis, I have developed a set of recommendations on how the government should proceed to establish an equitable liability scheme. The ideal framework would be one that allows for businesses that have lost revenue due to contamination to recoup those sums from a duty bearer that is able to pay but also allows for sufficient collective responsibility to increase the 'buy-in' to the system and consequently the effectiveness.

8*.1 Structure of the Scheme*

Give these factors, rather than a new common law cause of action under negligence or a traditional "command and control" statutory liability system, I would suggest establishing a compensatory fund because this would allow for strict liability while reducing some direct costs that are associated with traditional statutes. This is in line with an efficient policy that also takes the precautionary principle into consideration. Fairness would also be taken into consideration since strict liability eliminates the need for elaborate appeal systems.

8.2 Causation

Perhaps the most pressing problematic issue that a compensatory fund resolves is the burden of proving causation. The inability of the regulators and the courts to account for natural processes of dispersion of seed and pollen is at the root of the contamination issue. A compensatory fund does not require one to definitively point to a culpable individual who through their actions (negligently or otherwise) triggered the applicants' loss. The loss itself, if connected to contamination, is sufficient to allow for compensation. The causality principle enumerated in the Lugano Convention would overcome this burden. Article 10 "formulates that the court shall take due account of the increased danger of causing such damage inherent in the dangerous activity."[264] In the Canadian context, the language of 'danger' could be replaced with risk to accommodate the political stigma that such terminology may have. Nevertheless, such an act would allow for a lower standard of proof when the damage is typical of such activity. The proof needed then would be to 1. show that loss was suffered due to contamination and 2. that contamination was not brought on by the applicant's own actions. While the burden of proof still rests largely with the applicant, the level to which they must demonstrate is significantly reduced with the elimination of showing direct human induced causation.

This reduction in the burden of proof to show causation is justified as it allows for a fairer system. Given the ecological inevitability of GE contamination many farmers will be unable to establish causation to a particular 'wrong dower' and without recourse. Instead of spending the resources on trying to figure out whom to blame, if anyone, strict liability safeguards against unequal treatment. Moreover, fairness, as defined in the above criteria, requires transparency. Attaching automatic and strict liability to all those that benefit financially from GE seed

[264] Council of Europe. "Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment." Lugano, 21. VI. 1993. Article 10.

production allows for such transparency. The ability to streamline the evidentiary burden can also reduce confusion among the users that are forced to seek compensation.

The lowered burden of causation also comports with the polluter pay principle as explained by Zoë Robaey above. Since it is the introduction of *risk* that attaches to the moral responsibility to pay and not the actual act of damaging property, it makes sense to distribute the obligation to pay amongst all those contributing to the heightened risk. This is in fact not a far stretch from the newer test for causation needed for negligence under Canadian law; that one need only make a *material contribution* to the plaintiff's loss.[265] The proposed causation may properly be said to attach when one materially contributes to the risk of loss.

8.3 Funding the Scheme

The fund could be financed, at least in part, through a type of GE Seed tax that would have all those who take advantage of GE seeds ie. developers, end users etc. contribute to the fund. A similar system of taxing has been introduced in Portugal where the fund is maintained through direct taxes, interest on the unused tax amounts and application fees. This would again be in line with an effective model given the efficient manner in which the funds can be collected. Fairness is considered as well as the polluters pay principle, as defined in this paper, is at the heart of the taxing system.

Such a system would allow for an adaptive governance system, which is necessary to adequately manage and avoid resource depletion, as outlined by Ostrom and the above analysis. Adaptability is achieved by allowing the tax to fluctuate over time based on the previous year(s) payouts to compensate for loss. If there is an increase in the amount of contamination, and therefore the amount of funding needed to compensate for that lose, the tax levels will rise in conjunction with these changes. Once the premiums become too costly, the impetus is modified

[265] Walker Estate v York Finch General Hospital, 2001 SCC 23, [2001] 1 SCR 647

to allow for equilibrium to occur. If the "cost" i.e. the tax rises to the point where those putting the risk into the environment find the benefits are no longer worth it, the system can begin to regulate itself to a degree (a mixed form of self-organization). Another possible effect may be a more fundamental change in the way that GE research is conducted. Since some uses of the technology are less problematic than others, the biotech industry may take these liability costs into consideration when pursing future market opportunities.

One possible draw back to avoid is the possibility that the deep-pockets of a few polluters would skew the system in a manner that would allow for a type of 'buy out' of conventional farming crops, that is, if the tax levels are at a point that makes it more efficient to pay rising premiums instead of managing the risk of contamination. Such a scenario may permit increasing contamination to the point where damages are irreversible. This situation may be avoided by factoring in long-term economic and biological loss due to contamination into the tax premiums. This may mean that premiums are fixed to increase as the contamination problem expands; including a type of calculation of the loss suffered due to the industry's inability to maintain a diversity of practices and crop varieties. As the common pool nears closer to exhaustion, so must the premiums rise to reflect the irreversibility of the situation. Such a robust system could be justified by arguing that it is looking out for the wellbeing of the environment as well as the industry as a whole. Rising premium rates would stand in for a clear indication that biodiversity, along with the freedom to choose one farming practice, is at risk and in need of corrective formal state action.

8.4 Authority

There may be an issue with the use of a compensatory fund in that it may be challenged as an infringement of international trade law. If the fund is regulated in a way that it is deemed a

subsidy or trade protection that gives some farmers an unfair trading advantage, the government would be liable for compensation to their trading partners. However, the regulations could instead be drafted more akin to a type of crop insurance scheme which would be acceptable so long as the government did not offer advantageous insurance premiums to indirectly subsidise farmers. This dilemma should be avoided as long as the GE seed tax covered the full liability amount and did not require the government to act as a guarantor. There may still be a plausible argument that the state, in facilitating the program is acting in a manner that allows for an unfair advantage in trade.

The fund would have the further advantage of providing an avenue to test and gather data for a possible private based insurance market in the future to complement the compensatory fund scheme.

Initially it would make sense that the fund would have some central management to keep administrative costs down, therefore the federal government as the lead regulator may be appealing. The current federally regulated, provincially delivered, Crop Insurance Act's objective seems to incorporate this possibility: a "program that stabilizes a producer's income by minimizing the financial impacts of production losses caused by natural hazards."[266]

However, a more important factor then minimising costs (which conceivably are already lower than a more traditional fault-finding liability scheme) is the protection of community wellbeing. Overall what is required is a system that will allow for an adaptive governance system by implementing a type of ecosystem policy approach that does not delineate responsibility narrowly along federal or provincial lines but rather factors in multiple interests and influences. In light of this objective, stronger leadership from the provincial authorities would be beneficial as they have the power to delegate powers and capacity building to

[266] AAFC, Agriculture and Agri-Food Canada (2014). AgriInsurance Program

municipal levels under section 13, Property and Civil Rights in the Province, which includes the regulation of trade and industry within the province.[267] This approach would alleviate some concerns raised in the SESF assessment. Managing a common pool resource requires clear boundaries which are extremely difficult in this case. However, managing the fund provincially allows for the establishment of different rates between or even within provinces that allows for the variances in plant contamination rates; based on whether they utilize the air and the expected or reasonable distances the pollen will travel. While the boundaries may not coincide with political boundaries, smaller, defined boundaries can be established for the relevant specie under review. This is important given the different agricultural priorities between provinces. PEI has a much lower GE adoption rate then the prairies. As the rate of GE crops changes within an area so will the levels of liability, allowing for an adaptive governance model. Though municipal level oversight may allow for more nuanced insight, it is unlike that these bodies would have the capacity to manage the undertakings involved nor the coordination needed to effectively work with the multiple neighbouring and overlapping production areas.

In order to safeguard against resource depletion, a compensation fund on a more localised level would allow for greater protection. Monitoring rates and data from the liability claims regionally will give a more accurate image of how the ecosystem is responding to stressors rather than the aggregate claims on a national level. Precautionary measures can be put in place if an area is reaching its ecosystem's limits.

Liability claims however do not need to be limited to the compensatory fund. Traditional tort law remedies should be made available for those who contribute to contamination through their negligent or malicious behaviour. Maintaining civil remedies within the liability framework should help with building trust (another important factor in avoiding resource

[267] *Ward v. Canada (Attorney General)* 2002 SCC 17, [2002] 1 S.C.R. 569 at para. 42.

depletion) amongst the users of the fund since there is less fear that one might "free load' form the common pool by disregarding their contractual obligations. I would suggest, however, that the rules pertaining to good GE crop management should be developed by the community members – both GE and non-GE framers. Currently the rules are delivered by the government in conjunction with industry. Allowing some public participation can encourage information sharing and consequently some self-organising practices. While this is not nearly to the level needed to avoid resource exhaustion, given the difficulties of self-organising in this context, maintaining traditional command and control polices is still the best option.

8.5 Damages

The type of damages that are covered by the fund must be established in advance for both transparency reasons and also to establish the parameters of what is expected to be covered to calculate the tax rate. Although public damage is a significant issue, for the purpose of the compensatory fund, I would suggest limiting it to only private damages. Liability for public damages should still be sought through traditional routes like the CEPA. Including public damage in the same fund may make the scheme unmanageable.

Private damage should be defined so to include a wide definition of economic loss, not just restricted to the loss of crop price premiums due to de-certification. The socio-economic costs of destroying, cleaning and replanting non-GE crops should be included as heads of damages. The damages should however be limited to contamination above the 0.9% threshold because of both practical reasons of limited capabilities to adequately test below this limit and the pure economic loss suffered below this level would be difficult to calculate. Though organic certifiers may not accept this as a threshold, policy makers do have the authority to set limits for practical and policy management purposes. A caveat may be put in place that damage below this

amount can still be claimed but shifting the onus to establish real and *substantial* financial loss onto the applicant.

One drawback from this scheme may be that the damage should be limited to claims within the year in which the crop is contaminated. This is needed to ensure that the tax rate is properly calculated each year to inform where the point of equilibrium should be. As well from an efficiency stand point such boundaries or limitation periods allow for policy makers to make rational decisions with greater certainty. Unfortunately this means that the compensation cannot account for damage that is not initially detectable.

Establishing the parameters of damages as such allows for an efficient service delivery protocol and the administrative costs that the state would take on should be minimal. Ideally these costs would also be covered by the fund itself.

8.6 Approvals

I am recommending a separate system, as opposed to integrating it directly within the GE approvals process, because of the current inherent conflict of interest within the departments responsible for assessing the products. However, changes to the assessment process to incorporate the risks associated with financial liability should also be made. Indeed the liability claims themselves demonstrates the need to amend the approval regime to disallow applications that pose an undue financial hardship in terms of compensation.

The approvals process ought to have an intra-generational view that looks at future liability so that the industry can sustain itself over the long term. Using the common pool assessment, it is advisable that a more holistic approach is used which considers social-economic factors before an approval is given. Doing a cost-benefit analysis that considers liability based on organic certification standards and property damage, not on normative ideas of what a

politically appropriate level of contamination is, ought to be included as a fundamental phase in the assessment process.

Expanding the definition of risk assessment to include social and economic impacts would likely incorporate some concerns that organic and integrated pest-management farmers have about gene flow contamination, however this will never be enough to avoid all future liability. Therefore, the above redress scheme is necessary to recoup the losses that are not able to be factored into the regulatory approvals process. The best regulatory system will still not be adequate since as Ann Slater from NFU states it; you can "tell that to the bees. They do not know the difference, and have not signed any coexistence plan."[268]

[268] *Supra* note 244.

Statutes

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