

## **GM Crops Introduced in Agriculture: A Critical Appraisal in Determining Legal Liability & Effective Measures Preventing GM Contamination**

Rashed Ahmed<sup>1</sup>, Nusrat Jahan Shaba<sup>2</sup>,

<sup>1</sup>(Assistant Professor, Department of Law & Justice, The People's University of Bangladesh, Bangladesh)

<sup>2</sup>(Lecturer, Department of Law & Justice, The People's University of Bangladesh, Bangladesh)

---

**Abstract:** Genetic engineering is an extremely sophisticated technology which is almost impossible to handle for most of the developing countries in case of any adverse situation. This technology has raised highly controversial issues and considerable international debate over the liabilities associated with crops containing genetically modified organisms ("GMOs"). This paper focuses on the debate over the associated legal liability issues in between developed countries & developing countries regarding GM contamination and also examines whether common law remedies provide adequate protection against it. In its examination of all these issues, this article identifies the challenges & risks factors that must be faced to ensure justice for all those farmers affected by GM products.

**Keywords:** Contamination, Farmer's Liability, Legal liability, Genetically Modified Organisms (GMO), Patent Rights.

---

### **I. Introduction:**

There are four major genetically modified ("GM") crops in commercial production today, including soybeans, maize, cotton and canola; though trials are under way for many other products. GM crops<sup>1</sup> created by modern agricultural bio-technology have attracted worldwide attention over the past decade.<sup>2</sup> Genetic modification involves the alteration of an organism's genetic material by manipulation of its DNA.<sup>3</sup> A set of genes is removed from the DNA of one organism and inserted into the DNA of another, resulting in the production of genetically modified seeds.<sup>4</sup> Such a transfer of genetic information across natural species barriers may not occur naturally through conventional breeding or hybridization.<sup>5</sup> Principally, "GM crops are plants engineered by scientists who have inserted pieces or strands of foreign genetic material in an effort to change or supplement one or more of the plant's traits."<sup>6</sup> The GM varieties of soy and cotton have become widely accepted and account for approximately ninety percent of production in this sector.<sup>7</sup> The United Nations estimates that agricultural output will have to rise fifty percent by 2030 to meet this increased demand.<sup>8</sup> The US grows around fifty percent of the world's GM crops; combined with Argentina the two countries make up seventy percent of GM production. Other countries which grow GM crops include Brazil, Canada, India, China, Paraguay, South Africa, Uruguay, Philippines, Australia, Spain, Mexico, Colombia, Chile, France, Honduras, Czech Republic, Portugal, Germany, Slovakia, Romania and Poland.<sup>9</sup> The most notable expansion has been in

---

<sup>1</sup> Maskus, E. Keith, "Intellectual Property Rights in Agriculture and the Interests of Asian-Pacific Economies", 29 WORLD ECON. 715, 719(2006).

<sup>2</sup> See FELICIA WU & WILLIAM P. BUTZ, THE FUTURE OF GENETICALLY MODIFIED CROPS: LESSONS FROM THE GREEN REVOLUTION (2004), [http://www.rand.org/pubs/monographs/2004/RAND\\_MG161.pdf](http://www.rand.org/pubs/monographs/2004/RAND_MG161.pdf) (last visited May 14, 2010).

<sup>3</sup> See ENGINEERING GENESIS: THE ETHICS OF GENETIC ENGINEERING IN NONHUMAN SPECIES 2 (Donald Bruce & Ann Bruce eds., 1998); see also Tester, Mark, "Seeking Clarity in the Debate Over the Safety of GM Foods," 402 NATURE 575, 575 (1999).

<sup>4</sup> Monsanto Co. v. Trantham, 156 F. Supp. 2d 855, 858 (W.D. Tenn. 2001) (involving the insertion of genes into cottonseed and soybeans to make the plants resistant to herbicide).

<sup>5</sup> Cockburn, Andrew, "Assuring the Safety of Genetically Modified (GM) Foods: the Importance of an Holistic, Integrative Approach", 98 J. BIOTECH. 79, 80 (2002).

<sup>6</sup> See Carie-Megan Flood, Pollen Drift and Potential Causes of Action, 28 J. CORP. L. 472, 477 (2003) (quoting Kolehmainen, Sophia, "Precaution Before Profits: An Overview of Issues in Genetically Engineered Food and Crops", 20 VA. ENVTL. L.J. 267, 269 (2001)).

<sup>7</sup> See GMO Compass website, GM Crops: Growing Around the World, [http://www.gmocompass.Org/eng/agri\\_biotechnology/gmo\\_planting/](http://www.gmocompass.Org/eng/agri_biotechnology/gmo_planting/) (last visited May 14, 2010).

<sup>8</sup> Id.

<sup>9</sup> See INT'L SERVICE FOR THE ACQUISITION OF AGRI-BIOTECH APPLICATIONS, GLOBAL STATUS OF COMMERCIALIZED BIOTECH/GMCROPS: 2007 (2007), [http://www.isaaa.org/resources/publications/briefs/37/executive\\_summary/default.html](http://www.isaaa.org/resources/publications/briefs/37/executive_summary/default.html) (last visited Apr. 21, 2010);

the emerging economies of Argentina, Brazil, India and China.<sup>10</sup> GM technology has the potential to revolutionize world agriculture, particularly in developing countries, in ways that would substantially reduce malnutrition, improve food security, increase rural income, and possibly even reduce environmental pollutants.<sup>11</sup> However, GM products have also generated enormous public concern<sup>12</sup> regarding the health, environmental, legal, social and ethical issue raised by gene technology. While the debates over the advantages and disadvantages will continue, genetic engineering is already changing the face of agriculture.<sup>13</sup> The legal issues surrounding GM crops have received less attention than the more popular social and environmental issues. This article explains the arguments at the center of the debate regarding the risks of producing GMOs & its contamination.

## **II. Rationale and objectives of the study:**

The main objective of this study is to examine the existing responsibilities of the farmers of developing countries concerning GM issues. To fulfill the main objectives, the following mentioned objectives have been taken into consideration:-

1. To identify the limitations & risk factors associated with GM crops.
2. To examine the present stand of legal liabilities of the farmers producing GM crops.
3. To suggest some effective legal measures preventing GM contamination.

## **III. Research methodology:**

The present study is an outcome of amalgamation of types of work: Methodologies for this research study include qualitative as well as to some extent quantitative data processing technique for data collected from publications of concerned authorities, available books, research studies, articles on related topic, key note paper presented in conference, news paper reporting, internet.

## **IV. Risks factors covered in producing GM crops:**

Public perception of the use of genetic modification in food production is very emotionally charged and it is therefore essential that the risks and benefits are considered carefully. This section examines the benefits and the risks—both perceived and actual—of GM food. The negative perceptions and fears about genetically modified foods worldwide are considerable.<sup>14</sup> It has been suggested that some consumers reject GM food and agriculture because consumers believe, they could be health hazards.<sup>15</sup> The effects of GM crops on human health have been of major concern in public debates, even though the crops are subjected to far greater levels of scrutiny than foods produced by more traditional plant-breeding techniques.<sup>16</sup> Genetically engineered foods may also carry an antibiotic-resistant gene,<sup>17</sup> and one commentator has argued that, “some of the antibiotics used for this purpose are still used to treat human illnesses, and there is concern that resistance to the Antibiotic could be transferred to humans and animals through food and feed products.”<sup>18</sup> Foreign genes introduced into food plants may therefore carry potentially harmful substances that may have negative impacts on human health.<sup>19</sup> The negative impact of GM crops on the environment and ecosystems is another significant issue in the GM debate.<sup>20</sup> For example, introducing new genes into an existing crop could, in turn, affect the surrounding environment, including other varieties of the same species.<sup>21</sup> The danger is that the “genes of the genetically

---

<sup>10</sup> See KATARINA NOSSAL ET AL., GM CROPS IN EMERGING ECONOMIES: IMPACTS ON AUSTRALIAN AGRICULTURE (2008) [http://www.abareconomics.com/publications\\_html/crops/crops\\_08/gmcrops.pdf](http://www.abareconomics.com/publications_html/crops/crops_08/gmcrops.pdf) (last visited Apr. 21, 2010).

<sup>11</sup> See WU ET AL., supra note 2, at XV; see also, Nigel G. Halford & Peter R. Shewry, “Genetically Modified Crops: Methodology, Benefits, Regulation and Public Concerns”, 56 BRIT. MED. BULL. 62, 73(2000)

<sup>12</sup> Geiger, Chris, “Samantha Madell: The Social Implications of Genetically Modified Food (2000) (unpublished M.A. dissertation, Macquarie University, Sydney, Austl.). [http://members.ozemail.com.au/~gamgee/writing\\_genetic\\_engineering.html](http://members.ozemail.com.au/~gamgee/writing_genetic_engineering.html) (last visited May 18, 2010).

<sup>13</sup> Director-General Jacques Diouf, Biotechnology: FAO Response to Open Letter From NGOs (2004), <http://www.fao.org/newsroom/en/news/2004/46429/index.html> (last visited May 19, 2010).

<sup>14</sup> See Joan Costa-Font & Elias Mossialos, “Are Perceptions of ‘Risks’ and ‘Benefits’ of Genetically Modified Food (In) Dependent?” 18 FOOD QUALITY & PREFERENCE 173, 173-82 (2007).

<sup>15</sup> See Marianne McGarry Wolf et al., “A Comparison of Consumer Attitudes Towards GM Food in Italy and the USA, in Consumer Acceptance of Genetically Modified Foods”, 131 (Robert E. Evenson & Vittorio Santaniello eds., 2004).

<sup>16</sup> Malarkey, Trish, “Human Health Concerns with GM Crops”, 544 MUTATION RES. 217, 217 (2003).

<sup>17</sup> Beever, D.E., and Kemp, C.F., “Safety Issues Associated with the DNA in Animal Feed Derived From Genetically Modified Crops: A Review of the Scientific and Regulatory Procedures”, 70 NUTR. ABSTR. REV. SER. A, 197 (2000).

<sup>18</sup> See N. Clark et al., “Biotechnology and Development: Threats and Promises for the 21st Century”, 34 FUTURES 785, 793 (2002).

<sup>19</sup> Whiteman, Deborah, “GENETICALLY MODIFIED FOODS: HARMFUL OR HELPFUL?” (2000), <http://www.csa.com/discoveryguides/gmfood/review.pdf> (last visited May 18, 2010).

<sup>20</sup> See Richard Bennett et al., “Environmental and Health Impacts of Growing Genetically Modified Herbicide-Tolerant Sugar Beet: A Life-Cycle Assessment”, 2 PLANT BIOTECH. J. 273 (2004).

<sup>21</sup> See Jeroen Van Den Bergh & Justin M. Holley, “An Environmental—Economic Assessment of Genetic Modification of Agricultural Crops”, 34 FUTURES 807, 809 (2002).

modified crop could transfer to other wild or domesticated varieties of the species.”<sup>22</sup> There are fears that such transfers could facilitate the development of resistant “super-weeds,” loss of genetic diversity within crop species, or even the destabilization of entire ecosystems.<sup>23</sup> This, in turn, would reduce the food supply for insects and birds.<sup>24</sup> Thus, GM crops bring unknown effects to the natural environmental gene flow by creating unstoppable super-weeds, which threaten wildlife and biodiversity, all of which negatively impact organic farming initiatives. Cross-pollination is another major concern.<sup>25</sup> An irreversible or uncontrollable “escape” of genes from a GM crop to neighboring plants of the same species, wild or domestic, could occur by pollen transfer.<sup>26</sup> This would present a serious problem for adjacent farmers, who would find it increasingly difficult to produce purely non-GM varieties in the presence of gene transfer.<sup>27</sup> It is argued that, “neighbors may suffer damages, for example, by being unable to market their non-GM crop as they wish if the non-GM crops test positive for GMOs that came from a neighboring farmer’s field.”<sup>28</sup> The possible negative effects of GM contamination are numerous: This contamination would have serious implications for small scale farmers. For instance, it would endanger the indigenous seeds that these farmers have developed over centuries and that they trust and know. Farmers with contaminated fields could also end up being forced to pay royalties to the companies that own the patents on the GM crops that contaminated their fields.<sup>29</sup> This introduces the concern of legal issues associated with genetic engineering. GM foods are a product of human intellectual efforts and intellectual property laws allow developers to recoup costs and earn returns on their investments in research and development by prohibiting unauthorized copying.<sup>30</sup> As it is argued, “Once the technology itself is separated from concern of commercial ownership of the food supply, it can be seen that there are real issues and concerns. These issues are largely legal rather than biological in nature and revolve around intellectual property rights.”<sup>31</sup> Intellectual property rights create a limited monopoly in organisms and the access to GM technology becomes limited by restrictions. Legal action can be pursued against those who infringe upon the relevant patent by copying the invention or by selling patented seeds without the permission of the patent owner.<sup>32</sup> Moreover, farmers who choose to raise non-genetically engineered crops intended for GM-free markets could, at times, be held liable if crops test positive for GM, even if the patented plant or seed was acquired unintentionally.<sup>33</sup> The possession of patented GM seeds without the consent of the patent holder could lead to infringement.<sup>34</sup> Another problem arising from the use of gene technology concerns its possible threat to the conventional practice of seed saving: the reusing, sharing, exchanging and selling of farm-saved seeds, which has been a practice in agriculture for centuries. One commentator has argued that the multinational seed corporations’ “control over the world’s seeds constitutes an overwhelming threat to agricultural genetic diversity and small-scale traditional farming systems.”<sup>35</sup> The ability of farmers to select and save seeds that have been adapted to local conditions is essential for the success of local agriculture.<sup>36</sup> Critics have also questioned the ethics of extending patent rights to plant genes,<sup>37</sup> forcing non-GM farmers to seek a license to allow them to replant seeds from an earlier year’s crop<sup>38</sup> or to purchase new seeds from multinational companies, such as Monsanto<sup>39</sup> and Syngenta,<sup>40</sup> when their

<sup>22</sup> Id. at 813.

<sup>23</sup> Clark, supra note 24, at 792.

<sup>24</sup> Id.

<sup>25</sup> Cullet, Philippe, “Farmer Liability and GM Contamination: Schmeiser Judgment,” 39 ECON. & POL. WKLY. 2551, 2551-54 (2004).

<sup>26</sup> See “THE WORLD CONSERVATION UNION, CURRENT KNOWLEDGE OF THE IMPACTS OF GENETICALLY MODIFIED ORGANISMS ON BIODIVERSITY & HUMAN HEALTH(2007),” [http://cmsdata.iucn.org/downloads/ip\\_gmo\\_09\\_2007\\_1\\_.pdf](http://cmsdata.iucn.org/downloads/ip_gmo_09_2007_1_.pdf) (last visited May 19, 2010); see also NUFFIELD COUNCIL ON BIOETHICS, THE USE OF GENETICALLY MODIFIED CROPS IN DEVELOPING COUNTRIES, [http://www.nuffieldbioethics.org/fileLibrary/pdf/GM\\_Crops\\_short\\_version\\_FINAL.pdf](http://www.nuffieldbioethics.org/fileLibrary/pdf/GM_Crops_short_version_FINAL.pdf) (last visited Apr.16, 2010).

<sup>27</sup> See Ken Belcher et al., “Genetically Modified Crops and Agricultural Landscapes: Spatial Patterns of Contamination”, 53 ECOLOGICAL ECON. 387, 388 (2005).

<sup>28</sup> MOELLER, R. DAVID & SLIGH, MICHAEL “FARMERS’ GUIDE TO GMOS” 21 (Karen R. Krub ed., 2004), available at [http://www.rafiusa.org/pubs/Farmers\\_Guide\\_to\\_GMOs.pdf](http://www.rafiusa.org/pubs/Farmers_Guide_to_GMOs.pdf).

<sup>29</sup> Makanya, Zachary, “Twelve Reasons for Africa to Reject GM Crops”, GRAIN, July 2004, at 19, available at [http://www.grain.org/seedling\\_files/seed-04-07-04.pdf](http://www.grain.org/seedling_files/seed-04-07-04.pdf).

<sup>30</sup> Lee, Maria & Burrell, Robert, “Liability for the Escape of GM Seeds: Pursuing the ‘Victim’?”, 65 MOD. L. REV. 517 (2002).

<sup>31</sup> Mark, C. Jordan, “The Privatization of Food: Corporate Control of Biotechnology”, 92 AGRONOMY J. 803, 805 (2009).

<sup>32</sup> See Ninety-seven percent of all patents are held by nationals of industrialized countries and 90% of all technology and product patents are held by global corporations. See U.N. DEV. PROGRAM, HUM. DEV. REPORT 2000 84 (2000).

<sup>33</sup> Mgbеoji, Ikechi, “Adventitious Presence of Patented Genetically Modified Organisms: Is Intent Necessary for Actions in Infringement?”, 27 BULLETIN OF SCI. TECH. SOC’Y 314 (2007), available at <http://bst.sagepub.com/cgi/reprint/27/4/314>.

<sup>34</sup> See HAROLD G. FOX, CANADIAN PATENT LAW AND PRACTICE 383-84 (1969);

see also Bernhardt, M. Stephanie, “High Plains Drifting: Wind-Blown Seeds and the Intellectual Property Implications of the GMO Revolution”, 4 NW. J. TECH. &INTELL. PROP. 2, 5 (2005).

<sup>35</sup> Rogers, Nicole, “Seeds, Weeds and Greed: An Analysis of the Gene Technology Act 2000 (Cth), Its Effect on Property Rights, and the Legal and Policy Dimensions of a Constitutional Challenge,” 2MACQUARIE L. J. 1, 1 (2002).

<sup>36</sup> See “GRAIN BRIEFING, THE END OF FARM- SAVED SEED?: INDUSTRY’S WISH LIST FOR THE NEXT REVISION OF UPOV” (2007), [http://www.grain.org/briefings\\_files/upov-2007-en.pdf](http://www.grain.org/briefings_files/upov-2007-en.pdf) (last visited May 21,2010).

<sup>37</sup> See Lee & Burrell, supra note 39, at 519.

<sup>38</sup>Id.

seeds are inadvertently contaminated by GM material. Patented GM crops are significantly more expensive than conventional or hybrid crops<sup>41</sup> and “Farmers that use GM seed have to contract with the seed company not to grow the seeds they harvest.”<sup>42</sup> This would reduce the range of local and native seeds that are fundamental to the local food systems. The introduction of GM crops into the developing world is certain to raise extremely complex issues and policy concerns, and transform agricultural practices without respecting local traditions.<sup>43</sup> It is argued that “Certainly there are perceived physical dangers associated with GM technology but there is also an ethical dimension to the debate over the use of GM to enhance food products that may well be acting as an impediment to the widespread acceptance of GM crops.”<sup>44</sup> The introduction of such crops could be seen as an immoral application of agricultural biotechnology because the process of modifying genes creates living things that would never occur in nature.<sup>45</sup> This undermines the natural and biological functions that constitute, and are inherent in, biological life and the organism’s natural capacity to generate new life. GM cropping is, therefore, viewed as being inconsistent with transcendent and foundational moral, spiritual and biological principles.<sup>46</sup> It is also claimed that GM crops are immoral because, as we have seen, they threaten the traditional rights of farmers by denying their ability to save the seeds of their harvests.<sup>47</sup> The socio-economic issues surrounding GM crops encompass the growing power of multinational corporations over traditional farming. The involvement of large multinational corporations (particularly chemical corporations) in the creation and marketing of agricultural biotechnologies, and the use of intellectual property in the form of patents, is raising new and interconnected social and ethical questions.<sup>48</sup>

### **V. Farmer’s legal liabilities concerning GMOs:**

The production and use of GM crops creates many potential liabilities<sup>49</sup>. Some of these legal liabilities have been the topic of considerable debate both in developed and developing countries. Legal issues are raised in the production and use of GMO crops in a number of ways. In this context, “contamination” is intended to mean simply the presence of a genetically modified plant or plant part in the production process of a crop or product which is intended by the grower or producer to be “GM-free.”<sup>50</sup> A non-GM farmer’s crop, harvest or land could become contaminated by GM crops, and in the course of their farming practice, this farmer replants his fields with seeds taken from those contaminated plants. The farmer subsequently faces legal action for patent infringement.<sup>51</sup> Another farmer who chooses to raise non-GM crops intended for GM-free markets could be held liable for patent infringement if the crops test positive for GM. Contamination of conventional crops mostly results from the often inadvertent spread of GM seed and pollen from one farm to another. Thus, farmers with non-GM crops may face legal liability issues due to such contamination. The companies that create GM crops have intellectual property rights in the crops usually in the form of patents.<sup>52</sup> The companies can take legal action against farmers who grow the transgenic crops without the companies’ permission.<sup>53</sup> A farmer who is the victim of gene contamination could find himself liable to the corporation that created the GM crop, regardless of

---

<sup>39</sup> The Monsanto Company (NYSE: MON) is a U.S. based multinational agricultural biotechnology corporation. It is the world’s leading producer of the herbicide glyphosate, marketed as “Roundup.” Monsanto is also the leading producer of genetically engineered (GE) seed. See Monsanto, <http://www.monsanto.com/> (last visited Apr. 17, 2010).

<sup>40</sup> Syngenta AG is a large global Swiss agribusiness company which notably markets seeds and pesticides. Syngenta is involved in biotechnology and genomic research. The company is a leader in crop protection, and ranks third in total sales in the commercial agricultural seeds market. See Syngenta, <http://www.syngenta.com> (last visited Apr. 17, 2010).

<sup>41</sup> Anderson, Teresa, “Patented GM Crops: Making Seed Saving Illegal”, *AFRICAN EXECUTIVE*, July 2006, <http://www.africanexecutive.com/modules/magazine/articles.php?article=766&magazine=76> (last visited May 21, 2010).

<sup>42</sup> Truswell, A. Stewart, “Genetically Modified Plant Foods - Hopes and Fears”, 2 *MACQUARIE L. J.* 177, 178 (2002).

<sup>43</sup> *THE WORLD CONSERVATION UNION*, supra note 33.

<sup>44</sup> See Nigel K. Pope et. al., “Consumer Attitudes Towards Genetically Modified Foods: Development of a Multidimensional Scale”, <http://smib.vuw.ac.nz:8081/WWW/ANZMAC2004/CDSite/papers/Pope1.PDF> (last visited May 21, 2010).

<sup>45</sup> Yount, Lisa, “INTRODUCTION AT ISSUE: ETHICS OF GENETIC ENGINEERING”, (ed., 2004), available at <http://www.enotes.com/ethics-genetic-article/39264>.

<sup>46</sup> Rogers, supra note 44, at 8.

<sup>47</sup> Buttel, H. Frederick, “The Environmental and Post-Environmental Politics of Genetically Modified Crops and Foods”, 14 *ENVTL. POL.* 309, 309- 23 (2005).

<sup>48</sup> Wickson, Fern, “Australia’s Regulation of Genetically Modified Crops: Are We Risking Sustainability?”, 2 *AUSTL. J. EMERGING TECHS. & SOC’Y* 36, 40 (2004).

<sup>49</sup> Boadi, Richard Y., “MANAGING LIABILITY ASSOCIATED WITH GENETICALLY MODIFIED CROPS IN INTELLECTUAL PROPERTY MANAGEMENT IN HEALTH AND AGRICULTURAL INNOVATION: A HANDBOOK OF BEST PRACTICES” 1385 (2007), <http://aatf-africa.org/UserFiles/File/ipHandbook-14.pdf> (last visited May 19, 2010).

<sup>50</sup> See Keir Bristow et. al., “GMO’s Liability for “GM” Contamination”, 10 *AUSTRALASIAN BIOTECH.* 37, 39 (2000).

<sup>51</sup> See GREENPEACE AUSTL., “GENETICALLY ENGINEERED FOOD CROPS: FINANCIAL AND LIABILITY RISKS FOR NON-GE FARMERS” (2003), [http://sites.greenpeace.org.au/truefood/downloads/liability\\_briefing\\_nov\\_03.pdf](http://sites.greenpeace.org.au/truefood/downloads/liability_briefing_nov_03.pdf) (last visited May, 21 2010).

<sup>52</sup> Adcock, Mike, “Intellectual Property, Genetically Modified Crops and Bioethics”, 2 *BIOTECH. J.* 1088, 1088 (2007).

<sup>53</sup> Norman, Siebrasse, “The Innocent Bystander Problem in the Patenting of Higher Life Forms”, 49 *MCGILL L. J.* 349, 360 (2004) (quoting the Canadian Biotech. Advisory Comm. Rep.).

the mental state of the person who carries out the infringing acts.<sup>54</sup> The inadvertent presence of GM crops on the non-GM farmers' lands and the infringement under patent law has raised a number of legal issues, since even a completely innocent neighbor could be held liable for patent infringement.<sup>55</sup> A recent successful suit brought by Monsanto in Canada against a conventional farmer, Percy Schmeiser, highlights some of these legal issues. Monsanto had a patent for glyphosate-resistant canola plants.<sup>56</sup> In other words, the seeds were resistant to Roundup, a pesticide used to eradicate weeds.<sup>57</sup> Glyphosate resistant canola plants were found to be growing on Schmeiser's farm, and he did not have a license to use the Monsanto seeds.<sup>58</sup> Monsanto sued for patent infringement.<sup>59</sup> Schmeiser has consistently claimed<sup>60</sup> that he did not knowingly acquire and plant Monsanto's GE seed and that windborne seed must have contaminated his crop.<sup>61</sup> Despite Schmeiser's argument that he should not be liable for the infringement, the trial Judge found that "Schmeiser knew or ought to have known that those plants were glyphosate-resistant when he saved their seeds in 1997 and planted them the following year."<sup>62</sup> The court held that knowledge or intention was irrelevant to the question of infringement.<sup>63</sup> Some commentators have argued that "this decision, *Monsanto v. Schmeiser*,<sup>64</sup> presents us with the specter of a successful action being brought against a farmer who is entirely unaware of the presence of the claimant's patented genetic material, and who infringes merely by replanting seeds taken from these plants as part of normal farming practice."<sup>65</sup> One critic argues that *Monsanto Co. v. Dawson*<sup>66</sup> also confirms that the inadvertent presence of contaminated crops does not protect the innocent possessor from infringement and farmers will be liable for patent infringement if they use a patented plant without any knowledge that a patent exists.<sup>67</sup> Intrinsically, where a patented invention is used without permission, the patent holder's rights will be infringed, even though the defendant did not know and had no reason to believe that the patent was infringed.<sup>68</sup> Thus "if farmers grow non transgenic crops in an area where transgenic crops are grown, there could be a presumption that they 'ought to know' of the possible presence of protected transgenic seeds on their fields."<sup>69</sup> Even a completely innocent farmer could be held liable for patent infringement when unknowingly harvesting and saving seed containing patented genes. Farmers who choose to cultivate non-GM varieties can be sued for the unintentional presence of transgenic DNA in their crops because it is presumed that they "ought to know" of the possible presence of protected GM seeds on their fields.<sup>70</sup> In fact, the *Monsanto v. Schmeiser* decision gives a clear warning to farmers worldwide that they have to monitor their fields for the presence of GM seeds even if they have no knowledge of the potential presence of GM seeds.<sup>71</sup> This is an odd situation, as the farmer is deemed to have infringed upon the patent even if his fields were, in fact, inadvertently contaminated by drifting pollen.<sup>72</sup> Therefore the poor & illiterate farmers of developing countries are really in alarming condition of risk regarding the question of survive due to the application of GM technology & aggression through legal barriers of the multinational companies. It is questionable as to whether non-GM seed users or those with contaminated crops should be liable or responsible to those farmers who are actively seeking to gain from the cultivation of GM crops and who are also in a position to reduce the risks of contamination of non-GM crops.<sup>73</sup> Concurrently, the question arises whether the mere fact of possessing the patented gene should lead to liability and whether it

<sup>54</sup> Heald, Paul J. & Smith, James C. "The Problem of Social Cost in a Genetically Modified Age" (UGA Legal Studies Research, Paper No. 06-004, 2005), <http://ssrn.com/abstract=878691> (last visited May 18, 2010).

<sup>55</sup> McEowen, Roger A., "Legal Issues Related to the Use and Ownership of Genetically Modified Organisms", 43 WASHBURN L.J. 611, 611 (2004); see also Bernhardt, supra note 43.

<sup>56</sup> *Monsanto v. Schmeiser*, [2001] F.C. 256 (Can.); *Schmeiser v. Monsanto*, [2002] F.C. 309 (Can.).

<sup>57</sup> *Ibid.*

<sup>58</sup> Cullet, Philippe, "Monsanto v Schmeiser: A Landmark Decision concerning Farmer Liability and Transgenic Contamination," 17 J. ENVTL. L. 83, 83 (2005).

<sup>59</sup> *Monsanto v. Schmeiser*, [2001] F.C. 256 (Can.); *Schmeiser v. Monsanto*, [2002] F.C. 309 (Can.).

<sup>60</sup> Schmeiser, Percy, "Genetic Contamination and Farmers' Rights", SYNTHESIS/REGENERATION, May 24, 2002, <http://www.greens.org/s-r/29/29-21.html> (last visited May 19, 2010).

<sup>61</sup> Rogers, supra note 44, at 5.

<sup>62</sup> *Schmeiser v. Monsanto*, [2002] F.C. 309 (Can.) (*Schmeiser's* appeal was later dismissed).

<sup>63</sup> See *Contaminating Canada's Seed Supply*, GRAIN, April 2003, [http://www.grain.org/seedling\\_files/seed-03-04-en.pdf](http://www.grain.org/seedling_files/seed-03-04-en.pdf) (last visited May 22, 2010).

<sup>64</sup> *Monsanto v Schmeiser*, [2001] 3 F.C. D-36, 2001 FCT 256 (Can.).

<sup>65</sup> Lee, Maria & Burrell, Robert, "Liability for the Escape of GM Seeds: Pursuing the 'Victim'?", 65 MOD. L. REV. 517, 519 (2002).

<sup>66</sup> *Monsanto Co. v. Dawson*, 2000 WL 33953542 (E.D. Mo. 2000).

<sup>67</sup> Kershen, Drew L., "Of Straying Crops and Patent Rights," 43 WASHBURN L. J. 575, 582 (2004).

<sup>68</sup> Sherman, Brad, "Biological Inventions and the Problem of Passive Infringement," 13 AUSTL. INTELL.PROP. J. 146, 149 (2002).

<sup>69</sup> Cullet, Philippe, "Case Law Analysis—Monsanto v Schmeiser: A Landmark Decision Concerning Farmer Liability and Transgenic Contamination," 17 J. ENVTL. L. 83, 83 (2005).

<sup>70</sup> MOELLER & SLIGH, supra note 37.

<sup>71</sup> Cullet, supra note 32, at 2551.

<sup>72</sup> Cullet, supra note 89, at 83.

<sup>73</sup> See "SOIL ASSOC., GM LIABILITY—WHO SHOULD CARRY THE CAN?" SOIL ASSOCIATION RESPONSE TO CONSULTATION PAPER FROM MARK RUSKELL MSP (2004),

[http://www.whyoranic.org/web/sa/saweb.nsf/librarytitles/1956A.HTML/\\$file/GMregul049,%20response%20to%20MRuskell%20cons%20on%20liability%20bill.pdf](http://www.whyoranic.org/web/sa/saweb.nsf/librarytitles/1956A.HTML/$file/GMregul049,%20response%20to%20MRuskell%20cons%20on%20liability%20bill.pdf) (last visited Apr. 14, 2010).

would be reasonable to transfer the burden to the users. The potential for liability due to genetic contamination and its effects on non-GM farmers must be carefully assessed. Legislative protection should be introduced and enforced to protect farmers from liability concerns in relation to GM crops, specifically to protect farmers who grow conventional crops from any contamination by genetically modified crops. Strict legislation on contamination is therefore vital to protect non-GM growers against the multinational companies that develop and own the intellectual property rights in the GM crop causing the contamination. There is a need for the recognition of an innocent by stander's defense and a farmer's privilege under patent law.<sup>74</sup> However, it must be noted that *Monsanto v. Schmeiser* has not been followed or referred to by cases in other jurisdictions.

## **VI. Effective remedies against GM contamination under the common law & tort law for protecting innocent farmers:**

GMO patent rights have grave implications for farmers. While farmers are liable under patent law for any unintended presence of patented GM seeds, it would be virtually impossible for farmers to seek compensation for GM contamination of their crops. However, the non-GM farmer could bring a claim against the GM farmer under common law if the seed handling was negligent. Common law works with patent law to ensure that a farmer's choices are respected.<sup>75</sup> Therefore, "farmers and seed companies who are responsible for genetically contaminating neighboring fields might be liable for damages based on the tort claims of trespass to land, nuisance, negligence, or strict liability."<sup>76</sup> These remedies may enable farmers to receive financial compensation for loss or damage suffered as a result of GM contamination of their crops.<sup>77</sup> A claim of trespass to land can arise when someone intentionally enters or intentionally causes something to enter another person's land and causes damage through carelessness, including the handling or movement of GM seeds from one's own property onto another's.<sup>78</sup> "It is also a trespass if the defendant does not intend to cause the entry of object, but knows that it is substantially certain to occur."<sup>79</sup> However, the spread of pollen via wind drift or insect pollination would be unlikely to amount to a trespass because this would not constitute a direct interference.<sup>80</sup> Pollen flow between cultivars of the same crop or between related plant species is a biological fact. Hence, if pollen flow by itself gave rise to legal liability for trespass on a neighbor's crops, all farmers would be exposed to legal liability for trespass for almost every crop they grow.<sup>81</sup> Therefore, GMO patent holders and persons engaged in GMO agriculture will only be held liable for trespass if the trespass is intentional, reckless or negligent.<sup>82</sup> Negligence is another legal concept in tort law, normally used to achieve compensation or damages for injured or affected parties.<sup>83</sup> The GM farmer who knows that the neighboring farmer may be adversely affected by pollen drift from GM crops may be liable to the non-GM farmer for negligence when failing to act reasonably under the circumstances, if this failure causes harm to another.<sup>84</sup> The non-GM farmer has to prove, on the balance of probabilities, that there is a greater than fifty per cent chance that the GM farmer's carelessness caused the non-GM crops to be contaminated. If the evidence of both sides is found to be equal, the non-GM farmer will lose the case. Another potential tort claim related to GMO contamination is the claim of nuisance which can be brought when a defendant engages in an activity that unreasonably interferes with a neighbor's use and enjoyment of the land they own or occupy.<sup>85</sup> Under common law, therefore, GM farmers

<sup>74</sup> Posting of Matthew Rimmer to [http://www.opendemocracy.net/percy\\_a\\_hero\\_0](http://www.opendemocracy.net/percy_a_hero_0) (Apr. 13, 2004, 03:13:00 GMT) (last visited June 1, 2010).

<sup>75</sup> Heald, Paul J. & Smith, James Charles, "Pollen Drift and the By standing Farmer: Harmonizing Patent Law and Common Law on the Technological Frontier", *ADVOCATE* 3, 4 (2006), [http://digitalcommons.law.uga.edu/cgi/viewcontent.cgi?article=1006&context=fac\\_pm/7](http://digitalcommons.law.uga.edu/cgi/viewcontent.cgi?article=1006&context=fac_pm/7) (last visited May 19, 2010).

<sup>76</sup> MOELLER, DAVID R., "FARMERS' LEGAL ACTION GROUP, GMO LIABILITY THREATS FOR FARMERS: LEGAL ISSUES SURROUNDING THE PLANTING OF GENETICALLY MODIFIED CROPS" (2001), [http://www.gefoodalert.org/library/admin/uploadedfiles/GMO\\_Liability\\_Threats\\_for\\_Farmers\\_PDF\\_Ver.pdf](http://www.gefoodalert.org/library/admin/uploadedfiles/GMO_Liability_Threats_for_Farmers_PDF_Ver.pdf) (last visited May 19, 2010).

<sup>77</sup> Ludlow, Karinne, "Genetically Modified Organisms and Private Nuisance Liability", 13 *TORT L. REV.* 92, 92 (2005); see also Scanlon, Stephen M., "Should Missouri Farmers of Genetically Modified Crops Be Held Liable for Genetic Drift and Cross-Pollination?" 10 *MO. ENVTL. L. & POL'Y REV.* 1, 8 (2002).

<sup>78</sup> Davies, Julie A. & Levine, Lawrence C., "Biotechnology's Challenge to the Law of Torts," 32 *MCGEORGE L. REV.* 221, 223-24 (2000); see also Repp, Richard A., "Biotech Pollution: Assessing Liability for Genetically Modified Crop Production and Genetic Drift", 36 *IDAHO L. REV.* 585, 600-05 (2000).

<sup>79</sup> See Carie-Megan Flood, "Pollen Drift and Potential Cause of Action", *J. CORP. LAW* 474, 482 (2003).

<sup>80</sup> See AUSTL. GOV'T DEP'T OF AGRIC., FISHERIES AND FORESTRY, SCI. & ECON. POL'Y BRANCH, *LIABILITY ISSUES ASSOCIATED WITH GM CROPS IN AUSTRALIA* 8(2003), (last visited May 22, 2010), [http://www.daff.gov.au/\\_data/assets/word\\_doc/0007/182842/liability\\_issues\\_paper\\_final.doc](http://www.daff.gov.au/_data/assets/word_doc/0007/182842/liability_issues_paper_final.doc)

<sup>81</sup> Kershen, Drew L., "Legal Liability Issues in Agricultural Biotechnology," 44 *CROP SCI. SOC'Y AM.* 456 (2004), available at <http://crop.scijournals.org/cgi/content/full/44/2/456> (last visited May 22, 2010).

<sup>82</sup> AUSTL. GOV'T DEP'T OF AGRIC., supra note 106, at 8.

<sup>83</sup> Rodgers, Christopher P., "Liability for the Release of GMOs into the Environment: Exploring the Boundaries of Nuisance," 62 *CAMBRIDGE L.J.* 371, 371-492 (2003).

<sup>84</sup> Smith, Paul J. & Smith, James C., "The Problem of Social Cost in a Genetically Modified Age", (U.Ga. School of Law Research Paper Series, Paper No. 06-004, 2006), <http://ssrn.com/abstract=878691> (Last visited May 19, 2010).

<sup>85</sup> Scanlon, supra note 103, at 22-23.

must control activities occurring within the boundaries of their own land and must ensure that such activities do not harm the interests of the owners or occupiers of other land. If a GM farmer interferes with a neighbor's quiet enjoyment of his or her own property—for example, by emitting pollen onto the non-GM farmer's lands and destroying crops; or by creating smells, sounds, pollution or any other hazard that extends past the boundaries of the property—the affected party may make a claim of nuisance.<sup>86</sup> Another claim related to GMO contamination is strict liability. Strict liability arises: When someone engages in an abnormally dangerous activity; in such cases, a person harmed by the abnormally dangerous activity can recover damages from the person who engaged in the activity, without having to prove that the person who did the activity was reckless or negligent. Some legal scholars argue, if a farmer and/or Seed Company knows that a GMO crop is difficult to control and is likely to cross-pollinate with crops in adjacent fields, the farmer and/or Seed Company should be held strictly liable for any resulting damages.<sup>87</sup> The above discussion shows that farmers and seed companies who are responsible for genetically contaminating neighboring fields might be liable for a neighbor's damages based on tort claims of trespass to land, nuisance, negligence, or strict liability.<sup>88</sup> There is an urgent need to establish the duty owed by GM farmers to their non-GM neighbors and to protect the interests of all concerned through a specific legislative framework or a statutory liability instrument.<sup>89</sup>

### **VII. Concluding Remarks:**

Gene technology appears to be an effective and highly adaptable mechanism with which to address the challenges of producing agricultural products, but appropriate intellectual property systems do not adequately exist or are not enforceable. This advanced technology appears to offer several significant advantages, including the potential to provide seed companies with a safe and efficient way to maximize the benefits from their protected products and processes. However, this is a technology that presents both benefits and challenges for biodiversity, agriculture, food security and sustainable livelihoods. One of the biggest threats to farmers is the simple fear of having to defend themselves in court due to unintentional crop contamination. Subsistence farmers are also critically disadvantaged by the prohibition against saving and replanting seeds. GM seeds threaten farmers' livelihoods and seed security. The challenges posed by the use of GM crops in farming may be neglected but they must be faced in order to increase the benefits for the ordinary people of worldwide.

---

<sup>86</sup> Id.

<sup>87</sup> "GMO: Genetically Modified Organism or Gigantic Monetary Obligation? The Liability Schemes for GMO Damage in the United States and the European Union," 22 *LOY. L.A. INT'L & COMP. L. REV.* 453,488-91 (2000); MOELLER & SLIGH *supra* note 37, at 4.

<sup>88</sup> Salleh, Ariel, "Organized Irresponsibility: Contradictions in the Australian Government's Strategy for GM Regulation", 15 *ENVTL. POL.* 399, 408-09 (2006).

<sup>89</sup> Kariyawasam, Kanchana "Legal Liability, Intellectual Property and Genetically Modified Crops: Their Impact on World Agriculture" *PACIFIC RIM LAW & POLICY JOURNAL* VOL. 19. NO. 3, Pp.484

## References

- [1]. Maskus, E. Keith, "Intellectual Property Rights in Agriculture and the Interests of Asian-Pacific Economies", 29 WORLD ECON. 715, 719(2006).
- [2]. FELICIA WU & WILLIAM P. BUTZ, THE FUTURE OF GENETICALLY MODIFIED CROPS: LESSONS FROM THE GREEN REVOLUTION (2004), [http://www.rand.org/pubs/monographs/2004/RAND\\_MG161.pdf](http://www.rand.org/pubs/monographs/2004/RAND_MG161.pdf)(last visited May 14, 2010).
- [3]. ENGINEERING GENESIS: THE ETHICS OF GENETIC ENGINEERING IN NONHUMAN SPECIES 2 (Donald Bruce & Ann Bruce eds., 1998); see also Tester, Mark, "Seeking Clarity in the Debate Over the Safety of GM Foods," 402 NATURE 575, 575 (1999).
- [4]. Monsanto Co. v. Trantham, 156 F. Supp. 2d 855, 858 (W.D. Tenn. 2001) (involving the insertion of genes into cottonseed and soybeans to make the plants resistant to herbicide).
- [5]. Cockburn, Andrew, "Assuring the Safety of Genetically Modified (GM) Foods: the Importance of an Holistic, Integrative Approach", 98 J. BIOTECH. 79, 80 (2002).
- [6]. Carie-Megan Flood, Pollen Drift and Potential Causes of Action, 28 J. CORP. L. 472, 477 (2003)(quoting Kolehmainen, Sophia, "Precaution Before Profits: An Overview of Issues in Genetically Engineered Food and Crops", 20 VA. ENVTL. L.J. 267, 269 (2001)).
- [7]. GMO Compass website, GM Crops: Growing Around the World, [http://www.gmocompass.org/eng/agri\\_biotechnology/gmo\\_planting/](http://www.gmocompass.org/eng/agri_biotechnology/gmo_planting/) (last visited May 14, 2010).
- [8]. INT'L SERVICE FOR THE ACQUISITION OF AGRI-BIOTECH APPLICATIONS, GLOBAL STATUS OF COMMERCIALIZED BIOTECH/GMCROPS: 2007 (2007), (last visited Apr. 21, 2010);[http://www.isaaa.org/resources/publications/briefs/37/executive\\_summary/default.html](http://www.isaaa.org/resources/publications/briefs/37/executive_summary/default.html).
- [9]. KATARINA NOSSAL ET AL.,GM CROPS IN EMERGING ECONOMIES: IMPACTS ON AUSTRALIAN AGRICULTURE (2008) [http://www.abareconomics.com/publications\\_html/crops/crops\\_08/gmcrops.pdf](http://www.abareconomics.com/publications_html/crops/crops_08/gmcrops.pdf) (last visited Apr. 21,2010).
- [10]. WU ET AL., supra note 2, at XV; see also, Nigel G. Halford & Peter R. Shewry, "Genetically Modified Crops: Methodology, Benefits, Regulation and Public Concerns", 56 BRIT. MED. BULL. 62,73(2000)
- [11]. Geiger, Chris, "Samantha Madell: The Social Implications of Genetically Modified Food (2000) (unpublished M.A. dissertation, Macquarie University, Sydney, Austl.). [http://members.ozemail.com.au/~gamgee/writing\\_genetic\\_engineering.html](http://members.ozemail.com.au/~gamgee/writing_genetic_engineering.html) (last visited May 18, 2010).
- [12]. Director-General Jacques Diouf, Biotechnology: FAO Response to Open Letter From NGOs (2004),<http://www.fao.org/newsroom/en/news/2004/46429/index.html> (last visited May 19, 2010).
- [13]. Joan Costa-Font & Elias Mossialos, "Are Perceptions of 'Risks' and 'Benefits' of Genetically Modified Food (In) Dependent"? 18 FOOD QUALITY & PREFERENCE 173, 173-82 (2007).
- [14]. Marianne McGarry Wolf et al., "A Comparison of Consumer Attitudes Towards GM Food in Italy and the USA, in Consumer Acceptance of Genetically Modified Foods", 131 (Robert E. Evenson & Vittorio Santaniello eds., 2004).
- [15]. Malarkey, Trish, "Human Health Concerns with GM Crops", 544 MUTATION RES. 217, 217 (2003).
- [16]. Beever, D.E., and Kemp, C.F., "Safety Issues Associated with the DNA in Animal Feed Derived From Genetically Modified Crops: A Review of The Scientific and Regulatory Procedures", 70 NUTR.ABSTR. REV. SER. A, 197 (2000).
- [17]. N. Clark et al., "Biotechnology and Development: Threats and Promises for the 21st Century", 34FUTURES 785, 793 (2002).
- [18]. Whiteman, Deborah, "GENETICALLY MODIFIED FOODS: HARMFUL OR HELPFUL?" (2000),<http://www.csa.com/discoveryguides/gmfood/review.pdf> (last visited May 18, 2010).
- [19]. Richard Bennett et al., "Environmental and Health Impacts of Growing Genetically Modified Herbicide-Tolerant Sugar Beet: A Life-Cycle Assessment", 2 PLANT BIOTECH. J. 273 (2004).
- [20]. Jeroen Van Den Bergh & Justin M. Holley, "An Environmental—Economic Assessment of Genetic Modification of Agricultural Crops", 34 FUTURES 807, 809 (2002).
- [21]. Cullet, Philippe, "Farmer Liability and GM Contamination: Schmeiser Judgment," 39 ECON. & POL. WKLY. 2551, 2551-54 (2004).
- [22]. "THE WORLD CONSERVATION UNION, CURRENT KNOWLEDGE OF THE IMPACTS OF GENETICALLY MODIFIED ORGANISMS ON BIODIVERSITY & HUMAN HEALTH (2007)," [http://cmsdata.iucn.org/downloads/ip\\_gmo\\_09\\_2007\\_1\\_.pdf](http://cmsdata.iucn.org/downloads/ip_gmo_09_2007_1_.pdf) (last visited May 19, 2010);
- [23]. NUFFIELD COUNCIL ON BIOETHICS, THE USE OF GENETICALLY MODIFIED CROPS IN DEVELOPING COUNTRIES, (last visited Apr. 16, 2010). [http://www.nuffieldbioethics.org/fileLibrary/pdf/GM\\_Crops\\_short\\_version\\_FINAL.pdf](http://www.nuffieldbioethics.org/fileLibrary/pdf/GM_Crops_short_version_FINAL.pdf)
- [24]. Ken Belcher et al., "Genetically Modified Crops and Agricultural Landscapes: Spatial Patterns of Contamination", 53 ECOLOGICAL ECON. 387, 388 (2005).
- [25]. MOELLER, R. DAVID & SLIGH, MICHAEL "FARMERS' GUIDE TO GMOS" 21 (Karen R. Krub ed.,2004), available at [http://www.rafiusa.org/pubs/Farmers\\_Guide\\_to\\_GMOs.pdf](http://www.rafiusa.org/pubs/Farmers_Guide_to_GMOs.pdf).
- [26]. Makanya, Zachary, " Twelve Reasons for Africa to Reject GM Crops", GRAIN, July 2004, at 19,available at [http://www.grain.org/seedling\\_files/seed-04-07-04.pdf](http://www.grain.org/seedling_files/seed-04-07-04.pdf)
- [27]. Lee, Maria & Burrell, Robert, "Liability for the Escape of GM Seeds: Pursuing the 'Victim'? 65MOD. L. REV. 517 (2002).
- [28]. Mark, C. Jordan, "The Privatization of Food: Corporate Control of Biotechnology", 92 AGRONOMYJ. 803, 805 (2009).
- [29]. Ninety-seven percent of all patents are held by nationals of industrialized countries and 90% of all technology and product patents are held by global corporations. See U.N. DEV. PROGRAM, HUM. DEV.REPORT 2000 84 (2000).
- [30]. Mgbeoji, Ikechi, "Adventitious Presence of Patented Genetically Modified Organisms: Is Intent Necessary for Actions in Infringement?", 27 BULLETIN OF SCI. TECH. SOC'Y 314 (2007), Available at <http://bst.sagepub.com/cgi/reprint/27/4/314>.
- [31]. HAROLD G. FOX, CANADIAN PATENT LAW AND PRACTICE 383-84 (1969);
- [32]. Bernhardt, M. Stephanie , "High Plains Drifting: Wind-Blown Seeds and the Intellectual Property Implications of the GMO Revolution", 4 NW. J. TECH. &INTELL. PROP. 2, 5 (2005).
- [33]. Rogers, Nicole, "Seeds, Weeds and Greed: An Analysis of the Gene Technology Act 2000 (Cth), Its Effect on Property Rights, and the Legal and Policy Dimensions of a Constitutional Challenge," 2MACQUARIE L. J. 1, 1 (2002).
- [34]. "GRAIN BRIEFING, THE END OF FARM- SAVED SEED?: INDUSTRY'S WISH LIST FOR THE NEXT REVISION OF UPOV" (2007), [http://www.grain.org/briefings\\_files/upov-2007-en.pdf](http://www.grain.org/briefings_files/upov-2007-en.pdf) (last visited May 21,2010).
- [35]. Anderson, Teresa, "Patented GM Crops: Making Seed Saving Illegal", AFRICAN EXECUTIVE, July 2006, <http://www.africanexecutive.com/modules/magazine/articles.php?article=766&magazine=76> (Last visited May 21, 2010).
- [36]. Truswell, A. Stewart, "Genetically Modified Plant Foods - Hopes and Fears", 2 MACQUARIE L. J.177, 178 (2002).
- [37]. Nigel K. Pope et. al., "Consumer Attitudes Towards Genetically Modified Foods: Development of a Multidimensional Scale", <http://smib.vuw.ac.nz:8081/WWW/ANZMAC2004/CDsite/papers/Pope1.PDF>(last visited May 21, 2010).

- [38]. Yount, Lisa, "INTRODUCTION AT ISSUE: ETHICS OF GENETIC ENGINEERING", (ed.,2004), available at <http://www.enotes.com/ethics-genetic-article/39264>.
- [39]. Buttel, H. Frederick, "The Environmental and Post-Environmental Politics of Genetically Modified Crops and Foods", 14 ENVTL. POL. 309, 309- 23 (2005).
- [40]. Wickson, Fern, " Australia's Regulation of Genetically Modified Crops: Are We Risking Sustainability"? 2 AUSTL.. J. EMERGING TECHS. & SOC'Y 36, 40 (2004).
- [41]. Boadi, Richard Y., "MANAGING LIABILITY ASSOCIATED WITH GENETICALLY MODIFIED CROPS IN INTELLECTUAL PROPERTY MANAGEMENT IN HEALTH AND AGRICULTURAL INNOVATION: A HANDBOOK OF BEST PRACTICES" 1385 (2007), <http://aatf-africa.org/UserFiles/File/ipHandbook-14.pdf> (last visited May 19, 2010).
- [42]. Keir Bristow et.al., "GMO's Liability for "GM" Contamination", 10 AUSTRALASIAN BIOTECH. 37,39 (2000).
- [43]. GREENPEACE AUSTL., "GENETICALLY ENGINEERED FOOD CROPS: FINANCIAL AND LIABILITY RISKS FOR NON-GE FARMERS" (2003), [http://sites.greenpeace.org.au/truefood/downloads/liability\\_briefing](http://sites.greenpeace.org.au/truefood/downloads/liability_briefing) .nov\_03.pdf (last visited May, 21 2010).
- [44]. Adcock, Mike, "Intellectual Property, Genetically Modified Crops and Bioethics", 2 BIOTECH. J.1088, 1088 (2007).
- [45]. Norman , Siebrasse, "The Innocent Bystander Problem in the Patenting of Higher Life Forms", 49 MCGILL L. J. 349, 360 (2004) (quoting the Canadian Biotech. Advisory Comm. Rep.).
- [46]. Heald, Paul J. & Smith, James C. "The Problem of Social Cost in a Genetically Modified Age" (UGA Legal Studies Research, Paper No. 06-004, 2005), <http://ssrn.com/abstract=878691> (last visited May 18,2010).
- [47]. McEown, Roger A., "Legal Issues Related to the Use and Ownership of Genetically Modified Organisms", 43 WASHBURN L.J. 611, 611 (2004); see also Bernhardt, supra note 43.
- [48]. Monsanto v. Schmeiser, [2001] F.C. 256 (Can.); Schmeiser v. Monsanto, [2002] F.C. 309 (Can.).
- [49]. Cullet, Philippe, "Monsanto v Schmeiser: A Landmark Decision concerning Farmer Liability and Transgenic Contamination," 17 J. ENVTL. L. 83, 83 (2005).
- [50]. Schmeiser, Percy, "Genetic Contamination and Farmers' Rights", SYNTHESIS/REGENERATION, May 24, 2002, <http://www.greens.org/s-r/29/29-21.html> (last visited May 19, 2010).
- [51]. Contaminating Canada's Seed Supply, GRAIN, April 2003,[http://www.grain.org/seedling\\_files/seed-03-04-en.pdf](http://www.grain.org/seedling_files/seed-03-04-en.pdf) (last visited May 22, 2010).
- [52]. Lee, Maria & Burrell, Robert, "Liability for the Escape of GM Seeds: Pursuing the 'Victim'?" 65MOD. L. REV. 517, 519 (2002)Monsanto Co. v. Dawson, 2000 WL 33953542 (E.D. Mo. 2000).
- [53]. Kershen, Drew L., "Of Straying Crops and Patent Rights," 43 WASHBURN L. J. 575, 582 (2004).
- [54]. Sherman, Brad, "Biological Inventions and the Problem of Passive Infringement," 13 AUSTL. INTELL.PROP. J. 146, 149 (2002).
- [55]. Cullet, Philippe, "Case Law Analysis—Monsanto v Schmeiser: A Landmark Decision Concerning Farmer Liability and Transgenic Contamination," 17 J. ENVTL. L. 83, 83 (2005).
- [56]. "SOIL ASSOC., GM LIABILITY—WHO SHOULD CARRY THE CAN?" SOIL ASSOCIATION RESPONSE TO CONSULTATION PAPER FROM MARK RUSKELL MSP (2004), [http://www.whyoorganic.org/web/sa/saweb.nsf/librarytitles/1956A.HTML/\\$file/GMregul049,%20response%20to%20MRuskell%20cons%20on%20on%20liability%20bill.pdf](http://www.whyoorganic.org/web/sa/saweb.nsf/librarytitles/1956A.HTML/$file/GMregul049,%20response%20to%20MRuskell%20cons%20on%20on%20liability%20bill.pdf) (last visited Apr. 14, 2010).
- [57]. Posting of Matthew Rimmer to [http://www.opendemocracy.net/percy\\_a\\_hero\\_0](http://www.opendemocracy.net/percy_a_hero_0) (Apr. 13, 2004,03:13:00 GMT) (last visited June 1, 2010).
- [58]. Heald, Paul J. & Smith, James Charles, "Pollen Drift and the By standing Farmer: Harmonizing Patent Law and Common Law on the Technological Frontier", ADVOCATE 3, 4 (2006),[http://digitalcommons.law.uga.edu/cgi/viewcontent.cgi?article=1006&context=fac\\_pm/7](http://digitalcommons.law.uga.edu/cgi/viewcontent.cgi?article=1006&context=fac_pm/7) (last visited May19, 2010).
- [59]. MOELLER, DAVID R., "FARMERS' LEGAL ACTION GROUP, GMO LIABILITY THREATS FOR FARMERS: LEGAL ISSUES SURROUNDING THE PLANTING OF GENETICALLY MODIFIED CROPS" (2001),[http://www.gefoodalert.org/library/admin/uploadedfiles/GMO\\_Liability\\_Threats\\_for\\_Farmers\\_PDF\\_Ver.pdf](http://www.gefoodalert.org/library/admin/uploadedfiles/GMO_Liability_Threats_for_Farmers_PDF_Ver.pdf) (last visited May 19, 2010).
- [60]. Ludlow, Karinne, "Genetically Modified Organisms and Private Nuisance Liability", 13 TORT L. REV. 92, 92 (2005); see also Scanlon, Stephen M., "Should Missouri Farmers of Genetically Modified Crops Be Held Liable for Genetic Drift and Cross-Pollination?" 10 MO. ENVTL. L. & POL'Y REV. 1, 8 (2002).
- [61]. Davies, Julie A. & Levine, Lawrence C., "Biotechnology's Challenge to the Law of Torts," 32 MCGEORGE L. REV. 221, 223-24 (2000); see also Repp, Richard A., "Biotech Pollution: Assessing Liability for Genetically Modified Crop Production and Genetic Drift", 36 IDAHO L. REV. 585, 600-05 (2000).
- [62]. Carie-Megan Flood, "Pollen Drift and Potential Cause of Action", J. CORP. LAW 474, 482 (2003).
- [63]. AUSTL. GOV'T DEP'T OF AGRIC., FISHERIES AND FORESTRY, SCI. & ECON. POL'Y BRANCH, LIABILITY ISSUES ASSOCIATED WITH GM CROPS IN AUSTRALIA 8(2003), (last visited May22,2010),[http://www.daff.gov.au/\\_data/assets/word\\_doc/0007/182842/liability\\_issues\\_paper\\_final.doc](http://www.daff.gov.au/_data/assets/word_doc/0007/182842/liability_issues_paper_final.doc)
- [64]. Kershen, Drew L., "Legal Liability Issues in Agricultural Biotechnology," 44 CROP SCI. SOC'Y AM.456 (2004), available at <http://crop.scijournals.org/cgi/content/full/44/2/456> (last visited May 22, 2010).
- [65]. Rodgers, Christopher P., "Liability for the Release of GMOs into the Environment: Exploring the Boundaries of Nuisance," 62 CAMBRIDGE L.J. 371, 371-492 (2003).
- [66]. Smith, Paul J. & Smith, James C., "The Problem of Social Cost in a Genetically Modified Age", (U.Ga. School of Law Research Paper Series, Paper No. 06-004, 2006), <http://ssrn.com/abstract=878691> (last visited May 19, 2010).
- [67]. "GMO:"Genetically Modified Organism or Gigantic Monetary Obligation? The Liability Schemes for GMO Damage in the United States and the European Union," 22 LOY. L.A. INT'L & COMP. L. REV. 453,488-91 (2000); MOELLER & SLIGH supra note 37, at 4.
- [68]. Salleh, Ariel, "Organized Irresponsibility: Contradictions in the Australian Government's Strategy for GM Regulation", 15 ENVTL. POL. 399, 408-09 (2006).
- [69]. Kariyawasam, Kanchana "Legal Liability, Intellectual Property and Genetically Modified Crops: Their Impact on World Agriculture" PACIFIC RIM LAW & POLICY JOURNAL VOL. 19. NO. 3.