GENETICALLY MODIFIED ORGANISMS: WHO SHOULD PAY THE PRICE FOR POLLEN DRIFT CONTAMINATION?

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I. INTRODUCTION

The use of genetically modified crops has increased considerably in the United States in the last several years and currently makes up a significant percentage of total crop plantings. In 2007, according to the United States Department of Agriculture (USDA), biotechnology varieties accounted for seventy-three percent of all corn, eighty percent of all cotton, and ninety-one percent of

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all soybeans planted in the United States.[1] An estimated sixty to seventy percent of food in the United States marketplace contains some amount of a genetically modified crop ingredient.[2] Along with this growth comes the issue of contamination of non-genetically modified crops caused by pollen drift.[3] It is becoming more and more difficult to give assurances that organic and conventional crops are pure because of the increased acceptance of genetically modified crops.[4] When the purity or characteristics of non-genetically modified crops are threatened, many issues are raised regarding liability for damage to crops that can no longer be packaged and sold in the manner intended.[5]

This Note provides a summary of both the benefits and risks associated with genetically modified crops, as well as a discussion of pollen drift, the issue of the contamination of organic crops by genetically modified crops, and potential legal issues linked to the contamination of organic or conventional crops. Finally, possible solutions for farmers whose crops are contaminated will be discussed; in particular, the importance of creating state legislation to protect farmers from crop contamination as well as the possibility of establishing an indemnity fund to reimburse farmers for losses.

II. GENETICALLY MODIFIED CROPS

A. *What are They?*

Genetically modified crops, also known as transgenic crops, are crops that include "a gene or genes which have been introduced artificially into the plant's genetic makeup using a set of several biotechnology techniques . . . known as recombinant DNA (rDNA) technology."[6] The primary genetically modified crops grown are corn, soybeans, cotton, and canola.[7] The growth of genetic modification of crops is exploding, not just in the United States, but worldwide.[8] The total acreage of genetically modified crops worldwide was

1. NAT'L AGRIC. STATISTICS SERV., USDA, ACREAGE 24-5 (2007), http://usda.mannlib.cornell.edu/usda/current/Acre/Acre-06-29-2007.pdf.

2. Transgenic Crops: An Introduction and Resource Guide, http://cls.casa.colostate.edu/TransgenicCrops/faqpopup.html (last visited August 9, 2008). [hereinafter Transgenic Crops].

3. Wendy Thai, *Transgenic Crops: The Good, the Bad, and the Laws*, 6 MINN. J. L. SCI. & TECH. 877, 878 (2005).

4. Serina Vandegrift & Christine Gould, *Issues Surrounding the International Regulation of Adventitious Presence and Biotechnology*, 44 JURIMETRICS J. 81, 83 (2003).

5. Transgenic Crops, *supra* note 2.

6. *Id*.

7. Roger A. McEowen, *Legal Issues Related to the Use and Ownership of Genetically Modified Organisms*, 43 WASHBURN L.J. 611, 611 (2004).

8. *See* Vandegrift & Gould, *supra* note 4, at 82.

more than 167 million and increased over fifteen percent in 2003, demonstrating that the genetic modification of crops is one the "most quickly adopted innovations in the history of agriculture, outpacing the emergence of animal-drawn plows, and the rise of tractors in the 1930s."[9]

1. *Benefits of Genetically Modified Crops*

Farmers choose to grow genetically modified food crops for a variety of reasons. One reason is that genetically modified crops are altered to be pest and herbicide resistant.[10] Plant pests cause around fourteen billion dollars in losses to crops each year in the United States, so making crops pest-resistant is an important reason to grow genetically modified crops.[11] Growing plants that are herbicide resistant allows farmers to spray fields without the possibility of lowering their yields.[12] Additionally, because genetically modified plants are pest and herbicide resistant, a reduced amount of land can be used while increasing production.[13] A decreased use of pesticide is seen as a benefit to the environment and human health.[14] Additional benefits include extending the shelf life of food products created from genetically modified crops[15] and augmented nutritional benefits, such as a higher amount of vitamins and starch.[16]

2. *Risks of Genetically Modified Crops*

While there are many benefits to genetically modified crops, there are also a number of risks associated with their use, specifically threats to the environment and human health. One of the greatest consumer concerns is the possibility of genetically modified crops contaminating the human food supply as a

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9. Jay Palmer, *Eat Up! Why Genetically Modified "Frankenfood" is Gaining Ground*, BARRON'S, Dec. 6, 2004, *available at* http://www.agbioworld.org/newsletter_wm/index.php?caseid=archive&newsid=2283.

10. Holly Beth Frompovicz, Comment, *A Growing Controversy: Genetic Engineering in Agriculture*, 17 VILL. ENVTL. L.J. 265, 267 (2006).

11. Gregory N. Mandel, *Gaps, Inexperience, Inconsistencies, and Overlaps: Crisis in the Regulation of Genetically Modified Plants and Animals*, 45 WM. & MARY L. REV. 2167, 2180 (2004).

12. Matthew Rich, Note, *The Debate Over Genetically Modified Crops in the United States: Reassessment of Notions of Harm, Difference, and Choice*, 54 CASE W. RES. L. REV. 889, 892-93 (2004).

13. *Id*. at 892.

14. MARK L. WINSTON, TRAVELS IN THE GENETICALLY MODIFIED ZONE 241 (2002).

15. Frompovicz, *supra* note 10, at 266.

16. Thai, *supra* note 3, at 879.

result of cross-pollination of food crops.[17] An example of this is the StarLink® corn contamination case, discussed in further detail *infra*, which dealt with contamination of corn taco shells by a genetically modified strain of corn which had not been approved for human consumption.[18] Adding to consumer concern is the fact that there have been few studies done to measure the long-term effects of consumption of genetically modified crops.[19]

Allergies are another risk associated with genetically modified crops, especially because "'there are no reliable ways to test GM foods for allergies.'"[20] A 1996 study discovered that genetically modified soybeans carrying a "storage protein from Brazil nuts . . . had the same allergenic properties as the Brazil nut, demonstrating that an allergenic factor from one plant species can be transferred into another by genetic engineering."[21] The potential danger for individuals with severe allergies is high because without labeling the public would not be notified of the presence of such an allergen.[22]

Environmentalists are concerned with genetically modified crops themselves becoming pests that could alter the makeup of species or "reduce biological diversity."[23] It is possible that genetically modified crops could enter into a threatened or endangered species' habitat.[24] A World Health Organization (WHO) study suggests that the Bt bacterium (used to produce genetically modified crops) could be destructive to insects that are beneficial or even create resistant insects.[25] The typically stronger genetically modified strains could have the effect of eliminating native species,[26] and even single genes can diminish genetic diversity.[27]

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17. *Id*. at 884-85.

18. Paul St. Amand, *Risks Associated with Genetically Engineered Crops*, *in* GENETICALLY MODIFIED CROPS: THEIR DEVELOPMENT, USES, AND RISKS 355 (G.H. Liang & D.Z. Skinner eds., 2004).

19. Debra M. Strauss, *The International Regulation of Genetically Modified Organisms: Importing Caution into the U.S. Food Supply*, 61 FOOD & DRUG L.J. 167, 170 (2006).

20. *Id*. at 171 (quoting Arpad Pusztai, *Genetically Modified Foods: Are They a Risk to Human/Animal Health?* (2001), http://www.actionbioscience.org/biotech/pusztai.html) (last visited August 9, 2008).

21. Amand, *supra* note 18, at 354.

22. Strauss, *supra* note 19, at 171.

23. Richard A. Repp, Comment, *Biotech Pollution: Assessing Liability for Genetically Modified Crop Production and Genetic Drift*, 36 IDAHO L. REV. 585, 591 (2000).

24. Frompovicz, *supra* note 10, at 271.

25. Strauss, *supra* note 19.

26. Frompovicz, *supra* note 10, at 272.

27. Amand, *supra* note 18, at 358.

B. *Pollen Drift Contamination*

1. *What is it and How Does it Happen?*

Pollen drift is "the unintentional transfer of pollen from transgenic crops to nearby conventional crops by wind or insects."[28] For example, weather conditions can cause genetically modified corn to drift into a neighboring field and cross-pollinate with organic corn.[29] Pollen can travel several miles when carried by wind.[30] One study showed that genetically modified bentgrass was found thirteen miles away from the golf course where it was grown.[31]

Pollen drift is one of the primary ways in which genetically modified crops mix with traditional crops.[32] The wind carries the genes from a genetically modified crop and fertilizes crops that are organic or conventional.[33] The cross-pollination that occurs threatens the genetic purity of organic and conventional crops.[34] An alarming study showed that certain genetically modified crops were more likely to cross-pollinate than crops that were not genetically modified.[35] There is a direct correlation between the number of acres of genetically modified crops and the occurrence of adventitious presence in crops.[36] Therefore, the more genetically modified crops are planted, the higher the rate of adventitious presence in crops. While contamination of crops as a result of pollen drift is not a new agricultural phenomenon,[37] contamination through pollen drift creates problems for organic and conventional farmers because the purity of their crop is decreased.[38]

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28. Transgenic Crops, *supra* note 2.

29. Philip Brasher, *Organic Farmers Sing Biotech Blues*, D.M. REG., July 14, 2003, *available at* http://www.biotech.wisc.edu/seebiotech/seemail/July2003/071403.html#org.

30. Michelle T. Friedland, *You Call That Organic?—The USDA's Misleading Food Regulations*, 13 N.Y.U. ENVTL. L.J. 379, 401 (2005).

31. *Id*.

32. Christy Harrison, Genetically Modified Food and Pollen Drift, AskQuestions.org, http://www.askquestions.org/details.php?id=30 (last visited August 9, 2008).

33. Friedland, *supra* note 30.

34. Rich, *supra* note 12, at 896.

35. *See id*. (explaining a study that showed genetically modified mustard plants "were more than twenty times more likely to cross-pollinate than non-modified mustard plants").

36. Vandegrift & Gould, *supra* note 4, at 85.

37. *See generally* GRAHAM BROOKES, CO-EXISTENCE OF GM AND NON GM CROPS: CURRENT EXPERIENCE AND KEY PRINCIPLES 8 (2004), http://www.pgeconomics.co.uk/pdf/Coexistencekeyprinciplesdocument.pdf (noting that farms have used various methods to minimize adventitious presence in crops for many years).

38. Drew L. Kershen & Alan McHughen, *Adventitious Presence*, CAST COMMENTARY, July 2005, at 1 (2005), *available at* http://www.legis.state.ia.us/lsadocs/IntComHand/2006/IHDLA015.pdf.

It is important to note that it is impossible for farmers to grow an entirely pure crop.[39] While certain methods can limit the amount of contamination by genetically modified crops, it cannot be eliminated altogether.[40] "An absolute zero threshold" cannot be achieved of either genetically modified or conventional crops.[41] For this reason, industry standards for purity of crops range from 98% to 99.5%.[42]

2. *Organic Farming and Problems With Pollen Drift*

Genetically modified crops in the United States are regulated by the USDA, the Environmental Protection Agency (EPA), and the Food and Drug Administration (FDA).[43] Organically produced foods are specifically regulated by the USDA's National Organic Products Final Rules.[44] For persons wishing to avoid genetically modified food, organic foods are an alternative.[45] The USDA bans organic farmers from growing genetically modified seeds and requires livestock producers to use feed that is organically grown.[46] In recent years, the sales of organic food have been increasing by twenty percent each year.[47] But as the use of genetically modified crops increases, it is more difficult for organic farmers to produce a product that is free from contamination by genetically modified crops.[48] The USDA's National Organic Program does not lay out a zero tolerance with regard to the amount of adventitious presence in organic crops.[49] Labeling requirements under the USDA state that a food labeled organic only means that the product was not genetically engineered; it does not take into account the possibility that pollen drift can cause genetically modified crops to contaminate organic crops.[50]

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39. *Id*.
40. *See* Vandegrift & Gould, *supra* note 4, at 85.
41. *Id*.
42. Kershen & McHughen, *supra* note 38 (explaining that the Association of Official Seed Certifying Agencies (AOSCA) allows 0.5% of adventitious material in seed crops, while the USDA tolerates 2% of contaminated corn).
43. Thai, *supra* note 3, at 885.
44. *See* Kershen & McHughen, *supra* note 38, at 2.
45. Friedland, *supra* note 30, at 427.
46. Brasher, *supra* note 29.
47. *Id*.
48. NIGEL G. HALFORD, GENETICALLY MODIFIED CROPS 93 (2003).
49. *Genetically Modified Organisms Study Committee Hearing* 1 (2006) (statement of Ron Rosmann, Rosmann Family Farms), *available at* http://www.legis.state.ia.us/lsadocs/IntComHand/2006/IHDLA008.pdf.
50. Transgenic Crops, *supra* note 2.

However, contamination of organic crops by genetically modified crops does not necessarily pose a threat to organic certification.[51] Organic farmers can retain their organic certification despite a test that shows the presence of genetically modified material in their crops,[52] because what is important is that "the producer has followed the certification process."[53] As long as the organic producer testifies that he has not intentionally used genetically modified seed in the production of the crop, he will meet the USDA's requirements.[54]

While organic farmers are able to keep their organic certification despite the presence of genetically modified crops caused by pollen drift, there is a concern of losing customers who expect a non-genetically modified product.[55] In addition, many organic farmers wish to sell as pure a product as possible.[56] Some food companies and livestock producers test organic products for genetically modified materials, and as a result, some organic commodities are being turned away.[57] A farmer will typically be paid less for a crop that has too high a level of adventitious presence; the alternative is to pay to clean the crop until it reaches an acceptable adventitious presence level.[58] Because farmers voluntarily sign such contracts with processors, they "bear the burden of meeting their contract obligations regarding purity of delivered product."[59]

European Union regulations for genetically modified material in crops are much more stringent than in the United States.[60] For example, Europe has required food labeling when any amount of genetically modified material is present in food products,[61] while the United States regulations only "recommend voluntary labeling of bioengineered foods and request that companies notify FDA of their intent to market GM foods at least 120 days before launch."[62] The United States does not view the risks of genetically modified foods in the same

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51. Press Release, Am. Seed Trade Ass'n, A Seed Industry Response to Issues Raised by the Presence of Biotech Seed in Conventional Seed Lots (July 8, 2004), *available at* http://www.amseed.org/newsDetail.asp?id=95.

52. Letter from Bill Hawks, Under Secretary, USDA, to Gus Douglass, Commissioner, Nat'l Ass'n of State Dep'ts of Agric., (Dec. 21, 2004), *available at* http://www.legis.state.ia.us/lsadocs/IntComHand/2006/IHDLA010.pdf. [hereinafter "Letter from Bill Hawks"].

53. Am. Seed Trade Ass'n, *supra* note 51.

54. Letter from Bill Hawks, *supra* note 52.

55. Harrison, *supra* note 32.

56. Friedland, *supra* note 30, at 432.

57. *See* Brasher, *supra* note 29.

58. Kershen & McHughen, *supra* note 38, at 2.

59. *Id*. at 3.

60. Vandegrift & Gould, *supra* note 4, at 89.

61. *Id*.

62. Strauss, *supra* note 19, at 183.

manner as European countries.[63] Europeans are more suspicious of modern food technologies, partially due to food problems in their countries, especially Bovine Spongiform Encephalopathy (BSE, also known as Mad Cow Disease).[64] Many countries require thorough authorizations before genetically modified products will be allowed into the market.[65] Exports to the European Union and Japan have suffered as a result of American farmers' inability to provide assurance that their product is free of genetically modified material.[66] If the demand abroad continues towards non-genetically modified crops, the United States could suffer even greater losses.[67]

3. *Legal Issues with Contamination Caused by Pollen Drift*

Legal liability for contamination caused by pollen drift is one of the most important issues with regard to organic and conventional farming.[68] Producers of non-genetically modified crops worry that they may have to pay for the economic cost of adventitious presence caused by pollen drift if they lose customers or possibly organic certification which would lead to a loss in income.[69] Interestingly enough, case history involving organic and conventional farmers versus genetically modified farmers is limited.[70] One proposed theory explaining the lack of litigation suggests that because USDA regulations allow farmers to keep their certification and continue to sell as organic despite having a contaminated product, farmers would be unlikely to recover in tort for contamination of their crops.[71] While there has been some litigation of crop contamination cases, there is little legal precedent in the area of responsibility and liability for pollen drift as of yet.[72] It is also possible that there is a lack of crop contamination cases being litigated because it can be difficult to prove who the party responsible for the

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63. *See id*. at 182.

64. Vandegrift & Gould, *supra* note 4, at 89.

65. Strauss, *supra* note 19, at 181.

66. Neil E. Harl, *Biotechnology Policy: Global Economic and Legal Issues*, 12 WILLAMETTE J. INT'L L. & DISP. RESOL. 1, 11 (2004).

67. *Id*. at 13 (noting that countries that are dominated by genetically modified products will suffer serious problems if the trend towards non-genetically modified products continues).

68. *See* Jane Matthews Glenn, *Footloose: Civil Responsibility for GMO Gene Wandering in Canada*, 43 WASHBURN L.J. 547, 549 (2004).

69. Amand, *supra* note 18, at 354.

70. *See* Neil D. Hamilton, *Forced Feeding: New Legal Issues in the Biotechnology Policy Debate*, 17 WASH. U. J.L. & POL'Y 37, 53-54 (2005).

71. *See* Friedland, *supra* note 30, at 431-32 (noting that because the contaminated crop can be sold as organic, there is no financial risk and thus no need to sue).

72. Hamilton, *supra* note 70, at 54.

contamination is, due to an increasing number of genetically modified crop growers.[73]

III. LIABILITY THEORIES

There are several possible theories of liability relating to land use available in the event of pollen drift contamination caused by genetically modified crops, including private nuisance, trespass, and strict liability.[74] However, proving liability can be a difficult task due to "[t]he nature of GMO agriculture."[75] Difficulties in proving liability include pinpointing where the contamination came from, and who should be held responsible-the farmer of the genetically modified crops, the manufacturer, or perhaps both.[76] If a farmer succeeds in proving liability, he could recover monetary damages to compensate for his losses or get an injunction from the court to prohibit the genetically modified crop producers' activities.[77]

A. *Private Nuisance*

Private nuisance is one theory of liability that an innocent farmer might use to recover for the contamination of his crops.[78] A private nuisance "is an invasion of an individual's interest in the reasonable use and enjoyment of his or her land."[79] If a farmer's conventional or organic crops are contaminated by genetically modified crops through pollen drift, the farmer could argue that there was an invasion of his interest in the use and enjoyment of the land.[80] However, because of the increased number of genetically modified crops being planted, identifying which neighboring farm caused the contamination might be tricky, making private nuisance difficult to prove.[81]

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73. Rich, *supra* note 12, at 909.
74. *See generally* McEowen, *supra* note 7, at 618-25.
75. Rich, *supra* note 12, at 909.
76. *Id.*
77. Repp, *supra* note 23, at 599.
78. *See* Gregory N. Mandel, *The Future of Biotechnology Litigation and Adjudication*, 23 PACE ENVTL. L. REV. 83, 99 (2006).
79. McEowen, *supra* note 7, at 623.
80. *Id.* at 624.
81. *Id.*

B. *Trespass*

Trespass occurs when there is an invasion or interference of one's exclusive possession of their land.[82] In order to successfully prove trespass, a farmer must show that there was a physical invasion or interference with their possession of the property.[83] A farmer could argue that a neighboring farmer planted genetically modified crops knowing that pollen drift could occur, contaminating nearby conventional or organic fields.[84] Because farmers who purchase genetically modified seed from manufacturers receive a brochure advising them to use methods to prevent pollen drift,[85] farmers might be successful with such a liability theory because they could prove intentional trespass.

C. *Strict Liability*

Strict liability holds a person responsible for damages due to the dangerousness of the product, regardless of whether there was negligence or intent for the damage to occur.[86] It could be used as a cause of action if a neighboring farmer has acted in a way that is found to be abnormally dangerous.[87] There are several factors that courts use to determine whether an activity is abnormally dangerous.[88] These factors include: "(1) existence of a high degree of risk of some harm to the person land, or property of another; (2) likelihood that the resulting harm will be great; (3) inability to eliminate the risk by exercise of reasonable care; [and] (4) extent to which the activity is not common . . . "[89] A farmer can try to prove strict liability by demonstrating that these factors were met in order to show an abnormally dangerous activity.[90] The farmer could argue that genetically modified producers are aware of the potential for damage that genetically modified crops create in terms of pollen drift contamination.[91] However, farmers may encounter problems trying to prove the degree of risk and likelihood

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82. Repp, *supra* note 23, at 600.
83. *Id*.
84. McEowen, *supra* note 7, at 618.
85. BROOKES, *supra* note 37, at 10.
86. McEowen, *supra* note 7, at 624.
87. Paul J. Heald & James Charles Smith, *The Problem of Social Cost in a Genetically Modified Age*, 58 HASTINGS L.J. 87, 126 (2006).
88. *See* Repp, *supra* note 23, at 617.
89. McEowen, *supra* note 7, at 625.
90. *See id.* at 624-25.
91. *See id.*

of harm.[92] Furthermore, with the increase in genetically modified plantings, a farmer may not be able to succeed on a strict liability theory.[93]

IV. CASE HISTORY

The most significant example of legal liability involving crop contamination litigated in the United States thus far is the StarLink® incident that occurred in late 2000.[94] StarLink® involved the discovery of genetically modified corn in taco shells,[95] but the StarLink® corn had not received approval for human consumption.[96] It is unclear how the contaminated corn entered the food supply, but it could have occurred if the farmer unknowingly purchased contaminated corn or if the crops were tainted through pollen drift from neighboring farms.[97] The mere presence of genetically modified crops in food poses no food or environmental harm problems pursuant to regulations under the USDA, the EPA, and the FDA.[98] However, the corn seed found in the food was neither approved nor registered for human consumption.[99]

One legal issue that arises when pollen drift occurs is tort-based liability.[100] The plaintiffs in the StarLink® case brought actions on several of these theories of liability, seeking recovery on negligence, strict liability, and nuisance claims in a class action lawsuit.[101]

The economic costs involved due to contamination were high for Aventis, the company that owned StarLink®.[102] The company was responsible for the cost of recalling the product and destroying the remainder of the seed inventory, as well as settling several lawsuits as a result of the contamination, including "settling with consumer who allegedly suffered allergic reactions . . . [and] settling a class action lawsuit by corn growers who allegedly suffered depressed

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92. Repp, *supra* note 23, at 617.
93. McEowen, *supra* note 7, at 625.
94. Mandel, *supra* note 78, at 92-3.
95. *In re* StarLink Corn Prods. Liab. Litig. v. Aventis Crop Science, 212 F. Supp. 2d 828, 833 (N.D. Ill. 2002).
96. DAVID R. MOELLER, GMO LIABILITY THREATS FOR FARMERS 2 (2001), *available at* http://www.flaginc.org/topics/pubs/arts/GMOthreats.pdf.
97. *In re* StarLink Corn, 212 F. Supp. 2d at 841.
98. DREW L. KERSHAN, PROPOSED LIABILITY FOR TRANSGENIC CROPS 3 (2005), *available at* http://www.legis.state.ia.us/lsadocs/IntComHand/2006/IHDLA016.pdf.
99. *In re* StarLink Corn, 212 F. Supp. 2d at 834.
100. MOELLER, *supra* note 96.
101. *In re* StarLink Corn, 212 F. Supp. 2d at 833.
102. Donald Uchtmann, Remarks, *Liability Issues: Lessons from StarLink*, 10 RICH. J. L. & TECH. 23, 4 (2004).

corn prices as a result of the mistake."[103] Because the case was settled for $110 million, there was no decision on the merits of the case, leaving the question of legal liability for crop contamination open in the United States.[104]

In Canada, organic canola farmers brought a suit against Monsanto Canada for damages caused by the contamination of their crops by Monsanto's genetically modified canola.[105] The Saskatoon Court of Queen's Bench dismissed the application for class action certification, noting that the farmers failed to prove that all organic canola farmers had suffered financial injury as a result of the contamination.[106] The court received no evidence that organic farmers lost their certification because of contamination by genetically modified crops, similar to the lack of lost organic certifications in the United States.[107] By denying the motion for certification of a class action suit, the court gave an indication to how it might rule on the case itself when it stated that the claim "did not disclose a plausible legal basis for imposing liability on the defendant on the grounds of negligence . . . nuisance . . . and trespass.[108] In contrast, the court did find that the plaintiffs in *StarLink* had adequately stated a claim for harm to their property because of contamination through pollen drift.[109]

V. POSSIBLE SOLUTIONS TO POLLEN DRIFT CONTAMINATION

Because there is a risk of contamination of non-genetically modified crops, and because litigation can be difficult and expensive for organic and conventional farmers, many farmers are seeking other alternatives for recovery. Growers of non-genetically modified crops are demanding legislative action be taken in order to protect their crops from contamination.[110] Through the state legislative process there are a number of different ways that farmers, specifically non-genetically modified producers, can seek protection including legislation supporting coexistence, a grain integrity indemnity fund, and liability legislation.

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103. *Id*. at 9.

104. LARA KHOURY & STUART SMYTH, REASONABLE FORESEEABILITY AND LIABILITY IN RELATION TO GENETICALLY MODIFIED ORGANISMS 12 (2005), *available at* http://www.economia.uniroma2.it/conferenze/icabr2005/papers/Smyth_Stuart_(2)_Khoury.pdf.

105. Matthews Glenn, *supra* note 68, at 549-50.

106. KHOURY & SMYTH, *supra* note 104, at 11.

107. *See* Kershen & McHughen, *supra* note 38, at 3.

108. KHOURY & SMYTH, *supra* note 104, at 11.

109. *In re* StarLink Corn Prods. Liab. Litig., 212 F. Supp. 2d 828, 842-43 (N.D. Ill. 2002).

110. A. Bryan Endres, *Coexistence Strategies in a Biotech World: Exploring Statutory Grower Protections*, 13 MO. ENVTL. L. & POL'Y REV. 206, 206 (2006).

A. *Coexistence*

One possible solution to the contamination of non-genetically modified crops by those crops that are genetically modified is for farmers to cooperate with each other in regard to planting practices.[111] This is known as coexistence, which deals with "economic consequences resulting from adventitious presence of material from one crop in another and is related to the principle that farmers should be able to cultivate freely the crops of their choice using the production system they prefer (GM, conventional or organic)."[112]

In 2005, three bills were adopted in Hawaii that promoted coexistence, an emerging new theme in state legislation.[113] All three bills encourage support by the legislature and the state's agricultural community for coexistence so that genetically modified crops may be grown along with organic and convention crops.[114] One of the pieces of legislation, Senate Concurrent Resolution 208, adopted by both houses, contains language asking Hawaii's Department of Agriculture to report to the legislature "plans to ensure success and co-existence among Hawaii's diverse agricultural interests."[115]

Two possible coexistence methods that farmers can use to minimize adventitious presence caused by pollen drift in their crops, are spatial and temporal isolation methods.[116] Suppliers in the United States who sell genetically modified seed to farmers give them a guide that provides recommendations both on using the seed as well as these coexistence practices.[117] Included in the guides are suggestions on techniques for reducing crop contamination using segregation, buffer crops and barriers and controlling the timing of the planting.[118]

Segregation of the crops requires a great deal of knowledge about both the farmer's own crops and farm production systems, as well as their neighbors'

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111. Kershen & McHughen, *supra* note 38, at 2.

112. BROOKES, *supra* note 37, at 3.

113. *See* PEW INITIATIVE ON FOOD AND BIOTECHNOLOGY, LEGISLATIVE ACTIVITY 2001-2006 RELATED TO AGRICULTURAL BIOTECHNOLOGY 14 (2006), *available at* http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Fact_Sheets/Food_and_Biotechnology/PIFB_Legislative_Tracker.pdf (noting that H.R. 194, S.R. 115 and S.C.R. 208 passed, all of which promote coexistence).

114. *See id*.

115. S.C.R. 208, 23rd Leg., Reg. Sess. (Haw. 2005).

116. *See* MARK WESTGATE, GROWING GENETICALLY ENGINEERED (GE) AND CONVENTIONAL CROPS SIDE BY SIDE 5 (2005), *available at* http://legis.state.ia.us/lsadocs/IntComHand/2006/IHDLA017.pdf.

117. BROOKES, *supra* note 37, at 10.

118. *Id*.

growing production practices.[119] Buffer crops are rows of other plant species that shield the crops to be protected from contamination through pollen drift.[120] Natural barriers such as mountains and rivers are also a possibility for a buffer zone as long as they would protect the non-genetically modified crops from pollen drift contamination.[121] The timing of the planting of the crops is another way in which farmers can cooperate to try and lessen the effects of pollen contamination.[122] Farmers growing non-genetically modified crops can plant at different times so that the pollination period will not overlap with the pollination period of nearby farms that grow genetically modified crops.[123]

One of the biggest hurdles for coexistence is the economic cost associated with it, especially for smaller producers.[124] For example, small organic farm operations might have limited space and thus would not be able to spare the extra land necessary to plant a buffer.[125] Proponents of genetically modified crops point out that a zero threshold, discussed *supra*, cannot exist because it is impossible to achieve total purity of crops, and thus thresholds are currently set between one percent and five percent.[126] The more pure that a producer wants a crop to become, the more expensive that process will be.[127] The argument that the cost is high for organic producers to coexist could be defeated by the explanation that in the past, the burden has fallen upon the producer of specialty crops, like organic crops and seed to shield their crops from contamination.[128] An additional problem is that the federal government has chosen to stay out of regulating coexistence issues.[129] Perhaps the reason for this is that because the majority of consumers do not wish to avoid genetically modified crops, the government feels that the market can work itself out on the issue.[130]

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119. *See* N.D. STATE UNIV. EXTENSION SERV., SUGGESTED BEST MANAGEMENT PRACTICES FOR THE COEXISTENCE OF ORGANIC, BIOTECH AND CONVENTIONAL CROP PRODUCTION SERVICES 4 (2003), *available at* http://www.ag.ndsu.nodak.edu/coexistence/a1275.pdf.

120. Harrison, *supra* note 32.

121. *See* Harl, *supra* note 66, at 20.

122. Friedland, *supra* note 30, at 430-31.

123. *Id*. at 431.

124. *See* Harrison, *supra* note 32.

125. *See id*.

126. *See* BROOKES, *supra* note 37, at 17.

127. *Id*. at 14 (explaining that the tighter the threshold, the higher the cost for producing that product).

128. *See id*. at 16 (noting that the market has historically dealt with issues of economic liability by having the organic producer pay the costs of defending the purity of their crop in exchange for receiving a higher value for it when it is sold.).

129. *See* Endres, *supra* note 110, at 206-07.

130. *Id*. at 232 (explaining that many consumers are ambivalent towards genetically modified organisms and this is why the government has a "laissez faire" approach to coexistence).

B. *Grain Integrity Indemnity Fund*

An idea that was proposed by the Iowa General Assembly as a solution for economic protection of crop contamination of non-genetically modified crops is a grain integrity indemnity fund.[131] The grain integrity indemnity fund is modeled after Iowa's grain indemnity fund,[132] which is a fund created by assessing a fee on licensed grain deals and warehouse operators on a quarterly basis.[133] If a financial loss occurs, the farmer may file a claim against the grain depositors and sellers indemnity fund.[134] Like the grain indemnity fund, the proposed grain integrity indemnity fund would assess fees on each bushel of grain sold in the state, which would then go into the fund.[135] The proposed legislation also provided support to corn and soybean farmers who suffered losses as a result of contamination.[136]

A major problem with the grain indemnity fund is that it does not punish the neighboring farms that caused the pollen contamination of the non-genetically modified crops.[137] While it does not hold the manufacturers who cause the damage liable for the injury, the plan does protect the innocent farmer from financial loss which is what the farmer is seeking when their crops are rendered unusable due to contamination through pollen drift.[138] The bill proposing the grain integrity indemnity fund did not pass out of subcommittee and has not been reintroduced in Iowa since 2004.[139]

C. *Liability Legislation*

In the past few years there has been an increasing amount of state legislative activity dealing with biotechnology.[140] The federal government has taken little action involving the regulation of agricultural biotechnology, so state legislatures are stepping in to handle the issues affecting farmers as a result of biotechnology.[141] The types of issues that state legislatures are addressing have

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131. *See* H.F. 108, 80th Gen. Assem., Reg. Sess. (Iowa 2003).
132. Hamilton, *supra* note 70, at 54.
133. IOWA CODE § 203D.3 (2005).
134. *Id.* at § 203D.6.
135. H.F. 108, 80th Gen. Assem., Reg. Sess. (Iowa 2003).
136. *Id.*
137. Hamilton, *supra* note 70, at 54.
138. *See id*. at 54-55 (noting that the farmers avoid a battle in the courtroom to prove causation and damages).
139. H.F. 108, 80th Gen. Assem., Reg. Sess. (Iowa 2003).
140. *See* Strauss, *supra* note 19, at 188 (noting that the higher number of bills show that state legislators are more interested in biotechnology issues).
141. *Id.*

evolved recently.[142] While the majority of the proposed bills are supporting biotechnology, primarily because biotechnology plays a role in economic development,[143] in the past couple of years state legislatures have seen more legislation dealing with liability and contract issues.[144]

The California Assembly introduced a piece of legislation in 2005 that would hold a genetically modified manufacturer liable for contamination of organic or conventional crops.[145] Assembly Bill 984, known as the Food Integrity and Farmer Protection Act, would protect farmers from contamination caused by genetically modified pollen drift, as a result of the negative impact it has on growers of organic crops and foreign markets.[146] Because California is one of the largest producers of organic crops in the United States, the state wants to protect its farmers from damage to their crops as a result of pollen drift.[147] The legislation hoped to shield "innocent farmers and farm businesses" from liability for contaminated crops and to instead hold the manufacturers of genetically modified crops liable.[148] The bill would have required the guilty party to pay for the losses suffered by the non-genetically modified grower.[149]

In 2006, the Vermont General Assembly also introduced a bill relating to liability for crop contamination that passed in both houses.[150] The bill, similar to the one introduced by California, notes that Vermont has a great economic interest in agriculture as well as the desire to allow farmers to run their farms as they best see fit.[151] The intent of Senate Bill 18 was to "codify farmers' ability to recover economic losses caused by the wrongful action of others" as well as to provide remedies for non-genetically modified producers so that they might be able to grow their products without fear of contamination.[152] However, Senate Bill 18 was vetoed by the Governor in 2006.[153]

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142. *See id*. at 189.

143. *Id*. at 188-89 (explaining that out of a total of thirty-seven bills passed in 2003-2004, twenty-one of them were supporting biotechnology.).

144. *Id*. at 189.

145. PEW INITIATIVE ON FOOD AND BIOTECHNOLOGY, *supra* note 113, at 3.

146. Assem. B. 984, 2005 Leg., Reg. Sess. (Cal. 2005).

147. *See generally* Assem. B. 984, 2005 Leg., Reg. Sess. (Cal. 2005) (noting that in 2003 California produced organic crops totaling 605 million dollars).

148. Assem. B. 984, 2005 Leg., Reg. Sess. (Cal. 2005).

149. Assem. B. 984, 2005 Leg., Reg. Sess. (Cal. 2005).

150. S. 18, 2005 Leg., Reg. Sess. (Vt. 2006).

151. S. 18, 2005 Leg., Reg. Sess. (Vt. 2006); *see* Assem. B. 984, 2005 Leg., Reg. Sess. (Cal. 2005).

152. S. 18, 2005 Leg., Reg. Sess. (Vt. 2006).

153. The Vermont Legislative Bill Tracking System, http://www.leg.state.vt.us/database/status/summary.cfm?Bill=S%2E0018&Session=2006 (last visited August 9, 2008).

State legislation seeking to hold manufacturers of genetically modified crops liable provides what the grain integrity indemnity fund plan did not provide. The producers of non-genetically modified crops are entitled to recovery for their economic losses, as well as holding the manufacturers responsible for those losses.[154] Through these proposed bills, organic and conventional farmers are protected from contamination caused by pollen drift. While there is yet to be legislation passed in a state that completely protects these farmers in such a manner, the fact that there is an increase in this type of legislation shows that it will perhaps begin to happen in the future.

VI. CONCLUSION

Pollen drift caused by genetically modified organisms can result in economic harm to farmers of organic and conventional crops. While there are several different solutions, the best one for compensating farmers is through state legislation that will allow the injured farmer to recover while holding the party that caused the contamination liable for the damage.

Farmers can seek compensation for losses by bringing a tort lawsuit against the genetically modified crop grower who was responsible for the pollen drift.[155] However, as it is often difficult to establish the necessary elements of trespass, strict liability, and private nuisance, this is not the best option for handling the emerging crop contamination problem. Nor is the grain integrity indemnity fund the best possible option. The indemnity fund idea would allow farmers to recover for their economic loss due to contamination caused by pollen drift.[156] However, this allows the growers or manufacturers of the genetically modified crops to escape any liability whatsoever, thus allowing them to continue their practices.[157]

In order to protect both the conventional and organic farmers as well as hold the growers or manufacturers liable for their harm, the best solution is to pass state legislation that will make those who cause the harm liable for the damage caused to non-genetically modified growers. While legislation promoting coexistence is helpful, it does not hold the proper party responsible for causing harm to the innocent farmers. Only by enacting legislation such as the type introduced by Vermont and California in 2005 will states truly protect the non-

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154. S. 18, 2005 Leg., Reg. Sess. (Vt. 2006), Assem. B. 984, 2005 Leg., Reg. Sess. (Cal. 2005), H.F. 108, 2003 80th Gen. Assem., Reg. Sess. (Iowa 2003).

155. Friedland, *supra* note 30, at 428.

156. Hamilton, *supra* note 70, at 55.

157. *Id*. at 54.

genetically modified growers from further harm by making proper party pay for the damages caused.