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Transgenic Transboundary Pollution: Liability when Genetically Modified Pollen Crosses National Borders

*Teal O. Miller**

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I. INTRODUCTION

Over the past few decades genetically modified organisms (GMOs) have become pervasive in agriculture.¹ In 2013, 433.2 million acres were planted with genetically modified crops in twenty-seven countries.² This figure has grown

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1. Clive James, ISSA BRIEF NO. 49: GLOBAL STATUS OF COMMERCIALIZED BIOTECH/GM CROPS: 2014 1 (ISAAA 2014), available at <http://isaaa.org/resources/publications/pocketk/16/default.asp> (on file with *The University of the Pacific Law Review*).

2. *Id.* at 2.

exponentially from just 4.3 million acres planted in 1996.³ Proponents of the spread of genetically modified (GM) crops argue that these crops—with their increased yield, resistance to pests and pesticides, and drought resistance—are the answer to world issues such as hunger and famine.⁴ Further, the future of transgenic⁵ crops likely includes using plants as production methods for pharmaceuticals and industrial compounds.⁶ However, others take a more cautious approach to GM crops; they warn that there are unknown risks posed to the environment, human health, and genetic diversity among our food crops.⁷

Because of these concerns, many countries still treat GM crops with caution.⁸ Notably, the European Union (EU) has applied the precautionary principle to the introduction of genetically modified products and crops into the market.⁹ This principle allows participating countries to stop the dissemination of GM products if there is a concern for the safety of the public or the environment.¹⁰ Countries may ban such products even if there is not enough data to allow a risk analysis and assessment with sufficient certainty.¹¹ Europe is not alone in its cautionary approach; Mexico, while not as staunchly anti-GMO as the EU, has put a ban on the growth of genetically modified maize.¹² This ban stems from a concern for the genetic diversity of corn in its birthplace and for the cultural implications of growing GM maize.¹³ Corn's "agronomic and nutritive qualities and the mechanisms of reproduction . . . make maize populations especially diverse,

3. *Id.*

4. Sean D. Murphy, *Biotechnology and International Law*, 42 HARV. INT'L L.J. 47, 47 (2001).

5. "Transgenic" refers to organisms that have had genetic material from other organisms of different species intentionally inserted into their genomes. Most GMOs are transgenic and I use the terms interchangeably here.

6. Rebecca M. Bratspies, *Consuming (F)ears of Corn: Public Health and Biopharming*, 30 AM. J.L. & MED. 371, 371 (2004); Glynis Giddings et al., *Transgenic Plants as Factories for Biopharmaceuticals*, 18 NATURE BIOTECHNOLOGY 1151 (2000); Maria Gavilescu & Yusuf Christi, *Biotechnology—A Sustainable Alternative for Chemical Industry*, 23 BIOTECHNOLOGY ADVANCES 471 (2005).

7. Murphy, *supra* note 4.

8. *Id.*; Panel Report, *European Communities—Measures Affecting the Approval and Marketing of Biotech Products*, WT/DS/291/R, WT/DS/292/R, WT/DS/293/R (Sept. 29, 2006), available at http://www.wto.org/english/news_e/news06_e/291r_e.html (on file with *The University of the Pacific Law Review*).

9. COMM'N OF THE EUR. COMMUNITIES, COMMUNICATION FROM THE COMMISSION ON THE PRECAUTIONARY PRINCIPLE 2 (2000), available at <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52000DC0001> (on file with *The University of the Pacific Law Review*).

10. *Id.* at 7.

11. *Id.* The EU's practice of allowing complete bans on genetically modified products goes far beyond what is allowed under the GATT-WTO Regime. In a dispute brought by the United States, Canada, and Argentina against the EU for its de facto moratorium on GM products, the WTO decided that such a moratorium was unacceptable because of the limits it put on free trade. Panel Report, *supra* note 8.

12. Antonio Turrent & Jose Antonio Serratos, *Context and Background on Maize and its Wild Relatives in Mexico*, in MAIZE AND BIODIVERSITY: THE EFFECTS OF TRANSGENIC MAIZE IN MEXICO 1 (2004); EDIT ANTAL ET AL., MAIZE AND BIOSECURITY IN MEXICO: DEBATE AND PRACTICE 17 (2007).

13. *Infra* Part II.

dynamic, and susceptible to the unintended incorporation of genetically altered traits.”¹⁴

One risk of genetically altered crops is the spread of altered genes to neighboring conventional crops or to different species.¹⁵ Plants reproduce through cross-pollination, and, depending on the species, pollen is carried from plant to plant and field to field, by birds, insects, and even wind.¹⁶ Corn, the focus of this Comment, disperses its pollen through wind transfer.¹⁷ Corn pollen can travel a half-mile in two minutes with fifteen miles-per-hour winds.¹⁸ Under the correct conditions this distance can increase dramatically. This means pollen from genetically altered corn grown in one field can pollinate neighboring farms and crops far away.¹⁹ This pollen drift presents a problem when GM crops are planted close to borders with other nations, like Mexico, that have bans on genetically modified crops.²⁰

This Comment looks into the implications of genetically modified pollen crossing borders and discusses the application of transboundary pollution law to such situations. Nations that allow the growth of transgenic crops may be liable for the spread of transgenes to the non-GMO crops of neighboring countries. These implications will be explored using the United States-Mexico border as a test case.²¹ Part II will focus on Mexico’s ban on GMO maize, its rationale, and the implications that allowing growth of GMO maize would have on Mexican society.²² Part III examines existing international law regulating and assigning liability for transnational pollution and how these laws and treaties might be applied to the spread of GM pollen across the United States-Mexico border.²³ Part IV looks into what existing agencies in the United States might be best able to create policies to minimize or avoid liability that could arise from transboundary spread of genetically modified pollen.²⁴

14. Kathleen McAfee, *Beyond Techno-Science: Transgenic Maize in the Fight over Mexico’s Future*, 39 GEOFORUM 148, 149 (2008).

15. Turrent & Serratos, *supra* note 12.

16. Jessica Lynd, Comment, *Gone with the Wind: Why Even Utility Patents Cannot Fence in Self-Replicating Technologies*, 62 AM. U. L. REV. 663, 666 (2013).

17. KENT BRITTAN, METHODS TO ENABLE THE COEXISTENCE OF DIVERSE CORN PRODUCTION SYSTEMS, AGRIC. BIOTECH. IN CAL. SERIES, PUBLICATION 8192 1 (2006).

18. *Id.* at 2.

19. ANTAL ET AL., *supra* note 12, at 59.

20. See *Corn Production*, TEX. CORN PRODUCERS (last visited Oct. 12, 2014), <http://texascorn.org/learn-more/corn-production/> (on file with *The University of the Pacific Law Review*) (indicating counties along the United States-Mexico border with high corn production); see also USDA FOREIGN AGRIC. SERV., COMMODITY INTELLIGENCE REPORT (Aug. 12, 2012), available at http://www.pecad.fas.usda.gov/highlights/2012/08/Mexico_corn/ (on file with *The University of the Pacific Law Review*) (showing Mexican States with high corn production, including those along the border).

21. *Infra* Part II.

22. *Infra* Part II.

23. *Infra* Part III.

24. *Infra* Part IV.

II. MEXICO'S BAN ON GM MAIZE

This section discusses the importance of maize to the Mexican culture and the interests involved in Mexico's decision to limit the growth of GM maize. Part A delves into the history of maize in Mexico and Part B discusses the current conflict surrounding the ban on growing GM maize.

A. *A Culture of Corn*

Corn holds a unique place in Mexican culture.²⁵ People in Mexico cultivated corn thousands of years ago from teosinte, a plant that still exists, but bears only a remote resemblance to the corn that is grown today.²⁶ As the birthplace of maize, there are hundreds of unique landraces²⁷ grown in Mexico.²⁸ Generations of farmers have cultivated these landraces, and today, small and subsistence farmers grow them all over the country.²⁹ The genetic diversity of maize grown in Mexico is immense, and this diversity is critical to maintain the world's food sources.³⁰ As agricultural crops become more homogenous, they become much more susceptible to pests and disease.³¹

Mexico not only has an interest in preserving diversity, but also in maintaining its economy.³² Small and subsistence farmers throughout Mexico depend on their corn to survive.³³ These farmers, or campesinos, live off of their crops and save seeds to plant year after year.³⁴ This style of cultivation is very different from industrial cultivation, which uses commercial hybrid seed.³⁵ This commercial seed has to be purchased anew each year because the seeds cannot be collected for replanting in the next year.³⁶

Mexico produces corn at all production levels, from campesino to industrial farmers.³⁷ Corn accounts for more than half of the cultivated land in Mexico and "is the most important crop in Mexico in terms of area sown, production value,

25. ANTAL ET AL., *supra* note 12, at 2.

26. Turrent & Serratos, *supra* note 12.

27. Landrace is defined as a traditional, open-pollination variety of a crop, here, corn. Kristin L. Mercer & Joel D. Wainwright, *Gene Flow from Transgenic Maize to Landraces in Mexico: An Analysis*, 123 AGRIC. ECOSYSTEM ENV'T 109 (2008).

28. Turrent & Serratos, *supra* note 12, at 9.

29. Stephen Brush & Michelle Chauvet, *Assessment of Social and Cultural Effects Associated with Transgenic Maize Production*, in MAIZE AND BIODIVERSITY: THE EFFECTS OF TRANSGENIC MAIZE IN MEXICO 7, 23 (2004).

30. Murphy, *supra* note 4, at 95-97.

31. *Id.*

32. Turrent & Serratos, *supra* note 12.

33. Brush & Chauvet, *supra* note 29, at 25.

34. *Id.*

35. *Id.* at 10.

36. *Id.* at 10.

37. *Id.* at 7.

and personnel employed.”³⁸ For smaller producers, who account for sixty percent of Mexico’s maize producers, corn is more than a commodity; it is a keystone of the country’s culture.³⁹

B. The Mexican Ban on Transgenic Maize Cultivation

In 1998, Mexico adopted a moratorium on growing GM corn.⁴⁰ This was a result of many factors, one of which was the enforcement of the North American Free Trade Agreement (NAFTA), which went into effect in 1994.⁴¹ This agreement phased out import tariffs that had been in place for more than fifteen years and protected Mexican maize producers against competition from cheaper United States grain products.⁴² With NAFTA in place, Mexico quickly became a major export market for United States maize and by 2000 it had become the second most important market behind Japan.⁴³ The United States does not separate transgenic corn from conventional corn during shipment, processing, milling, or packaging.⁴⁴ “Thus, all exports of United States maize grain . . . are likely to contain or be derived partially from transgenic crops.”⁴⁵

With this influx of transgenic maize, meant only for consumption or animal feed, the Mexican government and scientists anticipated that some of these transgenic seeds would be planted. This was of concern because:

[M]aize pollen carr[ies] transgenes over relatively long distances, [so] they knew that transgenic maize was likely to cross-pollinate with local varieties, transferring genetically engineered traits to those varieties. To prevent this, at least until its consequences were better understood, in 1998 Mexican authorities placed a de facto moratorium on planting of transgenic maize.⁴⁶

This moratorium remained in effect until 2004,⁴⁷ but it was not enough to stop transgenes from entering the maize population.⁴⁸ In 2001, a University of California, Berkeley-based researcher found transgenes in the corn being grown

38. *Id.* at 10.

39. *Id.* at 25.

40. Turrent & Serratos, *supra* note 12.

41. McAfee, *supra* note 14, at 150–51.

42. *Id.* at 150.

43. *Id.*

44. *Id.* at 151.

45. *Id.*

46. *Id.*

47. ANTAL ET AL., *supra* note 12, at 20.

48. Dr. Andrew W. Torrance, *Planted Obsolescence: Synagriculture and the Law*, 48 IDAHO L. REV. 321, 325 (2012).

in Oaxaca.⁴⁹ This discovery sparked controversy and a number of additional studies.⁵⁰ Not all of these studies found transgenes, but each study used different sampling techniques, sample sizes, and sample fields, which contributed to the differing findings.⁵¹ The Commission for Environmental Cooperation (CEC), established by the North American Agreement for Environmental Cooperation (NAAEC),⁵² conducted an in-depth study of the effects of transgenic maize in Mexico and found that transgenes existed in the Mexican maize population and that it is probably impossible to completely remove them.⁵³

Finding transgenes in the native populations of maize did not end the moratorium; it stayed in place until 2004 when Mexico passed the Law on the Biosecurity of Genetically Modified Organisms.⁵⁴ This law seeks to prevent, avoid, or reduce the risks that the release of GMOs into the Mexican market and environment might cause.⁵⁵ The law lays out a procedure for the introduction of GMOs: all new transgenic crops must be evaluated and must be planted first in controlled plots to determine if it is safe to commercialize the product.⁵⁶

Despite the law's attempt at comprehensive regulation of GMO introduction, critics state:

[O]ne single law cannot at the same time promote a technology and establish mechanisms for biosecurity; the law provides for very little public participation . . . there are serious doubts as to the possibility of coexistence between GMOs and traditional organisms, especially in the case of corn, given open pollination; the burden of proof rests with the industry, which can not be both judge and interested party; the law does not include mechanisms for avoiding conflicts of interest . . . it does not respect the Cartagena Protocol because it fails to include compensation for harm caused and the establishment of funds for incidental expenses.⁵⁷

After the implementation of this law, three of the main agro-industrial firms with a presence in Mexico—Dow, Monsanto, and Pioneer—applied for approval

49. *Id.*

50. Mercer & Wainwright, *supra* note 27, at 110.

51. *Id.* at 110–11.

52. NAAEC is a multinational body formed as part of NAFTA, which addresses environmental concerns between Canada, the United States, and Mexico.

53. Turrent & Serratos, *supra* note 12; McAfee, *supra* note 14, at 152.

54. ANTAL ET AL., *supra* note 12, at 20; Ley sobre Bioseguridad de Organismos Genéticamente Modificados [LBOGM] [Law on Biosafety of Genetically Modified Organisms], Diario Oficial de la Federación [DO], 2004, available at <http://www.salud.gob.mx/unidades/cdi/nom/compi/ley180305.html> (on file with *The University of the Pacific Law Review*).

55. *Restrictions on Genetically Modified Organisms: Mexico*, LIBR. OF CONG. (last visited Nov. 11, 2014) available at <http://www.loc.gov/law/help/restrictions-on-gmos/mexico.php> (on file with *The University of the Pacific Law Review*).

56. *Id.*; ANTAL ET AL., *supra* note 12, at 21.

57. ANTAL ET AL., *supra* note 12, at 22.

to plant transgenic maize.⁵⁸ The Mexican government approved a number of these applications allowing experimentation with transgenic corn in the Mexican states of Sinaloa, Sonora, and Tamaulipas.⁵⁹ However, these experiments were halted in October 2013 when a federal judge issued an injunction as part of an ongoing lawsuit.⁶⁰

This lawsuit was brought as a class action against the two Mexican governmental agencies charged with assessing and approving experimental planting of GMOs.⁶¹ A collection of citizens and organizations who wanted to protect the native landraces of maize from the possibility of cross-pollination by transgenic maize brought the case.⁶² They claimed, “transgenic maize threatens the biodiversity of traditional varieties grown by subsistence farmers and smallholders throughout Mexico.”⁶³ Since the injunction, the court dismissed the lawsuit on other grounds including lack of standing on the part of the plaintiffs, but the plaintiffs have appealed and the fight in the courts over transgenic maize continues.⁶⁴

III. TRANSNATIONAL POLLUTION LAW AND THE SPREAD OF TRANSGENES

Environmental pollution is not something that can be kept within a nation’s borders.⁶⁵ One country’s water and air pollution inevitably travels to its neighbors, impacting those ecosystems and populations.⁶⁶ Nations have addressed this issue in many ways such as creating treaties like the Cartagena Protocol and seeking arbitral decisions when disputes arise.⁶⁷ These laws, treaties, and

58. *Id.* at 17.

59. *Id.*

60. See *Restrictions on Genetically Modified Organisms: Mexico*, *supra* note 55 (issuing an injunction stopping genetically modified corn from being released).

61. Press Release, Semillas de Vida, Tribunal Federal Suspende Toda la Siembra de Maíz Transgénico (Oct. 10, 2013), available at <http://www.semillasdevida.org.mx/index.php/documentos/articulos/93-boletines-de-prensa/86-articulo-2-muestra> (on file with *The University of the Pacific Law Review*).

62. *Id.*; Laura Vargas-Parada, *GM Maize Splits Mexico*, 511 NATURE 16 (2014).

63. *Id.*

64. *Restrictions on Genetically Modified Organisms: Mexico*, *supra* note 55; Vargas-Parada, *supra* note 62.

65. See *Pulp Mills on the River Uruguay* (Arg. v. Uru.), Judgment, 2010 I.C.J. Rep. 14 (Apr. 20) (finding the spread between Argentina and Uruguay was a consequence of the mill); *Gabčíkovo-Nagymaros Project* (Hung./Slovk.), Judgment, 1997 I.C.J. Rep. 7 (Sept. 25) (arising from a dispute between Hungary and the Slovak Republic regarding the construction and operation of a system of locks impacting a transboundary river); Final Award, 20 Dec. 2013, *Indus Waters Kishenganga Arbitration* (Pak. v. India), available at http://www.pca-cpa.org/showpage.asp?pag_id=1392 (last visited Mar. 25, 2016) (on file with *The University of the Pacific Law Review*).

66. *Pulp Mills on the River Uruguay*, 2010 I.C.J. Rep. 14; *Gabčíkovo-Nagymaros Project*, 1997 I.C.J. Rep. 7; *Indus Waters Kishenganga Arbitration*, *supra* note 65.

67. Cartagena Protocol on Biosafety to the Convention on Biodiversity, pmbl., Jan. 29, 2000, 39 I.L.M. 1027 [hereinafter *Cartagena Protocol*]; *Pulp Mills on the River Uruguay*, 2010 I.C.J. Rep. 14; *Gabčíkovo-Nagymaros Project*, 1997 I.C.J. Rep. 7; *Indus Waters Kishenganga Arbitration*, *supra* note 65.

decisions have created a body of public international law that protects nations from the actions of their neighbors.⁶⁸ Nations extend this body of law as they become more aware of the effects of pollution and such laws can be applied to the unwanted spread of transgenes across borders.⁶⁹

A. *The Cartagena Protocol*

International agreements on biotechnology often cover only one of many concerns surrounding the creation, cultivation, and marketing to transgenic products.⁷⁰ As of yet, there is no comprehensive international regulatory scheme for the development and introduction of biotechnology.⁷¹ The Cartagena Protocol to the Convention on Biological Diversity is one agreement that has sought to develop regulations concerning the transboundary movement of GMOs.⁷² This protocol focuses mostly on the intentional transfer of living modified organisms (LMOs) across national borders.⁷³ It emphasizes and reinforces the precautionary principle, allowing parties to make decisions prohibiting the introduction of LMOs into their country even if there is a “[I]ack of scientific certainty due to insufficient relevant scientific information and knowledge regarding the extent of the potential adverse effects . . . on the conservation and sustainable use of biological diversity.”⁷⁴ This attention to the possible damage that an LMO may cause to a nation’s ecosystem allows each party to make individualized decisions regarding the import of any LMO.⁷⁵

The Cartagena Protocol also addresses the social ramifications of importing LMOs.⁷⁶ In making decisions on whether to allow the introduction of LMOs, a party may take into account “socio-economic considerations arising from the impact of living modified organisms on the conservation and sustainable use of biological diversity, especially with regard to the value of biological diversity to indigenous and local communities.”⁷⁷ This consideration is especially important to Mexico because of the central role that maize has in its culture and economy.⁷⁸

68. *See Pulp Mills on the River Uruguay*, 2010 I.C.J. Rep. 14 (exemplifying conflicts between nations and the use of public international law as a remedy); *Gabčíkovo-Nagymaros Project*, 1997 I.C.J. Rep. 7; *Indus Waters Kishenganga Arbitration*, *supra* note 65; *Cartagena Protocol*, *supra* note 67, at 1027 (an international agreement establishing laws and standards addressing biodiversity issues).

69. *Infra* Part III.C.

70. Murphy, *supra* note 4, at 48.

71. *Id.*

72. *Cartagena Protocol*, *supra* note 67.

73. *Id.*

74. *Id.*

75. *See id.* (examining damage and consequences to biosafety as they affect individual nations).

76. *Id.*

77. *Id.*

78. *Supra* Part II.

While this treaty, to which Mexico is a party but the United States is not, addresses some concerns surrounding transboundary movement of LMOs, it primarily focuses on intentional movement through trade from one party to another.⁷⁹ Article 17 of the Cartagena Protocol addresses unintentional transboundary movements, but again, this Article is more concerned with unintentional movements facilitated by people, such as accidental transport.⁸⁰ The Cartagena Protocol does not cover the spread of transgenes across borders through purely natural means, such as wind, nor does it address the liability stemming from such spread.⁸¹ There are, however, agreements and regulations in place regarding transboundary pollution more generally.⁸²

B. The Evolution of International Transboundary Pollution Law

“[N]o State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein.”⁸³ Thus declared the tribunal in the 1941 *Trail Smelter* arbitration between Canada and the United States, establishing a foundational principle of modern international environmental law.⁸⁴ A specially appointed arbitral panel held Canada liable for property damage in the United States caused by a smelting plant’s release of sulfur dioxide and established an operational regime for the prevention of future transboundary harm.⁸⁵

This decision rejected the notorious Harmon Doctrine of absolute territorial sovereignty.⁸⁶ U.S. Attorney General Judson Harmon articulated this doctrine in 1895 in response to a claim brought by Mexico against the United States.⁸⁷ Farmers along the Rio Grande in the United States were diverting large amounts of water for irrigation.⁸⁸ According to Mexico, this caused a substantial decrease

79. Cartagena Protocol, *supra* note 67.

80. *See id.* (establishing notification protocol in the event one nation should become aware of unintentional transboundary movements of LMOs).

81. *Id.*

82. Alexandre Kiss & Dinah Shelton, *Guide to International Environmental Law* 89–109 (George Washington University Law School, Working Paper No. 347, 2007).

83. *Trail Smelter*, (1949) 3 U.N.R.J.A.A. 1905 at p. 1965.

84. Austen L. Parrish, *Trail Smelter Déjà Vu: Extraterritoriality, International Environmental Law, and the Search for Solutions to Canadian-U.S. Transboundary Water Pollution Disputes*, 85 B.U. L. Rev. 363, 364 (2005).

85. *Id.* at 365.

86. Stephen C. McCaffrey, *The Harmon Doctrine One Hundred Years Later: Buried, Not Praised*, 36 NAT. RES. J. 965 (1996); *see also* Noah D. Hall, *Transboundary Pollution: Harmonizing International and Domestic Law*, 40 U. MICH. J.L. REFORM 681, 693–94 (2007) (addressing pollution across nations and the use of international and domestic law).

87. Treaty of Guadalupe Hidalgo-International Law, 21 Op. Att’y Gen. 274 (1895) [hereinafter Treaty of Guadalupe Hidalgo]; *see also* McCaffrey, *supra* note 86, at 72 (commenting on the development of the Harmon Doctrine); Hall, *supra* note 86, at 693–94.

88. Hall, *supra* note 86, at 693–94.

in the downstream water supply.⁸⁹ In response to Mexico's formal complaint about this water diversion, Harmon stated, "[t]he fundamental principle of international law is the absolute sovereignty of every nation, as against all others, within its own territory."⁹⁰ This doctrine in essence would have legitimized activities within the United States causing transboundary harm through damage to natural resources.⁹¹ The doctrine has been largely discredited and was never actually applied to the Rio Grande water dispute.⁹² In fact, while this dogmatic stance would seem to benefit the United States against Mexico, if it were applied to the northern neighbor, Canada, it would operate to the disadvantage of the United States with respect to water such as the Columbia River that flows from Canada into the United States.⁹³ Instead, the United States and Mexico resolved the dispute when they adopted a treaty that provided for the "equitable distribution of the waters of the Rio Grande."⁹⁴

The Harmon doctrine came under heavy criticism, even by the United States, and from the outset was largely ignored.⁹⁵ Instead, the *Trail Smelter* case became one of the most important cases in the development of international environmental law.⁹⁶ It established the principle that not only does each sovereign have a responsibility to ensure that its territory is not used "in such a manner as to cause injury" or damage to the environment or people of another country, but also that there will be liability for the violation of this tenet.⁹⁷ This case was the first international adjudicative decision that specifically addressed transboundary pollution,⁹⁸ and a number of international instruments have reaffirmed its basic holding.⁹⁹

89. *Id.*

90. Treaty of Guadalupe Hidalgo, *supra* note 87, at 281–82.

91. Hall, *supra* note 86, at 693–94.

92. *Id.*

93. *Id.*

94. Convention Providing for the Equitable Distribution of the Waters of the Rio Grande for Irrigation Purposes, U.S.-Mex., May 21, 1906, 34 Stat. 2953.

95. McCaffrey, *supra* note 86; Hall, *supra* note 86, at 693–94.

96. Kiss & Shelton, *supra* note 82, at 107.

97. *Trail Smelter*, (1949) 3 U.N.R.J.A.A. 1905 at p. 1965.

98. Subsequent international adjudicative decisions addressing transboundary pollution include: *Pulp Mills on the River Uruguay* (Arg. v. Uru.), Judgment, 2010 I.C.J. Reports 14 (Apr. 20); *Gabčíkovo-Nagymaros Project* (Hung./Slovk.), Judgment, 1997 I.C.J. Reports 7 (Sept. 25) (Final Award, Dec. 20, 2013), *Indus Waters Kishenganga Arbitration*, *supra* note 65.

99. *See, e.g.*, RESTATEMENT (THIRD) OF THE FOREIGN RELATIONS LAW OF THE UNITED STATES § 601(1) (1987) (incorporating the holding in *Trail Smelter* that a "state is obligated to take such measures as may be necessary, to the extent practicable under the circumstances, to ensure that activities within its jurisdiction or control . . . are conducted so as not to cause significant injury to the environment of another state or of areas beyond the limits of national jurisdiction."); United Nations Conference on Environment and Development, Rio de Janeiro, Brazil, June 3–14, 1992, Rio Declaration on Environment and Development, princ. 2, U.N. Doc. A/CONF.151/26, 31 I.L.M. 874, 876 (June 14, 1992) [hereinafter *Rio Declaration*] (integrating *Trail Smelter*'s holding into an international environmental agreement); *see also* Hall, *supra* note 86, at 699 (noting international instruments reaffirming *Trail Smelter*'s holding).

Many of the international conferences and agreements that propound the holding of *Trail Smelter* are considered “soft law” because they are nonbinding pronouncements of intent and thus do not have liability or remedies associated with them.¹⁰⁰ However, soft law may still influence states’ behavior and often contributes to the development of binding customary international law.¹⁰¹ Three such instruments are the Restatement (Third) of Foreign Relations Law of the United States,¹⁰² the Stockholm Declaration, and the Rio Declaration.¹⁰³ The Stockholm and Rio declarations were adopted at United Nations conferences on the environment in 1972 and 1992, respectively.¹⁰⁴ The Convention on Biological Diversity adopted at the Earth Summit in Rio eventually spawned the Cartagena Protocol regulating the intentional transboundary movement of LMOs discussed above.¹⁰⁵

C. Applying Transboundary Pollution Principles to Transgenes

The *Trail Smelter* case established more than a nation’s responsibility to use its own land in such a way so as to not harm neighboring countries, but also introduced the responsibility of a nation to control purely private conduct within its borders that might result in harmful transboundary consequences.¹⁰⁶ This focus on controlling the actions of individuals within a nation means that each country has a duty to protect its neighbors from negative environmental impacts.¹⁰⁷

The *Trail Smelter* decision was limited to air pollution, specifically the spread of sulfur dioxide across the United States-Canada border.¹⁰⁸ But, since then, the general proposition has been applied to a variety of situations including environmental damage from nuclear fallout and water pollution.¹⁰⁹ The

100. EDITH BROWN WEISS ET AL., INTERNATIONAL ENVIRONMENTAL LAW AND POLICY 189–91 (1998).

101. Andrew T. Guzman & Timothy L. Meyer, *International Common Law: The Soft Law of International Tribunals*, 9 CHI. J. INT’L L. 516, 517 (2008).

102. RESTATEMENT (THIRD) OF THE FOREIGN RELATIONS LAW OF THE UNITED STATES §601(1) (1987) (“A state is obligated to take such measures as may be necessary, to the extent practicable under the circumstances, to ensure that activities within its jurisdiction or control . . . are conducted so as not to cause significant injury to the environment of another state or of areas beyond the limits of national jurisdiction.”).

103. See Rio Declaration, *supra* note 99; see also Dinah Shelton, *Stockholm Declaration (1972) and Rio Declaration (1992)*, in *Encyclopedia of Public International Law* (2008).

104. *Id.*

105. Rio Declaration, *supra* note 99; Cartagena Protocol, *supra* note 67.

106. “[A] State owes . . . a duty to protect other States against injurious acts by individuals from within its jurisdiction.” *Trail Smelter*, (1949) 3 U.N.R.J.A.A. 1905 at p. 1963.

107. See *id.* (Internal regulations and administrative bodies should ensure that any activity performed within a country’s borders does not have deleterious effect on the environment at large, not just within the country).

108. *Id.*

109. Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226 (July 8); Pulp Mills on the River Uruguay (Arg. v. Uru.), Judgment, 2010 I.C.J. Reports 14 (Apr. 20); Gabčíkovo-Nagymaros Project (Hung./Slovk.), Judgment, 1997 I.C.J. Reports 7 (Sept. 25) (Final Award, Dec. 20, 2013), Indus Waters Kishenganga Arbitration, *supra* note 65.

International Court of Justice's advisory opinion on the *Legality of the Threat or Use of Nuclear Weapons* permanently established the *Trail Smelter* concept in international environmental law and stated that "[t]he existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment."¹¹⁰ A number of international decisions have cited this statement with approval.¹¹¹

By expanding the holding of *Trail Smelter* to more than just air pollution, international tribunals have resolved disputes between countries that arise from threats to the environment.¹¹² For example, a dispute arose between Argentina and Uruguay when Uruguay approved the construction of two pulp mills on the river that delineates the border between the two nations.¹¹³ Uruguay's decision allegedly threatened the ecosystem and violated a treaty of mutual use and protection of the river and its ecosystem.¹¹⁴ During its discussion of Argentina's allegations, the International Court of Justice considered the environmental effect that the mills' construction on the Uruguay side of the river might have on Argentina's environment.¹¹⁵ The court reiterated the prevention principles of *Trail Smelter* as well as in a subsequent decision, the *Coruf Channel* case,¹¹⁶ stating that "a State is thus obliged to use all the means at its disposal in order to avoid activities which take place in its territory . . . causing significant damage to the environment of another State."¹¹⁷ While the court did not ultimately find significant environmental damage, it did find procedural breaches of a treaty between Uruguay and Argentina that required each country to inform the other of any construction on the river.¹¹⁸ The court found that Uruguay failed to properly inform Argentina of the mill projects.¹¹⁹ Throughout the decision, the court emphasized that all nations must practice due diligence to ensure conduct within the boundaries of one nation do not negatively impact the environments of other

110. *Legality of the Threat or Use of Nuclear Weapons*, 1996 I.C.J. 226, *supra* note 109.

111. *E.g.*, *Pulp Mills on the River Uruguay*, 2010 I.C.J. Rep. 14 (basing a portion of analysis on this proposition); *Gabčíkovo-Nagymaros Project*, 1997 I.C.J. Rep. 7 (citing this proposition to emphasize the need to "look afresh at the effects on the environment"); *Indus Waters Kishenganga Arbitration*, *supra* note 65 (applying this international law).

112. *Pulp Mills on the River Uruguay*, 2010 I.C.J. Rep. 14; *Gabčíkovo-Nagymaros Project*, 1997 I.C.J. Rep. 7; *Indus Waters Kishenganga Arbitration*, *supra* note 65.

113. Only one of these mills was actually constructed and put into operation. *Pulp Mills on the River Uruguay*, 2010 I.C.J. Reports 14.

114. Statute of the River Uruguay, Uru.-Arg., Feb. 26, 1975, UNTS, Vol. 635, No. 9074, p. 98.

115. *Pulp Mills on the River Uruguay*, 2010 I.C.J. Reports 14.

116. *Trail Smelter*, (1949) 3 U.N.R.J.A.A. 1905; *see also* *The Corfu Channel Case (U.K. v. Alb.)*, 1949 I.C.J. Rep. at 22 (holding in the same decade as *Trail Smelter* that it is "every State's obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States").

117. *Pulp Mills on the River Uruguay*, 2010 I.C.J. Reports 14.

118. *Id.*

119. *Id.*

nations.¹²⁰ The court went so far as to require Uruguay to continuously monitor the impacts of the pulp mills to prevent such negative effects.¹²¹

Like the pulp mills in Uruguay, the spread of transgenes from crops planted in the United States near Mexico could have a significant negative effect both on Mexico's environment and economy.¹²² Under the public international law concepts established by *Trail Smelter* and subsequent cases, the United States has a responsibility to its neighbors to ensure that industries and practices inside the country do not have negative transboundary effects.¹²³ This responsibility should extend to ensuring that transgenes do not propagate in the crops of a neighboring country, especially if that country, like Mexico, has a specific ban on the growth of GMO plants.¹²⁴ Establishing this extension might require Mexico to show damage or threat of damage from contamination.¹²⁵ Given the importance of corn to Mexico's national identity and economy, proving damage would be only a small hurdle.¹²⁶

Furthermore, while the damage in *Trail Smelter* was based on physical damage inflicted on crops and trees,¹²⁷ society's current view on the environment has made damage to the environment itself, even without economic damage, a matter of international concern.¹²⁸ In *Gabčíkovo-Nagymaros Project*, the International Court of Justice emphasized that the protection of the environment is an "essential interest" of all nations.¹²⁹ The court stressed the importance of the environment, not only for individual nations but also for the whole of humankind.¹³⁰ Quoting from its opinion in *Threat or Use of Nuclear Weapons*, the Court stated:

[T]he environment is not an abstraction but represents the living space, the quality of life, and the very health of human beings, including generations unborn. The existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the

120. *Id.*

121. *Id.*

122. *Supra* Part II.

123. *See Trail Smelter*, 3 U.N.R.J.A.A. 1905 (requiring nations to ensure activity within a nation's borders to not negatively impact the environment of other nations).

124. *See Gabčíkovo-Nagymaros Project* (Hung./Slovk.), Judgment, 1997 I.C.J. Reports 7 (Sept. 25) (stating "in the field of environmental protection, vigilance and prevention are required on account of the often irreversible character of damage to the environment and of the limitations inherent in the very mechanism of reparation of this type of damage"); *Brush & Chauvet*, *supra* note 29, at 5 (noting the importance of maize to Mexico's economy and environment).

125. *See Trail Smelter*, 3 U.N.R.J.A.A. 1905 (liability and harm was based on economic damage to farms and timber forests).

126. *See supra* Part II (detailing the importance of maize to Mexico).

127. *Trail Smelter*, 3 U.N.R.J.A.A. 1905.

128. *Gabčíkovo-Nagymaros Project*, 1997 I.C.J. Reports at 41.

129. *Id.*

130. *Id.*

environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment.¹³¹

This new focus on environmental protection extends to protecting the genetic makeup and diversity of the environment.¹³² Allowing the homogenization of corn DNA in the birthplace of corn arguably has a negative effect on our environment that is far greater than transboundary pollution from a paper mill or smelting plant.¹³³

The *Pulp Mills* case went a step further than *Trail Smelter* holding, “[a] State is thus obliged to use *all the means at its disposal* in order to avoid activities which take place in its territory, or in any area under its jurisdiction, causing significant damage to the environment of another State.”¹³⁴ This sets out a high burden for countries. While the United States does have some regulations and regulatory bodies in place that control the creation, production, and growth of GM plants, they are fairly lax; also, the United States operates under a permissive system to promote the GM market.¹³⁵

D. The Political Harm Theory

The United States has a responsibility not to “use or permit the use of its territory in such a manner as to cause injury” to another state not only environmentally, but also politically.¹³⁶ One critic of United States’ GMO policy, Alison Peck, argues that the United States’ minimal regulations and politically motivated desire to trade GM products imposes on other nations’ political rights to determine how they accept or reject GM products.¹³⁷ GMOs cannot be contained, and most countries must deal with the adventitious presence of transgenes or “the unintentional and incidental commingling of trace amounts of one type of seed, grain or food product with another.”¹³⁸ Because trace amounts of transgenic products and seed cross borders, countries like Mexico must then

131. *Id.* (quoting Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, p. 242, para. 29 (July 8)).

132. *See* Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, 242, para. 29. (July 8) (reasoning there are elements that should be taken into account when implementing new rules and laws).

133. *See* Murphy, *supra* note 4, at 95–97 (describing the dangers of decreasing crop genetic diversity that may arise from GM crops); Nancy Ehrenreich & Beth Lyon, *The Global Politics of Food: A Critical Overview*, 43 U. MIAMI L. REV. 1, 12 (2011) (discussing the dangers presented to Mexican farmers by decreased genetic diversity of maize).

134. *Pulp Mills on the River Uruguay (Arg.v. Uru.)*, Judgment, 2010 I.C.J. Reports 14 (Apr. 20) at 56 (emphasis added).

135. *Infra* Part IV.

136. Alison Peck, *The New Imperialism: Toward an Advocacy Strategy for GMO Accountability*, 21 GEO. INT’L ENV’T L. REV. 37 (2008).

137. *Id.*

138. *Id.* at 38.

struggle with how to contain the contamination. The country's political right to determine whether to accept GM products is eviscerated and, instead, the country must find ways to handle the unwanted GM products that have inadvertently entered the country.¹³⁹ This diminishes a country's sovereignty over food crops and its ability to make cultural decisions.¹⁴⁰

Peck argues that framing the harm caused by the spread of GMOs as political gives nations that follow the precautionary principle a stronger argument against the United States' policies that promote the proliferation of GMOs in the international market.¹⁴¹ This is because the harm experienced politically is real and undeniable.¹⁴² For example, Brazil found trace amounts of GMOs in its crops and had to struggle with how to incorporate, contain, or control the spread of the modified genes.¹⁴³ Today, Brazil grows modified soybean, maize, and cotton, but the adventitious presences of GM crops that the government had not approved for any purpose took the decision out of Brazil's control.¹⁴⁴

This quantifiable and tangible harm could be a better tool to promote the precautionary principle than environmental harm.¹⁴⁵ Nations that fear the damage GMOs might cause face the issue that scientific evidence of these dangers does not currently exist and likely cannot, unless contamination in fact occurs.¹⁴⁶

Mexico has built a sense of identity and a culture around corn.¹⁴⁷ It is of utmost importance to many small farmers who have cultivated heirloom varieties that they be able to protect their heritage.¹⁴⁸ That protection hinges on Mexico's ability to ban the growth of GM maize and shield landraces from pollen drift and fertilization by GM pollen.¹⁴⁹

The United States' importation of GM corn into Mexico for use as feed and food threatens Mexico's ability to enforce a ban on the growth of GM maize.¹⁵⁰ Because the United States exports a significant amount of corn to Mexico and because the United States does not separate GM and non-GM seeds before export, it is impossible for the Mexican government to ensure that none of the GM seeds are planted, introducing transgenes into the native populations.¹⁵¹ This

139. *Id.*

140. *Id.*

141. *Id.*

142. *Id.*

143. *Id.*

144. *Id.*

145. *Id.*

146. *Id.*

147. Turrent & Serratos, *supra* note 12.

148. *Id.*

149. *Id.*

150. McAfee, *supra* note 14, at 150.

151. See Brush & Michelle Chauvet, *supra* note 29, at 25 (discussing the difficulties of ensuring that GM corn is not planted in Mexico under NAFTA); McAfee, *supra* note 14, at 150-51 (describing the difficulty of restricting GM maize growth in Mexico under NAFTA).

leads to the irreversible presence of transgenes in the population and strips Mexico of its power to determine whether to accept transgenic corn and its ability to protect the genetic identity and quality of its native corn.¹⁵² The Commission for Environmental Cooperation's report on the effects of transgenic maize in Mexico determined that Mexico had good reason to prohibit the growth of GM maize and, in order to accomplish this, corn imported from the United States should be milled to ensure that GM seeds could not be inadvertently planted.¹⁵³ If Mexico required imported corn to be milled, it would add a significant cost, but might allow Mexico to reclaim some of its political power to define its relationship with biotechnology and GM maize.¹⁵⁴

IV. MINIMIZING LIABILITY AND REGULATING THE TRANSNATIONAL SPREAD OF TRANSGENES

A. Regulations and Regulatory Bodies in the United States

In the United States, three agencies have been charged with ensuring the safety of GMOs.¹⁵⁵ The Environmental Protection Administration (EPA) is tasked with ensuring GMOs are safe for the environment; the United States Department of Agriculture (USDA) is responsible for ensuring that they are safe to grow; and the Food and Drug Administration (FDA) ensures that food and consumable products made from GMOs are safe for human ingestion.¹⁵⁶ Despite the involvement of three government agencies, production of transgenic crops in the United States is minimally regulated.¹⁵⁷ Once a product is approved for growth, farmers can plant with very little oversight.¹⁵⁸ This is in part because, from the outset of American GMO regulation in 1987, such regulations have been shaped by viewing GMOs as product-based, presuming a low risk from genetic modification, and a desire to "review GM products under existing federal"

152. See COMM'N FOR ENVTL. COOPERATION, MAIZE & BIODIVERSITY, THE EFFECTS OF TRANSGENIC MAIZE IN MEXICO; KEY FINDINGS AND RECOMMENDATIONS 25 (2004) (stating that Mexico cannot successfully keep modified genes out of its maize population if GM maize is imported)

153. See *id.* at 27 (noting that if all imported GM maize was milled, there would be no danger of modified genes entering the population).

154. See *id.* (stating that milling GM corn would reduce the chances of modified genes being introduced into the population).

155. Elizabeth G. Hill, Comment, *Nature's Harvest or Man's Profit: Environmental Shortcuts in the Deregulation of Genetically Modified Crops*, 44 TEX. TECH L. REV. 353, 366 (2012).

156. *Id.*

157. Emily Marden, *Risk and Regulation: U.S. Regulatory Policy on Genetically Modified Food and Agriculture*, 44 B.C. L. REV. 733, 734 (2003).

158. *Id.* at 733.

statutes.¹⁵⁹ This Comment argues that the EPA and the USDA are best positioned to address the spread of transgenes across the United States-Mexico border.¹⁶⁰

1. The EPA

When the regulatory framework was established in the mid-1980s, the EPA was only charged with applying existing pesticide laws to GM plants that produced a pesticide.¹⁶¹ The focus in the EPA, like the USDA and FDA, was on the end product—the pesticide produced—not on the plant itself or the effects of genetic drift on other life forms.¹⁶² Under existing law, the Federal Insecticide, Fungicide, and Rodenticide Act and the Federal Food, Drug, and Cosmetic Act, the EPA can assess the pesticides produced in plants and assign “tolerances” to these pesticides.¹⁶³ A tolerance is the permissible amount of pesticide residue in food items such that there is “reason[able] certainty that no harm will result” from consumption over a person’s lifetime.¹⁶⁴ This narrow scope of regulation came under fire in 1999 when a study showed that corn pollen from Bt corn¹⁶⁵ was dusting milkweed plants and killing monarch butterfly caterpillars.¹⁶⁶ This deleterious effect on a non-target species called into question the EPA’s policy to only look at the end product effect of plant-pesticides and not the overall effect on the environment.¹⁶⁷

The EPA’s strategy was again called into question by the Starlink crisis.¹⁶⁸ Starlink, a genetically modified corn hybrid, produces a plant-pesticide protein, Cry9C, much like Bt corn.¹⁶⁹ The Cry9C protein, however, was not given full approval for use in food.¹⁷⁰ Instead it was given “split registration,” which allowed the growth of Starlink corn, but limited its use to animal feed.¹⁷¹ The

159. *Id.*

160. Unlike the USDA and EPA, the FDA does not deal with issues of crop production, but rather with the sale of end product food. As such, the FDA is not poised to address the spread of transgenes because it focuses on the use of GMOs after they are harvested, not when they are planted and grown. However, because this is a matter that affects foreign countries it is likely that the State Department also has a part to play in developing policies regarding the transboundary spread of GMOs.

161. Marden, *supra* note 157, at 743.

162. 40 C.F.R. § 152.3 (2003).

163. 7 U.S.C. § 136 (2000); 21 U.S.C. § 346(a) (2000).

164. 21 U.S.C. § 346(c)(2) (2000).

165. Bt corn is a genetically modified strain of corn that produces a toxin commonly produced by a soil bacterium, *Bacillus thuringiensis*, which kills pests such as the corn borer. Ric Bessin, *Bt-Corn: What it is and How it Works*, COLLEGE OF AGRIC., FOOD AND ENV’T, UNIV. OF KY. (Jan. 22, 2013), <http://www2.ca.uky.edu/entomology/entfacts/ef130.asp> (on file with *The University of the Pacific Law Review*). Bt tends to affect larvae or caterpillars which otherwise would eat the corn. *Id.*

166. John E. Losey et al., *Transgenic Pollen Harms Monarch Larvae*, 399 NATURE 214 (1999).

167. Marden, *supra* note 157, at 780.

168. *Id.* at 781–83.

169. *Id.*

170. *Id.*

171. *Id.*

concern was that the Cry9C protein might cause allergies if ingested by humans because the protein could survive cooking and was difficult to digest.¹⁷² An independent testing laboratory discovered Cry9C contamination in Taco Bell taco shells.¹⁷³ This discovery showed that the EPA regulations and planting instructions were not effective and that transgenic plant products not approved for human consumption had entered the food chain.¹⁷⁴ While there were specifications for farmers growing Starlink, either the specifications were ineffective in and of themselves, or the farmers were not implementing them.¹⁷⁵ This allowed transgenes to contaminate conventional crops, a contamination that some thought was “inevitable given the lack of enforcement capacity of the EPA.”¹⁷⁶

Despite rising concerns about the environmental impact transgenic plants could have, the EPA has not changed its approach to regulating the production of such plants.¹⁷⁷ The EPA continues to focus on the risks of any pesticides genetically modified plants produce, not on the plants or genes themselves.¹⁷⁸ The EPA should have a more significant role in evaluating the impacts to the genetic diversity of food crops and the environment at large.¹⁷⁹ Without genetic diversity, ecosystems and farm crops become much more susceptible to diseases and pests.¹⁸⁰ In order for the United States to limit liability for damage caused by its transgenes in other countries, it must have a clear policy and procedure for introducing new GM plants into the environment and controlling the inevitable natural dissemination of transgenes into plant genomes.¹⁸¹ The EPA should focus its regulations not only on the effects of the pesticides produced by GMOs, but also on the plants themselves and the holistic effect they have on the greater environment.¹⁸² This more holistic view would increase the ability to control the dispersal of modified genes.¹⁸³

172. *Id.*

173. *Id.*

174. *Id.*

175. *Id.*

176. *Id.*

177. *Id.* at 784.

178. *Id.*

179. *Id.*

180. While transgenic techniques can be used to make crops more resistant to particular environmental factors it tends to decrease genetic diversity overall. The import of GM crops causes farmers to replace traditional crop varieties with GMOs, decreasing the overall genetic diversity and contributing to the loss of genes that may become necessary in the future to combat different environmental factors. Murphy, *supra* note 4, at 95–97.

181. See Alison Peck, *Leveling the Playing Field in GMO Risk Assessment: Importers, Exporters and the Limits of Science*, 28 B.U. INT’L. L.J. 241 (2010) (arguing that a more transparent policy on GMO production will increase the ability to control the spread of modified genes into non-modified plants).

182. *Id.*

183. *Id.*

This is especially the case when considering transgenic corn and its impact on Mexico.¹⁸⁴ The United States is the largest developer of biotechnology,¹⁸⁵ and as such, most new GM plants are developed with the U.S. ecosystem and farming systems in mind.¹⁸⁶ Additionally, not many food crops originate in the United States, and, as a result, there are few wild species that could crossbreed with GM crops.¹⁸⁷ However, that is not the case in Mexico.¹⁸⁸ As the birthplace of corn, it contains a huge diversity of genetics, a diversity that must be preserved.¹⁸⁹ The effect of a transgene contaminating plants in Mexico would likely have a much larger effect than in the United States.¹⁹⁰ This disparate impact is one of the many areas in which the EPA should have a larger role to discover and regulate.¹⁹¹

2. *The USDA*

At the outset of GM regulation, the USDA took the most cautious stance towards new genetically modified crops.¹⁹² Unlike the FDA and EPA, the USDA did not presume that existing regulations would be sufficiently broad to cover GMOs.¹⁹³ Instead, it created rules and regulations specific to the “importation, interstate movement, or release into the environment” of new genetically modified crops.¹⁹⁴ By defining new GM plants as “plant pests,” the USDA had the power to take remedial measures, including seizure, quarantine, or destruction of new GM crops per the Federal Plant Pest Act (FPPA).¹⁹⁵ Under the FPPA, the USDA required anyone who wanted to plant a new GMO to get a permit.¹⁹⁶ As the USDA gained experience with GMOs and experienced political pressure from GMO developers, it modified its regulations to be more in line with the policy of minimal regulation.¹⁹⁷

184. *See supra* Part II (discussing the impact transgenic maize would have on Mexico).

185. Peck, *supra* note 181, at 244.

186. NAT'L RES. COUNS., *FIELD TESTING GENETICALLY MODIFIED ORGANISMS: FRAMEWORK FOR DECISIONS* (National Academy Press 1989) [hereinafter *FIELD TESTING*].

187. *Id.*

188. Turrent & Serratos, *supra* note 12.

189. *Id.*

190. *See supra* Part II (discussing the impact of GM corn on Mexico); *see also* *FIELD TESTING*, *supra* note 186 (discussing the issues that arise from introducing new variants of corn to Mexico).

191. *See supra* Part II (discussing the impact of GM corn on Mexico); *see also* *FIELD TESTING*, *supra* note 186 (discussing the issues that arise from introducing new variants of corn to Mexico).

192. Marden, *supra* note 157.

193. *Id.*

194. Introduction of Organisms and Products Altered or Produced Through Genetic Engineering Which Are Plant Pests or Which There is Reason to Believe Are Plant Pests, 52 Fed. Reg. 22,908 (June 16, 1987).

195. 7 U.S.C. § 150(aa)-(jj) (repealed 2000).

196. Introduction of Organisms and Products Altered or Produced Through Genetic Engineering Which Are Plant Pests or Which There is Reason to Believe Are Plant Pests, 52 Fed. Reg. at 22,908.

197. Marden, *supra* note 157.

Over the next decade, the USDA became more lax with its regulations as it began granting some crops, including corn, non-regulated status.¹⁹⁸ Upon petition to the USDA, non-regulated status may be granted to those GM products that do not pose a “greater plant pest risk than the unmodified organism from which it derived.”¹⁹⁹ In 1997, the USDA expanded its non-regulated status to any modified organism “closely related” to a GM plant that had been granted non-regulated status.²⁰⁰ Thus, after the USDA approves one plant through the petition process, all a party with a new GM plant has to do is certify that it is “closely related” to the approved plant and the new GM plant will be exempt from regulation.²⁰¹

While the USDA has stepped back from its once precautionary view of GMOs, it still might be poised to address concerns of the transboundary spread of transgenes.²⁰² As the agency that regulates agriculture, it could adopt regulations that would decrease any chance of unwanted genes from crossing into Mexico.²⁰³ Creating a buffer of a few miles between any GM cornfields and the border would decrease any chance of cross-pollination.²⁰⁴ This could be important in regards to corn with genetics to produce biopharmaceuticals or industrial compounds, the next step in bioengineered plants.²⁰⁵

B. The Judiciary’s Role in Limiting Potential Liability

As genetically modified crops become increasingly common in the United States, transboundary pollination becomes more likely.²⁰⁶ Should this happen, under *Trail Smelter*, the United States is liable for any damage the spread of transgenes might cause.²⁰⁷ The United States might counter this liability if it reassesses its focus on the production and sale of new GM technologies.²⁰⁸ As discussed above, the U.S. regulatory policy on genetic modification has focused on the end product, not the recombined genes themselves.²⁰⁹ The U.S. regulatory scheme assumes that transgenes are not a threat to the environment because they

198. Genetically Engineered Organisms and Products; Notification Procedures for the Introduction of Certain Regulated Articles; and Petition for Nonregulated Status, 57 Fed. Reg. 53,036 (proposed Nov. 6, 1992) (to be codified at 7 C.F.R. pt. 340).

199. Marden, *supra* note 157, at 772.

200. 62 Fed. Reg. 23,945 (May 2, 1997) (to be codified at 7 C.F.R. pt. 340).

201. *Id.*

202. *See id.* (moving the USDA away from the precautionary principle).

203. *See id.* (requiring new GM plants to meet USDA standards).

204. *See* BRITTAN, *supra* note 17 (noting suggested distances between fields to avoid cross pollination).

205. Giddings et al., *supra* note 6; Gavilescu & Christi, *supra* note 6.

206. *See* Lynd, *supra* note 16 (noting the ease with which plants cross pollinate).

207. *See supra* Part III.B (discussing the implications of international transboundary pollution law).

208. *See* Marden, *supra* note 157 (arguing enhanced regulation of GMOs in the US would better address the issues raised by increasing use and numbers of GMOs).

209. *Id.*

are made up of the same components as naturally occurring genes.²¹⁰ This limited view may subject the United States to liability for any international environmental damage resulting from the transboundary migration of transgenic pollen.²¹¹ Evidence suggests that this relaxed view about the spread of transgenes might be changing.²¹²

In 2005, the Animal and Plant Health Inspection Service (APHIS)—the USDA branch that makes regulatory decisions about transgenic crops—approved a new Roundup Ready alfalfa for deregulation.²¹³ In order to deregulate a new crop, APHIS must complete an environmental assessment to determine if the new crop will significantly affect the environment.²¹⁴ If, during the environmental assessment process, substantial questions are raised as to the effect a new GM crop might have on the environment, APHIS must prepare an environmental impact statement to answer these questions before deregulating the crop.²¹⁵ APHIS prepared an environmental assessment and made the application public for comments before approving the alfalfa.²¹⁶ APHIS ultimately found no significant impact.²¹⁷ This finding allowed APHIS to forego preparing an environmental impact statement.²¹⁸ APHIS came to this conclusion despite the fact that 520 of the 663 comments submitted to APHIS opposed deregulation.²¹⁹

The concerns raised included probable contamination of non-GM fields with the transgene, the impact such contamination might have on organic farmers, and a possible increase in Roundup-resistant weeds caused by increased use of the herbicide.²²⁰ The environmental assessment disregarded these concerns and a group of farmers challenged the APHIS decision to deregulate without an environmental impact statement.²²¹

The case was taken before the United States District Court for the Northern District of California.²²² The question of whether the introduction of a GM crop might contaminate non-GM fields, thus diminishing or eliminating the availability of non-GM varieties, is a significant environmental impact requiring

210. *Id.*

211. *See supra* Part III (discussing liability that might be imposed by international transboundary pollution law); *see also* Peck, *supra* note 181 (arguing that increased regulation would help alleviate the dangers posed by GMOs).

212. *Geertson Farms Inc. v. Johanns*, No. C 06-01075 CRB, 2007 WL 518624 (N.D. Calif. Feb. 13, 2007).

213. *Id.* at *2.

214. *Id.*

215. *Id.*

216. *Id.*

217. *Id.*

218. *Id.*

219. *Id.*

220. *Id.*

221. *Id.*

222. *Id.*

the preparation of an environmental impact statement was one of first impression.²²³ The judge decided that such a threat to the environment, and by extension the value of farmers' crops and their personal choice of whether to grow GM plants, was significant enough to require a thorough investigation.²²⁴ In doing so, the court rejected a number of the government's arguments, including that the justification of the possible evolution of more herbicide resistant weeds was not a significant impact on the environment because weed species often develop such resistances.²²⁵ The court stated that such logic was "tantamount to concluding that because this environmental impact has occurred in other contexts it cannot be significant."²²⁶

The court also questioned the product-only focus of APHIS and its assumption that a recombined gene itself is not a threat to the environment.²²⁷ It stated that "[a]n action which potentially eliminates or least [sic] greatly reduces the availability of a particular plant—here, non-engineered alfalfa—has a significant effect on the human environment."²²⁸ This indicates that the spread of the transgene impacts the environment, and as such APHIS must first determine the extent of this impact before allowing commercial production.²²⁹ Moreover, the court noted that as "APHIS is operating in uncharted territory," it is not enough to rely on a record of potential spread, but new studies must be conducted.²³⁰

While the full impact of this case on the USDA's and EPA's practices is yet to be seen,²³¹ if this more cautious approach to releasing new GM plants into the environment is followed, the United States might be able to better limit its liability for any transboundary harm such crops might have.²³² Taking a more careful look at the possible spread of transgenes and using this information to regulate the planting and dissemination of such genes would go far to addressing the liability that transboundary pollution law could impose.²³³

223. *Id.*

224. *Id.*

225. *Id.*

226. *Id.*

227. *Id.*

228. *Id.*

229. *Id.*

230. *Id.*

231. Peck, *supra* note 181.

232. *See id.* (Increased regulation by the US could lessen the possible risks of the spread of GMOs).

233. *Supra* Part IV.

V. CONCLUSION

The spread of genetically modified plants is a global environmental issue.²³⁴ Keeping transgenes within a nation's borders is impossible;²³⁵ they spread not only through trade of foodstuffs, but also through natural means like the dispersal of pollen by wind and insects.²³⁶ Because of this, nations leading GM crop development must be thorough in their assessments of the environmental impacts of those crops.²³⁷ Moreover, these nations need to ensure that their policies and use of GM crops do not harm their neighbors environmentally, culturally, politically, or economically.²³⁸ Transboundary pollution law principles are applicable to the spread of transgenes and it follows that each nation must ensure that no activities involving GM crops occurring within its borders negatively affect its neighbors.²³⁹

As the leader in the development of new biotechnologies and transgenic crops, the United States holds the unique position of being the first to study and determine the risks of allowing a new transgenic crop to be planted.²⁴⁰ As of now, the United States has some of the world's lowest standards for allowing new GM crops into the market.²⁴¹ Because of international trade regulations, other countries that are more wary of transgenic crops have been required to lower their own standards and accept the import of GM products.²⁴² This allows the United States to set the bar on how in-depth a new GM crop and its effects on the environment must be examined before being commercialized.²⁴³ However, if such a new product does have a deleterious effect on the environment of the United States or a neighbor, such as Mexico, then the principles put forth in *Trail Smelter* and its progeny provide a basis for liability.²⁴⁴

234. See Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, 242, ¶ 29 (July 8) (making the responsibility of one nation to ensure activity within it does not harm another nation's environment a matter of international law).

235. Peck, *supra* note 181, at 38.

236. Lynd, *supra* note 16.

237. See Peck, *supra* note 181 (increased regulation will decrease the dangers posed by GMOs).

238. See *supra* Part III (discussing the application of transboundary pollution law to the spread of transgenes).

239. *Supra* Part III.B.

240. Peck, *supra* note 181, at 244.

241. See SHELBY FLINT ET AL., SUMMARY AND COMPARATIVE ANALYSIS OF NINE NATIONAL APPROACHES TO ECOLOGICAL RISK ASSESSMENT OF LIVING MODIFIED ORGANISMS IN THE CONTEXT OF THE CARTAGENA PROTOCOL ON BIOSAFETY, ANNEX III, SECRETARIAT OF THE CONVENTION OF BIOLOGICAL DIVERSITY (2012) (comparing the GMO regulations of a number of different nations).

242. See Peck, *supra* note 181 (noting the dominance of the US in the development and export of GMOs).

243. See *id.* (indicating that the US standard is imposed on other countries).

244. See *supra* Part III (discussing the applicability of international transboundary pollution law to GMOs).