

Shortcomings of the Cartagena Protocol: Resolving the Liability Loophole at an International Level

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ABSTRACT

The global community has recognized the promise and peril of genetically modified organisms (GMOs). To address biodiversity and human health concerns without completely stifling the progress of biotechnology, international states ratified the Cartagena Protocol on Biosafety in 2003. The Protocol required informed consent between exporters and importers of genetically modified agricultural seeds and also planned to adopt a regime for liability and redress by 2007. To date, a liability regime for GMOs has not been adopted. This Comment explores why the Cartagena Protocol needs a binding method for redressing harm from GMOs and examines the lessons learned from predecessor civil liability regimes in other environmental contexts. Based on these evaluations, the Comment concludes that the best model for GMOs is mitigated-strict liability with a compensatory fund.

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I.

INTRODUCTION

Genetically modified organisms (GMOs) evoke cultural, ethical and legal concerns on a global scale. To some, GMOs are a grand achievement of science, providing solutions to malnutrition, poverty and the rising costs of food production.¹ To others, GMOs open a Pandora's Box of health risks, biological mutation and unfair trade.² GMO is an umbrella term that encompasses Living Modified Organisms (LMOs) and bulk commodities.³ Both GMO types undergo genetic engineering processes to generate organisms with specific, desirable traits, but only LMOs have the ability to reproduce and grow.⁴ Additionally, LMOs

1. See John Kunich, *Mother Frankenstein, Doctor Nature, and the Environmental Law of Genetic Engineering*, 74 S. CAL. L. REV. 807, 807 (2001) (stating that genetically modified organisms could either be a "lifeline" or a "catastrophe" for the modern world).

2. DAVID HUNTER ET AL., *INTERNATIONAL ENVIRONMENTAL LAW AND POLICY* 85, 1059 (3d ed. 2007).

3. HUNTER, *supra* note 2, at 1064.

4. See Michael P. Healy, *Information Based Regulation and International Trade in Genetically Modified Agricultural Products: An Evaluation of the Cartagena Protocol on Biosafety*, 9 WASH. U. J.L. & POL'Y 205, 206, 214-15 (2002) (delineating between

are more commonly transported by natural elements like wind and insects.⁵ Bulk commodities are processed products made from mature organisms and are less likely to result in unintentional transboundary movement.⁶ The agricultural industry often relies on LMO seeds to increase crop yield, reduce dependency on pesticides and produce a more flawless product for commercial sale.⁷

Unknown to most Americans,⁸ it is fully permissible to use LMO seeds in the United States, and a significant percentage of conventional produce and grain grown domestically has been genetically enhanced.⁹ In the global community, however, these "Frankenfoods"¹⁰ are far from unanimously accepted. Both developing and developed countries may be found on either side of the debate.¹¹ Although health and environmental risks from LMO crops have not materialized into widespread, tangible problems,¹² many countries approach GMOs with trepidation.¹³

uses for "agricultural products" and for "animal feed and human consumption"); see also Elizabeth Duall, *A Liability and Redress Regime for Genetically Modified Organisms Under the Cartagena Protocol*, 36 GEO. WASH. INT'L L. REV. 173, 186 (2004) (explaining that harm from LMOs stems from their ability to "interact with other forms of life [and] reproduce").

5. See Gareth W. Schweizer, Note, *The Negotiation of the Cartagena Protocol on Biosafety*, 6 ENVTL. LAW. 577, 581 (2000) (warning that "bees or wind transfer" could inadvertently spread pollen from GMOs).

6. HUNTER, *supra* note 2, at 1064; Healy, *supra* note 4, at 206 (delineating between GMO products that are *released* into the environment as seeds, and those that are *shipped* for human or livestock consumption).

7. HUNTER, *supra* note 2, at 84–85.

8. Lars Noah, *Managing Biotechnology's [R]evolution: Has Guarded Enthusiasm Become Benign Neglect?*, 11 VA. J.L. & TECH. 4, 43 (2006).

9. See Kunich, *supra* note 1, at 812–13 (tracing the advent of U.S. transgenic crops in 1995 through the increasing usage trend); Noah, *supra* note 8, at 31–33 (explaining that the U.S. FDA takes the position that GMOs do not require a "distinct regulatory approach," similar to the approach used for food additives, because GMOs are descendent from whole foods, which are generally recognized as safe (GRAS)); see also HUNTER, *supra* note 2, at 1062 (stating that the U.S. produces "over 60% of the global [GMO] crop") (alteration in original); David Leonhardt, *Talks Collapse on U.S. Efforts to Open Europe to Biotech Food*, N.Y. TIMES, June 20, 2003, at A1 (stating that 40% of all corn produced in the U.S. is genetically modified).

10. Kunich, *supra* note 1, at 814 (internal citation omitted).

11. See HUNTER, *supra* note 2, at 1062, 1064 (explaining that many developing countries do not want to become "unwitting laboratories for the release of GMOs into the environment" and Europe also opposes unchecked use of GMOs in agriculture, while the United States is a major producer and proponent of GMO use); Kunich, *supra* note 1, at 814–19 (explaining that European nations have always resisted GMO products and groups in the United States recently have become more vocal about the negative aspects of the widespread use of transgenic produce).

12. HUNTER, *supra* note 2, at 1059; Duall, *supra* note 4, at 186 (stating that there are no "actual, realized generic harms associated with GMOs").

These countries adopt a view that genetic engineering technologies are too new and lack enough scientific evidence to prove they are safe.¹⁴ Opponents fear that significant reliance on GMOs for food production is shortsighted given the possibility of latent, adverse effects.¹⁵

To respect this precautionary stance and to prepare for the possibility of actual harms, the Cartagena Protocol on Biosafety ("Cartagena Protocol"),¹⁶ the international treaty that regulates the LMO trade, should enact a liability regime that offers remedy and redress for any adverse health and environmental effects caused by LMOs. Currently, the Cartagena Protocol requires an Advanced Informed Agreement (AIA) between parties wishing to import or export LMOs. The Protocol also establishes a Biosafety Clearinghouse for exchanging information about the use of LMO technologies and the execution of the Protocol.¹⁷ But the parties have yet to adopt a comprehensive liability regime.

Prior literature on the Cartagena Protocol has focused attention on these ratified sections of the international agreement, especially the AIA.¹⁸ Other articles have examined free trade concerns¹⁹ and causes of action for environmental damages based in tort under the Cartagena Protocol.²⁰ But the literature largely fails to examine the best way to create a liability regime *within* the construction of the Cartagena Protocol or evaluate the most recent strides the Protocol's drafters have made toward this goal.²¹ This Comment fills the literature gap by investigating

13. HUNTER, *supra* note 2, at 1064; Duall, *supra* note 4, at 183.

14. HUNTER, *supra* note 2, at 1064; Duall, *supra* note 4, at 183.

15. Duall, *supra* note 4, at 183; Kunich, *supra* note 1, at 817; *see also* Schweizer, *supra* note 5, at 583-84 (explaining that "unknown environmental risks [from GMOs] will only be discovered over time").

16. Cartagena Protocol on Biosafety to the Convention on Biological Diversity, Jan. 29, 2000, 39 I.L.M. 1027 [hereinafter Cartagena Protocol].

17. The Cartagena Protocol on Biosafety: Background, <http://www.cbd.int/biosafety/background.shtml> (last visited Nov. 17, 2008).

18. *See, e.g.*, Thomas P. Redick, *The Cartagena Protocol on Biosafety: Precautionary Priority in Biotech Crop Approvals and Containment of Commodities Shipments*, 18 COLO. J. INT'L ENVTL. L. & POL'Y 51 (2007).

19. *See, e.g.*, Anais Kedgley Laidlaw, *Is It Better to be Safe than Sorry? The Cartagena Protocol Versus the World Trade Organisation*, 36 VICTORIA U. WELLINGTON L. REV. 427 (2005).

20. *See, e.g.*, Margaret Rosso Grossman, *Anticipatory Nuisance and the Prevention of Environmental Harm and Economic Loss from GMOs in the United States*, 18 J. ENVTL. L. & PRAC. 107 (2008) (exploring public, private, and anticipatory nuisance in the GMO context).

21. *But see* Duall, *supra* note 4, at 174, 181-82 (discussing a liability regime for the Cartagena Protocol prior to the first Conference of the Parties (COP) / Meeting of

how a liability regime under the Cartagena Protocol would mitigate potential biodiversity, environmental and human health problems posed by LMOs. Additionally, this Comment examines how other civil liability regimes should guide the design of a regime under the Protocol. Finally, this Comment evaluates previous efforts to adopt such a regime.

Part II describes in more detail the concerns presented by LMOs, the Cartagena Protocol's response to these concerns and the reasons a liability regime is necessary. Part III examines the major decisions the Cartagena Protocol parties will have to make before adopting a civil liability regime. Part IV explores three predecessor civil liability regimes and highlights aspects that the parties should include in any regime under the Cartagena Protocol. Part V proposes that the best option for redressing victims and preserving biodiversity is mitigated-strict liability with a supplementary, compensatory fund. Part V also compares this proposal to current negotiations by the Cartagena Protocol's Open-ended Ad Hoc Working Group of Legal and Technical Experts on Liability and Redress ("Liability Working Group"). Finally, Part V concedes that the best regime is not the most politically feasible regime and concludes that amassing the necessary support for ratifying this Comment's proposal is unlikely. The Comment concludes by suggesting that the Cartagena Protocol's Conference of Parties should strive to adopt a milder, more politically feasible liability agreement.

II.

THE TRANSPORT OF LIVING MODIFIED ORGANISMS (LMOs) REQUIRES A LIABILITY REGIME TO MANAGE POTENTIAL RISKS

States demanding strong LMO regulation maintain that biotechnology is far too new and untested to adequately predict its long term effects on humans and the environment.²² The oppos-

the Parties (MOP) in 2004). There have been four meetings of the Cartagena parties since 2003. The most recent meeting occurred in May 2008 in Bonn, Germany. The Cartagena Protocol on Biosafety, <http://www.cbd.int/biosafety/> (last visited Aug. 11, 2008).

22. See Duall, *supra* note 4, at 183 (explaining that "some governments . . . endorse a zero risk-approach" and seek to stringently control and manage GMO use); see also Kunich, *supra* note 1, at 817 (explaining that some commentators prefer a cautious approach to the use of biotechnology considering "unforeseen environmental hazards [may] manifest themselves only after many years of intensive penetration of transgenic organisms into the environment.").

ing viewpoint argues that agricultural biotechnology offers immense benefits and stunting the furtherance of genetic techniques due to unproven risks is too conservative.²³ The logical compromise between these viewpoints is to tolerate some risk in the interest of proven benefits, but establish a liability regime to offer redress in case suspected risks are realized. Leaving redress to the mechanisms of international “common law” is a paltry consolation to a ratifiable regime and is not advisable.²⁴

A. Risks Presented by LMOs

The goal of agricultural biotechnology is to develop robust plants that can ward off insects while withstanding disease, cold, heat, drought and flood without the aid of pesticides.²⁵ Scientists

23. See Duall, *supra* note 4, at 183 (“[M]any feel that halting the use of biotechnologies before their benefits can be maximized will have serious implications for the countries where those benefits are most sorely needed.”); Carmen Gonzalez, *Genetically Modified Organisms and Justice: The International Environmental Justice Implications of Biotechnology*, 19 GEO. INT’L ENVTL. L. REV. 583, 586 (2007) (“Proponents of biotechnology contend that genetically modified (GM) crops will alleviate hunger and protect the environment in the developing world by increasing agricultural productivity, enhancing nutritional quality, reducing the use of pesticides and herbicides, and producing crops that can withstand environmental stresses, such as drought, heat frost, and soil salinity.”).

24. Duall, *supra* note 4, at 189–90 (explaining that a legally binding regime “binds ratifying parties to honor its commitments” and “provide[s] legal certainty necessary to protect, deter, and compensate for damages caused by GMOs”). Without a defined liability regime under the Cartagena Protocol, the only fallback for an injured party is invoking the amorphous principles of international environmental law and attempting tort actions — both of which have proven toothless at remedying transboundary damage. See Wu Changhua, *Improving the Legal and Policy Foundation for Public Access to Environmental Information in China*, 24 TEMPLE J. SCI., TECH. & ENVTL. LAW 291, 294 (2005) (explaining that three principles of the 1992 Rio Declaration were “vague commitments” to afford redress for environmental damage that had to be tied to an environmental treaty before they could have any clout (in this particular article, the treaty vehicle was the Aarhus Convention)); Noah Sachs, *Beyond the Liability Wall: Strengthening Tort Remedies in International Environmental Law*, 55 UCLA L. REV. 837, 839, 848–51 (2008) (“Without specific treaties setting the ground rules for tort suits, individuals harmed by transboundary pollution have few viable avenues for redress because of what I call “liability walls”—procedural hurdles to bringing transnational tort suits.”); Jean Wu, Note, *Pursuing International Environmental Tort Claims Under the ATCA: Beanal v. Freeport-McMoran*, 28 ECOLOGY L.Q. 487, 500–01 (2001) (explaining how the United States Court of Appeals for the Fifth Circuit “specifically rejected a cause of action based on three international environmental law principles found in the Sands Treatise, including the Polluter Pays Principle, the Precautionary Principle, and the Proximity Principle . . . [because] these three principles . . . are not sufficiently concrete to have the force of international law”).

25. Duall, *supra* note 4, at 175. Some LMOs are designed specifically to tolerate heavy doses of pesticides and herbicides.

accomplish this by inserting DNA containing desired traits into conventional plants.²⁶ This bonus DNA may come from any number of species, not just other plants.²⁷ For example, scientists have taken strands of DNA from a fish that survives comfortably in cold waters and used them to promote frost resistance in crops.²⁸ The DNA insertion process requires carrier viruses that can access the host plant's nucleic DNA and make a genetic substitution.²⁹ Alternatively, the desired genes can be applied to microscopic pellets of gold or tungsten that are fired into the host plant's cells and then replace the plant's original nucleic DNA.³⁰ Although genetic superiority creates more resilient plant species, the benefits are not without risk. These risks include harm to both the environment and human health.

1. Environmental/Biodiversity Effects

LMOs present a considerable biodiversity concern.³¹ Genetically engineered crops are intended to be more resilient than both their conventional counterparts and other neighboring biota. The drawback to this genetic superiority is the possibility that LMOs may grow out of control and stifle the habitats of other native organisms.³² Also, artificially inserted genes are likely to appear in traditional crops through unintentional crossbreeding caused by pollen drift³³ and negligent farming prac-

26. Duall, *supra* note 4, at 174; Brady L. Montalbano, *It's Not Easy Being Green — Holding Manufacturers of Genetically Modified Bentgrass Liable Under Strict Products Liability*, 14 PENN. ST. ENVTL. L. REV. 111, 116 (2005) (describing the process of plant biotechnology).

27. Duall, *supra* note 4, at 174 (“The donor gene can be taken from the same species of plant or ‘from bacteria, viruses, insects, animals, or even humans.’” (quoting LUKE ANDERSON, *GENETIC ENGINEERING, FOOD, AND OUR ENVIRONMENT* 11 (1999))).

28. Jonathan H. Adler, *The Cartagena Protocol and Biological Diversity; Biosafe or Biosorry*, 12 GEO. INT’L ENVTL. L. REV. 761, 764-66 (2000); Duall, *supra* note 4, at 175.

29. Duall, *supra* note 4, at 175.

30. *Id.*

31. *Id.* at 186 (“Most of these harms originate in the ability of the genetically engineered living organisms to ‘interact with other forms of life, reproduce, transfer their characteristics and mutate in response to environmental influences.’” (quoting ANDERSON, *supra* note 27, at 35)).

32. *Id.* at 186-87 (providing an example of a salt-tolerant rice plant overgrowing its paddy and invading a marine area where it is not typically found).

33. Rebecca M. Bratspies, *Consuming (F)Ears of Corn: Public Health and Biopharming*, 30 AM. J.L. & MED. 371, 401 (2004) (stating that GMO genes can end up in unintentional plant locations due to pollen drift and “volunteer plants” from a previous season); Montalbano, *supra* note 26, at 117 (providing examples of uninten-

tices.³⁴ These unintentional crossovers can dilute genetic diversity within native species, ultimately eliminating natural populations of plants.³⁵ The loss of native species and natural genetic variations within species limits biodiversity, which may cause unknown ecological consequences.³⁶ Additionally, widespread LMO use could eventually result in crossover mutations in native plant and insect populations, creating super-weeds or super-pests³⁷ and rendering agricultural pesticides or herbicides useless.³⁸ Currently, only isolated instances of transboundary crossovers have been reported, but these may foreshadow greater, more widespread harms to biodiversity.³⁹

2. Human Health Effects

Human health effects from GMOs have caused less alarm in the scientific community than the biodiversity risks have,⁴⁰ but this has not changed the popular stigma associated with

tional crossbreeding including native contamination caused by StarLink Corn, Roundup Ready soybeans, and Monsanto RT-200 Canola seeds).

34. Bratspies, *supra* note 33, at 401 (explaining that GMO genes can end up in unintentional plant locations due to “improperly cleaned farm machinery [...] spilled seeds contaminating food crops” or “direct human action intentionally or negligently contaminating the food supply”).

35. Montalbano, *supra* note 26, at 117 (providing examples of unintentional crossbreeding including native contamination caused by StarLink Corn, Roundup Ready soybeans, and Monsanto RT-200 Canola seeds).

36. Duall, *supra* note 4, at 187; Christina L. Richmond, *Genetically Modified Crops in the Philippines: Can Existing Biosafety Regulations Adequately Protect the Environment?*, 15 PAC. RIM. L & POL’Y 569, 573-74 (2006) (listing four dangers of unintentional “gene flow” between engineered and conventional species including: the creation of super weeds, extinction of wild populations, limiting genetic diversity of natural populations, and polluting the genetic diversity of the ecosystem as a whole).

37. A common type of agricultural GMO utilizes genes that renders crops able to withstand heavy herbicide use. Duall, *supra* note 4, at 187.

38. *See id.* at 187 (explaining that “valuable pesticides” could be rendered useless due to genetic resistance).

39. *See Bratspies, supra* note 33, at 389 (stating the reality that major GMO manufacturers, like Monsanto, Dow and Pioneer Hi-Bred have had multiple incidents where non-food GMOs containing unapproved genes became intermingled with food crops); Healy, *supra* note 4, at 210-11 (describing how concerns about biotechnology were heightened when DNA from a GMO variety of corn was found in corn growing in a remote area of southern Mexico, clearly the result of unintentional transport); Noah, *supra* note 8, at 38 (describing how StarLink corn, approved for animal feed, unintentionally cross-pollinated food supply corn causing widespread recall of corn tortillas).

40. HUNTER, *supra* note 2, at 1059-62 (internal citation omitted); Healy, *supra* note 4, at 212 (“When compared to the risks that agricultural biotechnology poses to the environment, the risks posed to human health so far appear more limited.”).

Frankenfoods.⁴¹ The two major human health concerns are antibiotic resistance⁴² and increased allergens in GMO foods.⁴³ There is little scientific evidence, however, that government-approved GMO products pose a direct risk to human health.⁴⁴

Nevertheless, the use of GMOs to grow biopharmaceuticals rather than food crops is becoming more prevalent and raises concerns that gene out-crossing between biopharm plants and consumable plants *will* inevitably threaten human health.⁴⁵ The extension of GMO use from strictly agriculture to medicine shows that the technology is becoming increasingly common.⁴⁶ In order to protect human health, laws regulating genetic engineering technology should have a mechanism in place to remedy any potential injuries.

B. *The Cartagena Protocol Fails to Adequately Protect Humans and the Environment Against LMO Risks*

The Convention on Biological Diversity (CBD), born out of the United Nations Earth Summit in Rio de Janeiro (“Rio Declaration”), set the stage for the Cartagena Protocol by requiring the CBD’s Conference of Parties to create a means to regulate

41. Kunich, *supra* note 1, at 814.

42. HUNTER, *supra* note 2, at 1059–60 (internal citation omitted); Duall, *supra* note 4, at 187 (“Some fear also exists that genetically modified plants containing genes for antibiotics used in human medicines may produce drug resistance in humans, even though scientists have dismissed these concerns.”).

43. Kunich, *supra* note 1, at 822 (explaining the fear of increased allergens in GMOs and the possibility of gene flow between GMOs and bacteria that naturally reside in human digestive tracts); Noah, *supra* note 8, at 38 (explaining how StarLink corn contaminated tortillas caused hives and other allergic reactions in human consumers).

44. Healy, *supra* note 4, at 212–213 (asserting that “allergenicity risks are extremely difficult to assess and testing for human health effects has been sporadic and inconsistent”); Leonhardt, *supra* note 9 (“Scientific research has generally shown that genetically modified foods do not cause health problems.”).

45. Bratspies, *supra* note 33, at 373.

46. *See id.* at 372 (lamenting that federal agencies missed their opportunity to develop biopharm regulations while “many such [biopharm] crops are currently being planted in small test plots throughout the country”). Bratspies further explains that “biopharm companies envision a lucrative future in which agricultural fields, converted into biofactories, grow the raw materials for industrial or pharmaceutical production.” *Id.*; *see also* Kunich, *supra* note 1, at 812–13 (tracing the advent of U.S. transgenic crops in 1995 through the increasing usage trend and stating that “virtually all crops in the United States will, by the year 2010, either be genetically modified or mixed with genetically modified products”); Noah, *supra* note 8, at 45, 52 (describing the “second wave” of biotechnology that focuses on “pharmaceutical companies mov[ing] some of their production into the field”).

environmental and human health risks stemming from GMOs.⁴⁷ The Cartagena Protocol delineates between LMOs released into the environment for agricultural use and bulk commodities intended for human or livestock consumption.⁴⁸ Under the Cartagena Protocol's rules, states may regulate or restrict the importation of agricultural LMOs, provided the importing state undertakes an assessment to show the LMO product has some potential for adverse effects to biodiversity, the environment or human health.⁴⁹ Regulating bulk commodities or processed food products is not the main objective of the Protocol.⁵⁰

The Cartagena Protocol's main focus, mirroring the purpose stated by the CBD, is to conserve and sustain biodiversity.⁵¹ A secondary goal of the Protocol is to prevent human health risks caused by LMOs.⁵² Ratified in 2003, the Protocol is rooted in the Precautionary Principle, which was first stated in 1992 as Principle 15 of the Rio Declaration.⁵³ The Precautionary Principle requires: "Where there are threats of serious or irreversible damage [to the environment], lack of full scientific certainty shall

47. U.N. Conference on Environment and Development: Convention on Biological Diversity art. 8(g), June 5, 1992, 31 I.L.M. 818 [hereinafter Convention on Biological Diversity] ("[E]stablish or maintain means to regulate, manage or control the risks associated with the use and release of living modified organisms resulting from biotechnology which are likely to have adverse environmental impacts that could affect the conservation and sustainable use of biological diversity, taking also into account the risks to human health.").

48. Cartagena Protocol, *supra* note 16, arts. 3, 4 ("[L]iving modified organism means any living organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology."); Adler, *supra* note 28, at 770 ("LMO[s] [are] intended to be planted as a crop or otherwise released into the environment."); Healy, *supra* note 4, at 214-15 (explaining how the parties chose to bifurcate the Protocol scheme for agricultural products shipments and consumption shipments).

49. Cartagena Protocol, *supra* note 16, art. 10, 15.

50. Healy, *supra* note 4, at 217-18 (explaining how the Cartagena Protocol does not apply the AIA when the exports are "direct[ly] used as food, feed, or for processing" and vaguely requires that modified food products be labeled as such).

51. Cartagena Protocol, *supra* note 16, art. 4 ("This Protocol shall apply to the transboundary movement, transit, handling and use of all living modified organisms that may have adverse effects on the *conservation and sustainable use of biological diversity*.") (emphasis added). "Biodiversity encompasses all of the variability among the building blocks of life (i.e. genetic diversity), different forms of life (species diversity) and the interrelationships of the life (ecosystem diversity)." HUNTER, *supra* note 2, at 1004.

52. Cartagena Protocol, *supra* note 16, art. 4 ("... taking *also* into account risks to human health") (emphasis added).

53. Rio Declaration on Environment and Development, U.N. Conference on Environment and Development, June 13, 1992, U.N. Doc. A/Conf.151/5/Rev.1, reprinted in 31 I.L.M. 874, 879 [hereinafter Rio Declaration].

not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”⁵⁴ Therefore, strict regulation of GMOs is desirable despite the lack of scientific evidence of definite adverse effects. Likewise, including a liability regime along with the AIA informed consent regulations in the Cartagena Protocol is consistent with the Precautionary Principle because it prepares to remedy adverse effects from LMOs in the event they do occur.

Article 27 requires the Cartagena Protocol’s Conference of the Parties to develop a regime that establishes “liability and redress for damage resulting from transboundary movements of living modified organisms” within four years of its ratification.⁵⁵ The Cartagena Protocol officially entered into force on September 11, 2003, when the fiftieth country completed ratification.⁵⁶ But almost six years later, the Cartagena Protocol’s Conference of Parties still has not adopted a liability regime.

At the First Meeting of the Parties (First Meeting), held in 2004, the Parties formed a Liability Working Group to address Article 27 and establish a liability regime.⁵⁷ Subsequent to the First Meeting, the Liability Working Group held five conferences to explore LMO liability scenarios and draft language for a liability regime.⁵⁸ The most recent meeting of the Working Group

54. Rio Declaration, *supra* note 53, princ. 15.

55. Cartagena Protocol, *supra* note 16, art. 27.

56. UNEP, Cartagena Protocol on Biosafety: Status of Ratification and Entry into Force, <http://www.cbd.int/information/parties.shtml> (last visited Apr. 28, 2009). To date, 156 parties have ratified the Protocol. UNEP, The Cartagena Protocol on Biosafety, <http://www.cbd.int/biosafety/> (last visited Apr. 28, 2009).

57. U.N. Envtl. Programme [hereinafter UNEP], *Report of the First Meeting of the Conference of the Parties Serving as the Meeting of the Parties to the Protocol on Biosafety*, UNEP/CBD/BS/COP-MOP/1/15 (Apr. 14, 2004), available at <http://www.cbd.int/doc/meetings/bs/mop-01/official/mop-01-15-en.pdf>.

58. See generally, UNEP, *First Meeting of the Ad Hoc Working Group on Liability and Redress*, U.N. Doc. UNEP/CBD/BS/COP-MOP/2/11 (May 2005), available at <http://www.cbd.int/doc/meetings/bs/mop-02/official/mop-02-11-en.pdf>; UNEP, *Second Meeting of the Ad Hoc Working Group on Liability and Redress*, U.N. Doc. UNEP/CBD/BS/COP-MOP/3/10 (Mar. 2006), available at <http://www.cbd.int/doc/meetings/bs/mop-03/official/mop-03-10-en.pdf>; UNEP, *Third Meeting of the Ad Hoc Working Group on Liability and Redress*, U.N. Doc. UNEP/CBD/BS/WG-L&R/3/3 (Mar. 2007), available at <http://www.cbd.int/doc/meetings/bs/bswglr-03/official/bswglr-03-03-en.pdf>; UNEP, *Fourth Meeting of the Ad Hoc Working Group on Liability and Redress*, U.N. Doc. UNEP/CBD/BS/WG-L&R/4/3 (Nov. 2007), available at <http://www.cbd.int/doc/meetings/bs/bswglr-04/official/bswglr-04-03-en.pdf>; UNEP, *Fifth Meeting of the Ad Hoc Working Group on Liability and Redress*, U.N. Doc. UNEP/CBD/BS/WG-L&R/5/2/Rev. (Mar. 2008), available at <http://www.cbd.int/doc/meetings/bs/bswglr05/official/bswglr-05-02-rev1-en.pdf> [hereinafter MOAHWG-5].

was in March 2008.⁵⁹ After missing the Article 27 deadline in 2007, the Liability Working intended to unveil their liability rules at the Fourth Meeting of the Parties (Fourth Meeting) in May 2008.⁶⁰ Although some agreement was reached on the operational texts for binding civil liability at the Fourth Meeting, the deadline to officially ready a draft for a ratification vote was again pushed back to at least 2010.⁶¹ The delegation of party representatives opted to maintain a "Group of the Friends of the Co-Chairs, Ms. Jimena Nieto (Colombia) and Mr. René Lefeber (the Netherlands), Concerning Liability and Redress in the Context of the Cartagena Protocol on Biosafety."⁶² This group will meet once in 2009 and again in 2010 to "consider unresolved issues and draft a final text" before the Fifth Meeting of the Parties reconvenes in 2010.⁶³ The Liability Working Group is hopeful that a ratifiable document will be ready for a vote at this 2010 meeting in Aichi Prefecture, Japan.⁶⁴

Without a binding legal instrument, the Protocol cannot adequately protect importing states, their neighbors, or individual victims from potential adverse effects to biodiversity and human health caused by LMOs. In the absence of a regime, states and individuals are left with only tort doctrines to try to remedy their damages.⁶⁵ And because international tort actions are often ineffective, the absence of a liability regime ultimately forces im-

59. MOAHWG-5, *supra* note 58.

60. UNEP, *Provisional Agenda Fourth Meeting of the Conference of the Parties Serving as the Meeting of the Parties to the Cartagena Protocol on Biosafety*, U.N. Doc. UNEP/CBD/BS/COP-MOP/4/1 (Feb. 8, 2008), available at <http://www.cbd.int/doc/meetings/bs/bswglr-05/official/bswglr-05-02-rev1-en.pdf>.

61. Press Release, Secretariat of the Convention on Biological Diversity, Agreement Reached to Work Towards a Legally Binding Instrument on Liability and Redress with Regard to GMOs (May 16, 2008), available at <http://www.cbd.int/doc/press/2008/pr-2008-05-16-mop4-en.pdf>.

62. See UNEP, *Report of the Fourth Meeting of the Conference of the Parties to the Convention on Biological Diversity Serving as the Meeting of the Parties to the Cartagena Protocol on Biosafety*, at 84, U.N. Doc. UNEP/CBD/BS/COP-MOP/4/18 (June 25, 2008), available at <http://www.cbd.int/doc/meetings/bs/mop-04/official/mop-04-18-en.pdf> [hereinafter COP-MOP 4].

63. COP-MOP 4, *supra* note 62, at 25.

64. Cartagena Protocol: Upcoming Meetings, <http://www.cbd.int/biosafety/meetings/> (last visited Nov. 22, 2008).

65. See, e.g., Wu, *supra* note 24, at 489 (explaining that when "soft law" international environmental regulation is unable to protect against injuries caused by transnational corporations, victims have attempted redress in U.S. courts under the Alien Tort Claims Act).

pacted states and individuals to bear the costs of remedy,⁶⁶ while exporters keep the profits earned from selling injurious LMO products. This is inequitable and militates away from the general principle that the harming party pays.⁶⁷

C. A Liability Regime is Essential to Address LMO Risks

The Cartagena Protocol's Conference of Parties recognized that a liability regime was needed to provide redress for victims in the event that agricultural genetic engineering fears become reality.⁶⁸ But Article 27 was a consolation.⁶⁹ The Cartagena Protocol's Conference of Parties had intended to establish a document that determined responsible parties, standards for causation and standing, and methods to evaluate redressable damages to prepare for LMOs to cause injury or other adverse effects.⁷⁰ But during original treaty negotiations in Cartagena, Colombia, the parties could not agree on any of these terms and instead postponed the most controversial decisions. The parties did adopt the AIA, which requires advance notification by exporters and risk assessments by importers in order to mitigate potentially adverse effects before they occur.⁷¹ Although the AIA is a valuable tool, LMOs have the ability to disperse *without consent* via windblown pollen and seeds.⁷²

66. See Sachs, *supra* note 24, at 848–52 (listing the innumerable barriers to transboundary, international tort actions including obtaining personal jurisdiction, achieving extraterritorial service of process, resolving choice of law questions, and overcoming motions to dismiss on the grounds of forum non conveniens, for example).

67. Duall, *supra* note 4, at 192 (“In international law, the concept of liability may perform several functions: a corrective function, a reparative function, or a preventative function.”).

68. Kate Cook, *Liability: “No Liability, No Protocol”*, in THE CARTAGENA PROTOCOL ON BIOSAFETY: RECONCILING TRADE IN BIOTECHNOLOGY WITH ENVIRONMENT AND DEVELOPMENT? 372 (Bail et al. eds., 2002).

69. *Id.* at 372; Duall, *supra* note 4, at 184.

70. UNEP, The Cartagena Protocol: Liability and Redress, <http://www.cbd.int/biosafety/issues/liability.shtml> (last visited Apr. 4, 2008).

71. Cook, *supra* note 68, at 369. The Cartagena Protocol also created a Biosafety Clearing-House to “facilitate the exchange of scientific, technical, environmental and legal information on, and experience with, living modified organisms” between parties. Cartagena Protocol, *supra* note 16, art. 20.

72. Cook, *supra* note 68, at 372; Donald L. Barlett and James B. Steele, *Monsanto's Harvest of Fear*, VANITY FAIR, May 2008, at 156 (explaining how GMO seed giant Monsanto acknowledges the prevalence of cross boundary transfers of seeds and pollen, and vehemently tries to account for their spread in order to maintain control over their GMO seed patents).

The likelihood of transboundary creep, coupled with disagreement over the overall safety and use of LMOs, make a liability regime imperative for several reasons.⁷³ First, Article 27 of the Protocol explicitly stated that the Conference of Parties “shall” adopt “rules and procedures in the field of liability.”⁷⁴ Essentially, ratification of the Cartagena Protocol was contingent on the parties enacting a regime within four years.⁷⁵ Although postponing or never adopting a liability regime does not invalidate the ratified sections of the Cartagena Protocol,⁷⁶ it severely undermines the agreement by keeping it toothless and leaving victims to rely on ineffective tort remedies.⁷⁷ This especially hurts developing countries, which often lack domestic laws to address these problems.⁷⁸

Second, controlled or reduced LMO usage directly correlates with reduced threats⁷⁹ to human health⁸⁰ and the environment.⁸¹ If the parties enact and enforce a liability regime, LMO manufacturers will have incentives to genetically engineer LMO seeds to be less likely to disperse their DNA unintentionally.⁸² The re-

73. Duall, *supra* note 4, at 192–93 (stating that deterring widespread use of LMOs is advantageous because relying on the actual liability regime may prove difficult for calculating appropriate compensation).

74. Cartagena Protocol, *supra* note 16, art. 27.

75. *Id.*

76. See, e.g., HUNTER, *supra* note 2, at 966 (explaining that only 13 of the required 20 parties have ratified the Basel Protocol (for liability and redress), but despite the non-ratification of the liability regime, the parent treaty, the Basel Convention, remains in full force).

77. See Sachs, *supra* note 24, at 848–52 (listing the innumerable barriers to transboundary, international tort actions).

78. Cartagena Protocol: Still No Liability Regime, <http://www.ifrik.org/en/blog/carthagena-protocol-still-no-liability-regime> (last visited Nov. 20, 2008) (explaining that without a liability regime developing countries are especially at risk because they do not even have “[domestic] legislation in place for the approval of LMOs and/or for (environmental) liability”); see also Sachs, *supra* note 24, at 848 (“For the 2.8 billion individuals living in developing countries on incomes of less than \$ 2 per day, access to transnational tort remedies may, as a practical matter, be unattainable.”).

79. Duall, *supra* note 4, at 192–93 (stating that deterring widespread use of LMOs is advantageous because relying on the actual liability regime may prove difficult for calculating appropriate compensation).

80. HUNTER, *supra* note 2, at 1059–60 (describing increased allergen effects and antibiotic resistances as the two major human health concerns).

81. Richmond, *supra* note 36, at 573–74 (listing four dangers of unintentional “gene flow” between engineered and conventional species including: the creation of super weeds, extinction of wild populations, limiting genetic diversity of natural populations, and polluting the genetic diversity of the ecosystem as a whole).

82. Controlling cross pollination can be accomplished by making the desired gene substitutions in chloroplast DNA rather than nuclear DNA. Bratspies, *supra* note

duction of unintentional dispersal equates to fewer opportunities for LMO DNA to infiltrate native crops, weeds or insects. LMO farmers also will take greater care when planting genetically engineered products or will decline to use LMOs at all⁸³ in order to avoid potential responsibility.⁸⁴

Third, holding exporter states liable for adverse effects comports with the "Polluter Pays" Principle. This equitable doctrine requires the entity that caused the damage to remedy the injuries.⁸⁵ It would be unfair for LMO exporters to keep profits earned from selling the injurious LMO products while the importing state, transboundary state or individual victim bears the cost of remedy.⁸⁶

Fourth, holding exporter manufacturers responsible for adverse human health or biodiversity effects caused by LMOs will foster stricter compliance with the Cartagena Protocol's AIA provision.⁸⁷ Exporters will experiment thoroughly to ascertain GMO health and environmental risks and will communicate detailed notifications to the importer states in an effort to forestall adverse effects.⁸⁸ Consequently, importer states will be more apt

33, at 399. Chloroplasts are not found in pollen, therefore the altered genes are much less likely to be transported by wind and taken up by other plant species. *Id.*

83. Duall, *supra* note 4, at 192 ("[A] liability regime may act as a deterrent regarding environmentally harmful activities, thereby fulfilling a preventive function.").

84. Bratspies explains an analogous domestic example where stricter FDA enforcement against bioengineered crops will "spur industry to confront these questions [of their safety] and thus drive development of this technology towards safer options." Bratspies, *supra* note 33, at 397. International enforcement likely would have the same proactive effect against harm that may occur beyond United States borders.

85. Rio Declaration, *supra* note 53, principle 16; Cook, *supra* note 68, at 374; Duall, *supra* note 4, at 192 (stating that liability based on "polluter pays" equitably "shifts costs of environmental damage to the persons or state responsible for the activity").

86. See, e.g., Montalbano, *supra* note 26, at 120 (explaining that products liability is appropriate for sellers of genetically enhanced bentgrass seeds because "it is natural to assume that general products liability be applied if the harm incurred was a result of using such a product"); see generally Peter Nash Swisher, *Products Liability Tort Reform: Why Virginia Should Adopt the Henderson-Twerski Proposed Revision of Section 402a, Restatement (Second) of Torts*, 27 U. RICH. L. REV. 857, 861-63 (1993) (explaining the five public policy considerations for holding manufacturers responsible for their products and listing compensation for harm caused as the very first policy reason).

87. Cook, *supra* note 68, at 373; Duall, *supra* note 4, at 192 (explaining that a general goal of a liability regime is corrective and encourages compliance with environmental norms or, in this case, Protocol regulations).

88. Cartagena Protocol, *supra* note 16, Annex I (stating that notification information includes: taxonomic status, description of the nucleic acid or modification intro-

to trade in LMOs, because a liability regime acts as a safeguard against unforeseen effects. Importers would not have to accept potentially dangerous products totally at their own risk.⁸⁹

Despite these four justifications for adopting a liability regime, opponents argue that a liability regime is unnecessary.⁹⁰ They maintain that the risks to health and the environment are overblown, as there have been no catastrophes or widespread injuries.⁹¹ Further, international law already has established state responsibility provisions that obligate states to ensure that activities within their jurisdiction or control do not cause damage to the environment.⁹² Additionally, Article 14 of the CBD already covers damage to biodiversity, which could arguably preempt any liability regime created under the Cartagena Protocol.⁹³

However, current trends in international law suggest that adopting "treaty-based civil liability regimes to cover activities that [are] potentially hazardous to the environment" is necessary⁹⁴ and that following the Precautionary Principle instead of waiting for the first advent of serious harm is preferable.⁹⁵ The CBD preemption argument is weak because the CBD's Article 14 provision covers only *general* threats to biodiversity, not *specific* harms from LMOs.⁹⁶ Also, the CBD makes no mention of human health effects, which are explicitly referenced in the scope of the Cartagena Protocol and should be addressed in its liability regime.⁹⁷ As such, the parties should enact a regime to prepare for the possibility of human health and biodiversity impacts. The question becomes — what is the most effective way to channel liability for an instrumentality that may or may not cause harm in the immediate future?

duced, quantity transferred, existing risk assessment consistent with Annex III, regulatory status within the State of export).

89. Cook, *supra* note 68, at 373.

90. *Id.* at 374.

91. *Id.* at 372–74 (explaining that there has been no equivalent Torrey Canyon or Chernobyl disaster to justify the necessity of a liability regime for LMOs).

92. *Id.* at 372–74.

93. Convention on Biological Diversity, *supra* note 47, art. 14(2); Cook, *supra* note 68, at 375–76.

94. *Id.* (providing examples of treaties with civil liability regimes including oil pollution, the transport of hazardous and noxious substances by sea, and the transboundary transport of hazardous waste).

95. *Id.* at 375 ("[O]thers pointed out that in an era of precaution it was not appropriate to wait and see whether a catastrophic incident would occur before addressing the issue of liability.").

96. *Id.* at 376.

97. *Id.*

III. CONSIDERATIONS FOR CREATING AN LMO LIABILITY REGIME

International law has embraced binding liability regimes for activities involving hazardous materials.⁹⁸ The Cartagena Protocol should be no exception.⁹⁹ Although biotechnology has not yet caused widespread harm to biodiversity or humans, if predicted harms do occur in the future there must be a concrete way to compensate victims.¹⁰⁰ Additionally, it is clear that controlling the physical dispersal of LMOs is difficult and the suspected harms would be pervasive. The Cartagena Protocol's Conference of Parties agreed that a binding regime was necessary, but used Article 27 to delay major decisionmaking until four years after ratification of the original agreement.¹⁰¹

Prior to enacting Article 27, the Cartagena Protocol delegates considered what decisions the parties would have made in order to create a civil liability regime for LMOs. The major decisional areas included: damage valuation, potentially responsible parties, standing, liability basis, causation, available defenses, and adjudication forums. The delegates divided themselves into five groups based on their negotiating positions,¹⁰² but could not reach a compromise at initial Cartagena Protocol negotiations.¹⁰³

Most of the groups debated how much damage an LMO had to cause to biodiversity before liability would attach.¹⁰⁴ The parties also had differing perspectives on the breadth of general damages—some states recognized economic losses, others only physical injuries to humans or property.¹⁰⁵ The delegates recognized

98. *Id.* at 374 (explaining that international environmental law has trended to adopt civil liability regimes and providing examples of such treaties).

99. Healy, *supra* note 4, at 214 (“[T]he underlying notion that most of the countries brought to the table was that genetically modified organisms are inherently dangerous.”).

100. See A.E. Boyle, *Globalising Environmental Liability: The Interplay of National and International Law*, 17 J. ENVTL. L. 3, 13 (2005) (“The risk of very serious or widespread damage, despite its low probability, places most of the activities . . . in the ultra-hazardous category.”). Boyle argues for non-fault, and therefore binding, regimes in these scenarios. *Id.*

101. Cartagena Protocol, *supra* note 16, art. 27.

102. Schweizer, *supra* note 5, at 586–90.

103. Duall, *supra* note 4, at 184.

104. Cook, *supra* note 68, at 383.

105. Duall, *supra* note 4, at 190 (describing differing perspectives of states like Belgium and Austria and highlighting the fact that most parties have varying limitation periods and bases for assigning fault).

that quantifying biodiversity damage was especially challenging.¹⁰⁶

The parties also had to determine who would be a potentially responsible party. Some delegates wanted to limit responsibility to developers and manufacturers of the LMOs.¹⁰⁷ Others demanded that actors involved in transboundary shipping could be held responsible as well. Still other parties wanted to include the states of origin.¹⁰⁸ Delegates also noted that some of the largest LMO-exporting states had not signed the Cartagena Protocol or the CBD¹⁰⁹ and viewed the inability to hold these states responsible as a significant problem.¹¹⁰

Whether nonparties to the Cartagena Protocol should have standing to assert claims was another important decision the parties considered.¹¹¹ This is especially relevant because windblown pollen can transport LMO DNA into nonsignatory states of the Cartagena Protocol. Also discussed was whether states of import, transboundary states and individuals should all have equivalent standing requirements.¹¹²

The parties also could not determine what standard of liability to adopt. Some more cautious states argued that the unpredictable harm and dispersal of LMOs lends itself to a strict liability regime.¹¹³ Others wanted a fault-based, negligence model.¹¹⁴ The delegates recognized that causation under a negligence-based regime was especially problematic because the biodiversity effects to an ecosystem may not present themselves until many mutations and gene crossovers occur.¹¹⁵ This could take years and would make tracing fault back to the original LMO exporter extremely difficult.¹¹⁶

106. Duall, *supra* note 4, at 193–95.

107. Cook, *supra* note 68, at 384.

108. *Id.*

109. Duall, *supra* note 4, at 191. The United States, the largest LMO exporter, is not a signatory to either the Cartagena Protocol or the Convention on Biological Diversity. *Id.*

110. *Id.* at 192 (explaining that nonsignatories will have to comply with the Cartagena Protocol's rules of trade when exporting to a party to the Protocol, but "liability, compensation, and redress, however, are different matters, raising issues of jurisdiction, forum and enforcement").

111. *Id.*

112. Cook, *supra* note 68, at 383–84.

113. Duall, *supra* note 4, at 199 (suggesting that strict liability is a better model given the likely absence of fault by the exporter).

114. Cook, *supra* note 68, at 383–84.

115. *Id.* at 383.

116. *Id.*

The parties discussed permissible defenses for exporters. Some states suggested a “state of the art” defense, similar to a products liability regime.¹¹⁷ Another suggestion was an importer country assumption of risk defense.¹¹⁸ Others thought defendant-exporters should have to show that they at least considered the possible adverse effects of their products and did not blindly apply the market’s status quo.¹¹⁹

Once the parties had solved all of these issues, they still would have to determine the permissible forums for adjudicating LMO disputes. The Liability Working Group faced all of these problems at the first Meeting of the Parties in 2004.¹²⁰ Article 27 required the group to design a liability regime by 2007, but this deadline was not met.¹²¹

IV.

PREDECESSOR CIVIL LIABILITY REGIMES AND THEIR APPLICABILITY TO AN LMO MODEL

The creation of a Cartagena Protocol civil liability regime faces innumerable issues and sub-issues. This Comment focuses on four major areas: (1) establishing responsible parties and channeling liability, (2) deciding on the standard of liability, (3) quantifying injury and damages and (4) and proving causation. The following sections examine how predecessor civil regimes have structured liability rules and discuss whether the Cartagena Protocol’s liability regime could incorporate their provisions. The regimes discussed are the Basel Protocol, the Liability Regimes for Nuclear Damage, and the Liability Regimes for Oil Pollution Damage. These three were chosen as models because they deal with transboundary environmental damage and, in the case of nuclear and oil pollution damage, are considered the most successful civil liability regimes because they are actually in force.¹²²

117. *Id.*

118. A state of the art defense would allow exporters to prove that the LMO products they sold were safe per industry standards at the time of sale and shipment. *Id.*

119. *Id.*

120. UNEP, First Meeting of the Parties, *Working Group II: Liability and Redress*, U.N. Doc. UNEP/CBD/BS/COP-MOP/1/9 (Feb. 27, 2004), available at <http://www.iisd.ca/vol09/enb09289e.html> [hereinafter WG-II].

121. MOAHWG-5, *supra* note 58.

122. Sachs, *supra* note 24, at 853 (“Of the fourteen major civil liability treaties. . . only six have entered into force, and these six were all in the fields of liability for oil spills and nuclear accidents.”).

A. 1999 Basel Protocol on Liability and Compensation

Just as the Conference of Parties signed the Cartagena Protocol in 2003 but put off decisions about liability for several years, the signatories to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (“Basel Convention”) reached agreement in 1992¹²³ while committing to establish a liability regime “as soon as practicable.”¹²⁴ The process of designing a regime took seven years, but the Basel Protocol,¹²⁵ the liability regime for the Basel Convention, still has not been ratified by enough parties to enter into force.¹²⁶

Despite this lack of force, the Basel Protocol does provide an analogous model for the Cartagena Protocol’s liability regime to follow. Both parent treaties (the Basel Convention and the Cartagena Protocol) involve transboundary shipments of potentially dangerous instrumentalities, and both parent treaties already have prior consent regimes in place between importing and exporting countries.¹²⁷ Although a shipment of hazardous waste that *will* cause damage fundamentally differs from a shipment of LMO seeds that *may* cause damage, the Basel Protocol does exhibit some liability strategies that could be useful for the Cartagena Protocol’s Liability Working Group to adopt.

The Basel Protocol establishes both strict and fault-based schemes for assigning liability to exporters of hazardous substances. Strict liability applies when the exporter and importer are parties to the Basel Protocol.¹²⁸ Strict liability also applies if one party has signed the Basel Protocol and damage occurs when the wastes are in that party’s possession.¹²⁹ Fault-based liability applies when a party does not follow the specific provisions outlined in the parent treaty¹³⁰ Recognizing that the transport chain consists of multiple parties, the Basel Protocol transfers liability

123. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, May 1989, 28 I.L.M. 649 [hereinafter Basel Convention].

124. Basel Convention, *supra* note 123, art. 12.

125. Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and Their Disposal, U.N. Doc. UNEP/CHW.5/29, available at <http://www.basel.int/meetings/cop5/docs/prot-e.pdf> [hereinafter Basel Protocol].

126. HUNTER, *supra* note 2, at 966 (explaining that only 13 of the required 20 parties have ratified the Basel Protocol).

127. Basel Convention, *supra* note 123, arts. 4, 6.

128. Basel Protocol, *supra* note 125, art. 4; HUNTER, *supra* note 2, at 965.

129. Basel Protocol, *supra* note 125, art. 4; HUNTER, *supra* note 2, at 965.

130. Basel Protocol, *supra* note 125, art. 5; HUNTER, *supra* note 2, at 965.

from generators to exporters to importers to disposers as waste is transferred to its destination.¹³¹ Once transport ends and the importer receives the waste securely, the Basel Protocol no longer applies to that shipment. Any damage that occurs after the importer takes control is assumed by the importer.¹³² The Basel Protocol's limited window for assessing liability keeps causation problems at a minimum. Either damage is caused when an exporter has control and is thus the exporter's responsibility, or when an importer has control, making the importer liable.

Mitigated strict liability is a viable option for the Cartagena Protocol, but an agreement where importers assume all risk once the shipment reaches its destination would not work as well for the Cartagena Protocol. Instead, the liability regime would need to focus on holding *exporters* responsible. The main concern with the LMO trade is the effects to biodiversity and human health that may occur many years after an importer plants genetically modified seeds are or after genetic drift causes unintentional pollination in a neighboring country. Further, it is more likely that intervening factors, like wind or weather, will interrupt or muddy the causal chain for LMOs, because the lag time for LMOs to cause harm is much longer than it is for hazardous wastes. Additionally, sources other than importers or exporters may contribute to or even *cause* the adverse effects. Ceasing liability for an exporter after an importing country takes control of the transported LMO seeds would allow exporters to escape liability during a long period of time when harm may occur.¹³³ It would be a first for international law if the Cartagena Protocol held exporters liable for effects to human health and the environment long *after* LMO transport is complete, but such liability is a

131. Boyle, *supra* note 100, at 14. Sovereign states also may be held liable if they are explicitly acting in the transport chain. Basel Protocol, *supra* note 125, art. 4.

132. HUNTER, *supra* note 2, at 965.

133. In fact, the Basel Protocol's liability cessation after the disposing entity within the importing country has taken control of wastes also has been criticized. HUNTER, *supra* note 2, at 965. But unlike the United States and its CERCLA regime, no other country leverages strict liability on a generator from the creation of the waste through the point of disposal. *Id.*; see generally Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §§ 9601 *et seq.* (2008) [hereinafter CERCLA]. CERCLA holds generators of waste jointly and severally liable for any harm the hazardous waste caused from its inception past the point of disposal. CERCLA, 42 U.S.C. §§ 9601 *et seq.*

dire necessity in order for the regime to effectively redress damage.¹³⁴

The Basel Protocol defines damage in five ways: (1) loss of life or personal injury; (2) loss of or damage to property other than property held by the person liable in accordance with the present Protocol; (3) loss of income directly deriving from an economic interest in any use of the environment, incurred as a result of impairment of the environment, taking into account savings and costs; (4) the costs of measures of reinstatement of the impaired environment, limited to the costs of measures actually taken or to be undertaken; and (5) the costs of preventive measures, including any loss or damage caused by such measures, to the extent that the damage arises out of or results from hazardous properties of the wastes involved in the transboundary movement and disposal of hazardous wastes and other wastes subject to the Convention.¹³⁵

The Cartagena Protocol could define damages similarly, requiring an exporter to compensate for personal injury, property damage, or environmental impairment. The problem with using this definition for the Cartagena Protocol, however, is that it does not redress adverse effects to biodiversity very well.¹³⁶ Biodiversity "encompasses all of the variability among the building blocks of life (i.e., genetic diversity), different forms of life (species diversity) and the interrelationships of the life (ecosystem diversity)."¹³⁷ Simply remedying physical damages to habitats and living organisms would not completely account for the loss of genetic variability.¹³⁸

Additionally, the Basel Protocol does not shed light on who would have standing to sue for loss of biodiversity under the Cartagena Protocol. The Basel Protocol deals with quantifiable physical damages affecting individuals and states. It is more difficult to quantify harm from the loss of genetic differences and to

134. The major issue with LMOs is that the advent of their harm may not occur until many, many years after transport is complete and after a farmer has sowed his fields with these modified seeds. For a liability regime to be fully effective, the rules must find a way to capture latent effects caused by LMOs. Montalbano, *supra* note 26, at 118 (noting that "plant biotechnology is a new technology with little scientific data available concerning its risks and benefits, particularly *long-term* risks and benefits") (emphasis added).

135. Basel Protocol, *supra* note 125, art. 2.

136. Duall, *supra* note 4, at 195.

137. HUNTER, *supra* note 2, at 1004.

138. Duall, *supra* note 4, at 195-96.

determine who has suffered this damage, as is required for the Cartagena Protocol.¹³⁹

The Basel Protocol was able to reconcile the interests of exporters and importers by placing a cap on the damages available when strict liability is invoked.¹⁴⁰ This prevents any one party from being the absolute insurer of safety, while maintaining at least partial redress for the injured. For fault-based harms resulting from a party not following the provisions of the Basel Convention, there is no cap on damages.¹⁴¹ Another wise provision of the Basel Protocol requires importers and exporters to maintain insurance up to the limits stated in Annex B for strict liability harms.¹⁴² These provisions could be features of the Cartagena Protocol as well. Capping damages protects LMO exporters from excessive liability costly enough to force them out of the biotechnology industry altogether. This would be unfortunate because biotechnology has significant benefits, such as increased agricultural productivity.¹⁴³

Although the Basel Protocol and the Cartagena Protocol both focus on the effects of transboundary shipping, hazardous waste shipments generally cause immediate, quantifiable harms, whereas harms from LMO shipment are more uncertain and will take years to unfold. For these reasons, the Basel Protocol's definition of damage does not provide much guidance to the Liability Working Group. However, the Cartagena Protocol's liability regime should incorporate bifurcated liability, damage caps and required liability insurance

B. *Civil Liability for Nuclear Damage*

Four major treaties encompass the global liability regime for nuclear damages¹⁴⁴ and can help guide the Cartagena Protocol's

139. *Id.* at 195 (citing Note by the Executive Secretary, Intergovernmental Committee for the Cartagena Protocol on Biosafety, UNEP, Oct. 1-5, 2001, *Liability and Redress for Damage Resulting from the Transboundary Movements of Living Modified Organisms: Review of Existing Relevant Instruments and Identification of Elements*, ¶2, U.N. Doc. UNEP/CBD/ICCP/2/3 (2001), available at <http://www.biodiv.org/doc/meeting.asp?wg=ICCP-02&thm=CPB>).

140. Basel Protocol, *supra* note 125, art. 12(1), Annex B.

141. *Id.* at art. 12(2).

142. *Id.* at art. 14.

143. Adler, *supra* note 28, at 777.

144. See Vienna Convention on Civil Liability for Nuclear Damage of 1963, 1063 U.N.T.S. 265; Paris Convention on Third Party Liability in the Field of Nuclear Energy of 1960, 956 U.N.T.S. 264 (1960); 1963 Brussels Convention, 2 I.L.M. 685 [hereinafter 1963 Brussels Convention]; Joint Protocol Relating to the Application of the

liability regime design. All of the nuclear treaties impose strict liability on the operator, regardless of fault.¹⁴⁵ A causal connection between the damage and the nuclear incident is the only showing required of the injured party.¹⁴⁶ Even though these treaties are in force, the fact that the major nuclear countries have not signed them deprives them of significant authority.¹⁴⁷ Despite their lack of worldwide influence, the nuclear civil liability regimes do offer some guidance for the Liability Working Group.

Like the Basel Protocol, the nuclear regimes extend liability to private actors and sovereign states, require operators to maintain insurance for harms caused by their nuclear facilities, and set caps on damages.¹⁴⁸ Because damage from nuclear sources may exceed the cap, the 1963 Brussels Convention requires the state of origin to supply some compensation if the cap is not sufficient. And if damage is even more excessive, the Brussels Convention requires parties to jointly compensate the injured.¹⁴⁹ Establishing caps on damage and providing a residual state or market-share contribution has the advantage of providing redress to the injured while spreading costs.¹⁵⁰ The Liability Working Group should consider these options.¹⁵¹

If parties to the Cartagena Protocol attempted to impose almost absolute liability on manufacturers or planters, they would

Vienna Convention on Civil Liability for Nuclear Damage and the Paris Convention on Third Party Damage in the Field of Nuclear Energy, 16 U.N.T.S. 302 [hereinafter 1988 Joint Protocol].

145. Duncan E.J. Currie, *The Problems and Gaps in the Nuclear Liability Conventions and an Analysis of How an Actual Claim Would Be Brought Under the Current Existing Treaty Regime in the Event of a Nuclear Accident*, 35 DENV. J. INT'L L. & POL'Y 85, 87 (2006). Also note that there are some exceptions to strict liability, including acts of war or grave natural disaster. *Id.* at 101.

146. HUNTER, *supra* note 2, at 992.

147. See Sachs, *supra* note 24, at 857-58 (illustrating an "overall problem with [nuclear] liability treaties" is that "major nuclear states such as the United States, Canada, South Korea, and Japan have all refused to ratify the nuclear liability conventions").

148. Currie, *supra* note 145, at 87.

149. 1963 Brussels Convention, *supra* note 144, art. 3; HUNTER, *supra* note 2, at 992.

150. Boyle, *supra* note 100, at 21-22 ("Additional compensation funding should also be provided, as in many of the existing conventions. It is not prescriptive about who should provide the funds - industry, if appropriate - or if the measures available are insufficient then it should fall to states to ensure additional resources are allocated.").

151. Currie, *supra* note 145, at 94 ("[A] properly structured and well capitalized fund can ensure compensation and remediation regardless of fault, exceptions or the capitalization of defendants.").

encounter significant opposition. Damage from a nuclear incident is almost certain to be devastating, whereas damage from genetic drift caused by unintentional cross-pollination is not even certain to occur, although its effects could be widespread and very serious.¹⁵² Holding exporters or other actors in the LMO industry to such a high degree of liability could make biotechnology cost-prohibitive. The Liability Working Group must attempt to create a regime that will likely be ratified, not just focus on maximum compensation. Thus, assigning absolute liability to one actor is not workable.

The definition of damage adopted by these nuclear treaties focuses on the quantifiable damages to human health, property or the environment;¹⁵³ it does not redress amorphous injuries to biodiversity. And despite the quantifiable definition for damages, the nuclear treaties also face a latent effects problem similar to the LMO context: “[T]he existence of radiation may not be known, consequences may not be manifested until later generations, and even when they are manifested, the causes may not be known or may be difficult to prove.”¹⁵⁴ Critics of the nuclear treaties suggest addressing these difficulties by shifting the burden of proof to defendants, who would have to show that their activities did not cause the damage.¹⁵⁵ Another option for mitigating causation problems is to increase the statute of limitations to allow for proper research of causal elements¹⁵⁶ and start the statute of limitations from “the time [harm] becomes known or reasonably should have become known to the claimant.”¹⁵⁷

The Cartagena Protocol’s causation issue is similar to the nuclear treaties’ lag time problem. Like radiation effects, LMOs may not impact human health or biodiversity for many years fol-

152. See *supra* Part II.

153. Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage, art. 2, Sept. 12, 1997 (stating that nuclear damage means:

(iii) economic loss arising from loss or damage [referring to person or property];

(iv) the costs of measures of reinstatement of impaired environment; (v) loss of income deriving from an economic interest in any use or enjoyment of the environment, incurred as a result of significant impairment of the environment; and (vi)

the costs of preventative measures),

available at <http://www.iaea.org/Publications/Documents/Conventions/protamend.html>.

154. Currie, *supra* note 145, at 86.

155. *Id.* at 100.

156. *Id.* (explaining that Sellafield nuclear facility had caused cancers in nearby areas, but research was too new at the time the claim had to be filed to adequately convince the English court).

157. *Id.* at 93.

lowing transport and planting. The Liability Working Group should consider this critique of the nuclear regimes and toll the statute of limitations from when the injured party reasonably should have recognized the damage, rather than from when LMO transport occurred. The Cartagena Protocol's liability regime also should reverse the burden of proof so LMO exporters have the opportunity to refute their responsibility for particular damages, but the injured parties do not need to affirmatively establish causation beyond showing which category of LMO caused their injury.

Although the nuclear treaties' definition of damage would not apply to diminished biodiversity, a liability regime for LMOs could benefit from damage caps on harm, mandatory liability insurance, a defendants' burden of proof and distribution of damages exceeding the cap to states and other parties to the Cartagena Protocol.

C. *Civil Liability for Oil Pollution Damage*

Two main civil liability treaties and two protocols manage oil pollution damage from tanker leaks or spills.¹⁵⁸ These regimes impose strict liability¹⁵⁹ on ship owners for damage from oil transboundary shipments.¹⁶⁰ The Cartagena Protocol's liability regime should include the compulsory liability insurance system, the definition of damages and the Convention Fund found in these treaty instruments.

The oil pollution treaties require ship operators to obtain liability insurance based on the amount of oil tonnage carried and the size of the ship.¹⁶¹ If an accidental spill occurs, the ship

158. See 1992 Protocol to International Convention on Civil Liability for Oil Pollution Damage, Dec. 2, 1992 [hereinafter 1992 Protocol to Oil Pollution Damage] reprinted in 6A-VI Benedict on Admiralty Doc. No. 6-3 (Frank L. Wiswall, Jr. ed., 2001); 1992 Protocol to International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, Dec. 2, 1992, [hereinafter 1992 Protocol Fund], reprinted in Benedict, *supra*, at Doc. 6-9B; 1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, Dec. 18, 1971, 1110 U.N.T.S. 57; 1969 International Convention on Civil Liability for Oil Pollution Damage, Nov. 29, 1969, 973 U.N.T.S. 3.

159. 1992 Protocol to Oil Pollution Damage, *supra* note 158, art. III. Exceptions include acts of war, acts wholly caused by third parties, and acts resulting from maritime authorities not maintaining navigational aids.

160. Mans Jacobsson, *The International Liability and Compensation Regime for Oil Pollution from Ships—International Solutions for a Global Problem*, 32 TUL. MAR. L.J. 1, 2 (2007).

161. *Id.* at 4.

owner's insurer may provide significant compensation.¹⁶² In the event of an intentional or recklessly negligent spill, however, the ship owner himself is totally liable for the damage.¹⁶³ If a ship owner is liable due to an exception (e.g., the spill was caused by an act of war), the owner did not carry enough insurance and is not financially solvent, or the cost of remediation exceeds the owner's obligation based on the size and tonnage of his ship, injured parties may access the Convention Fund to obtain additional compensation up to the limit for a single incident.¹⁶⁴ The Fund is supported by oil industries in Convention member states based on the amount of oil imported to their states.¹⁶⁵ Observers were initially skeptical as to whether the oil industry would comply with the regime, but companies have contributed at a 99.8 percent rate.¹⁶⁶ Overall, the compensation regime for oil damage has functioned remarkably well.¹⁶⁷

The Cartagena Protocol lends itself to a compulsory insurance regime with a compensatory fund similar to the fund adopted by oil pollution treaties. The main exporters of LMOs are among the largest biotechnology companies in the world and have the financial capability to obtain insurance. The regime could limit exporters' liability based on the amount of LMOs exported so smaller industries do not bear disproportionate costs of LMO impacts. The parties to the Cartagena Protocol could establish a compensatory fund to account for any damages beyond the responsible party's insurance coverage. This type of regime can hold the polluter responsible, while spreading costs across the entire exporting, agricultural biotechnology industry.¹⁶⁸

162. *Id.*

163. *Id.* at 5.

164. *Id.* at 6 (explaining that the 2003 allowable amounts for a single incident were \$1.17 billion, U.S. dollars, including contributions from the funds and the base amount of \$317 million under the 1992 Protocol).

165. 1992 Protocol Fund, *supra* note 158, art. 15(2); Jacobsson, *supra* note 160, at 7 (stating that the 1992 and 1971 funds are administered by delegates from the member states that meet at regular sessions to determine how to distribute compensation).

166. Jacobsson, *supra* note 160, at 7.

167. *Id.* at 32 (“[I]t is fair to say that this regime has functioned reasonably well in most cases over the years, and it is one of the most successful compensation schemes in existence. It is particularly important that the great majority of all compensation claims have been settled amicably as a result of negotiations.”).

168. See Sachs, *supra* note 24, at 892 (explaining that a compensation fund “is an attractive means of securing more widespread acceptance and ratification of civil liability rules”).

A drawback to a compensatory fund is that it “dilutes the deterrent incentives,” because “culpable parties would not be held fully and individually responsible for any damage they cause.”¹⁶⁹ However, deterrence is less valuable for the Cartagena Protocol than for the oil pollution treaties, because deterrence cannot stop naturally occurring transboundary movement of LMO DNA. In addition, a fund would encourage ratification and guarantee some redress to injured parties.¹⁷⁰

The 1992 Protocol to International Convention on Civil Liability for Oil Pollution Damage defines “pollution damage” as damage caused by contamination and includes the cost of “preventive measures” to prevent or minimize pollution damage and further loss or damage caused by such measures.¹⁷¹ Generally, these damages consist of property damage, the cost of cleanup, economic losses to fisheries and tourism, and environmental damage.¹⁷² The oil pollution treaty fund employs an external group of experts who actuate and process claims for damages to ensure that this definition is consistently applied for each spill.¹⁷³ The Cartagena Protocol also could establish a group of experts to consistently evaluate which harms to biodiversity and human health are redressable. Consistent panel decisions will help hone the definition of biodiversity harm and make the application of penalties less arbitrary.

V.

AN IDEAL LIABILITY REGIME FOR THE CARTAGENA PROTOCOL AND COMPARISON TO THE LIABILITY WORKING GROUP'S CURRENT DIRECTION

The following sections critique the Liability Working Group's current liability and redress draft, which was proposed at the Fourth Meeting of the Parties in May 2008, by comparing it to the best aspects of the predecessor civil liability regimes discussed in the previous section. This part focuses on four major components of a liability regime: (1) establishing responsible parties and channeling liability, (2) deciding on the standard of lia-

169. *Id.*

170. *See infra* note 185 and accompanying text.

171. 1992 Protocol to Oil Pollution Damage, *supra* note 158, art. I (6)(a)-(b).

172. Jacobsson, *supra* note 160, at 9-10.

173. *Id.*

bility, (3) quantifying injury and damages and (4) proving causation.

A. *Establishing Responsible Parties and Channeling Liability*

The polluter pays principle is well-established in major international civil liability regimes.¹⁷⁴ It would be equitable for the Cartagena Protocol also to funnel liability to the parties responsible for adverse effects to human health and biodiversity. The LMO-exporting agricultural biotechnology industry is manufacturing, transporting and profiting from the genetically modified products. To prevent liability from becoming cost-prohibitive to the future of the biotechnology industry, however, the Cartagena Protocol should follow the example of other civil liability regimes by placing caps on damages.¹⁷⁵ The liability regime should also require exporters to maintain liability insurance up to the value of these caps.¹⁷⁶

Sovereign states are less involved in the production and transport of LMOs than manufacturers, although states do have some power to control industry.¹⁷⁷ It appears that “transboundary damage may still happen, however diligent the state has been in regulating and controlling the harmful activity.”¹⁷⁸ Even when due diligence is performed, it is inequitable to force the impacted state or individual to bear the whole burden of harm if the polluter cannot be found or is unable to pay.¹⁷⁹ LMO manufacturers who earn profits from their products should be held to a higher standard of care to ensure their seeds do not cause harm to importing states or individuals.¹⁸⁰

To balance the competing interests of redressing victims and preventing states from becoming “guarantors for industry,” states should contribute to redress, but only as residual

174. Philippe Cullet, *Liability and Redress for Human-Induced Global Warming: Towards an International Regime*, 43A STAN. J. INT’L L. 99, 111 (2007).

175. See *supra* Part IV.

176. See *supra* Part IV.

177. Boyle, *supra* note 100, at 6–7 (“[T]ransboundary pollution damage resulting from the activities of industry or business will not in normal circumstances be attributable to the source state in international law.”).

178. *Id.* at 7.

179. *Id.*

180. This is a basic postulate of products liability. See, e.g., Montalbano, *supra* note 26, at 130 (arguing that products liability is appropriate for manufacturers of genetically enhanced bentgrass seeds because “it is crucial to ensure manufacturers produce a safe product and provide proper disclosures about the risks therein”).

sources.¹⁸¹ States with large biotechnology companies within their borders benefit economically and from increased crop yields. Therefore some contribution towards compensation is equitable. The Basel Protocol, nuclear treaties, and oil pollution treaties also adopt the view that states should contribute residual compensation. None of these civil liability treaties, however, place a heavy liability burden on states unless they are directly involved in the transport or production of the hazardous activity.¹⁸² For example, the 1963 Brussels Convention only requires sovereign states to contribute residual funds when damages exceed the liability cap placed on nuclear operators.¹⁸³ The clear drawback to imposing residual liability is the likely hesitation of states to ratify this regime without defined limitations to their responsibility.

An even more secure way to compensate victims is a fund based on the amount of LMO exports, supplied by the biotechnology industry and states that are parties to Cartagena Protocol. Arguably, both importing and exporting states benefit from biotechnology and should contribute to this fund, which could be administered similarly to the 1992 Protocol to International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage.¹⁸⁴ Injured parties could access the fund when damages exceed private liability caps or when a private actor is otherwise unable to pay damages. The biotechnology industry has indicated its openness to the idea of such a compensatory fund.¹⁸⁵ A liability regime that couples this option with compulsory insurance may provide the best way to protect all parties' interests without imposing excessive or undefined liability on individual states or private industry.

Current negotiations by the Liability Working Group indicate that the Cartagena Protocol is at least considering a supplementary compensation scheme where states will be responsible for financing the "unsatisfied portion" of the injured party's claim.¹⁸⁶

181. *Id.*

182. *See supra* Part IV.

183. *See supra* Part IV.B.

184. 1992 Protocol Fund, *supra* note 158.

185. Cook, *supra* note 68, at 375 ("A number of biotechnology industry representatives raised informally the idea of a voluntary industry fund, based on contributions by industry, which could be used to meet the costs of damage arising from the transboundary movement of LMOs.").

186. MOAHWG-5, *supra* note 58, at 27; COP-MOP 4, *supra* note 62, at 98 (altering the text slightly to read "Parties, other Governments as well as governmental,

The Working Group also is negotiating a "supplementary collective compensation arrangement," which will accept voluntary contributions from the "private sector, parties to the Protocol and other Governments."¹⁸⁷ One concern with the current drafting of the supplementary arrangement is that contributions to the fund would be *voluntary*. The success of the 1992 oil pollution damage fund owes to the *requirement* that industry participates.¹⁸⁸ Voluntary contribution to a compensatory fund likely will result in an undercapitalized fund. The current draft also is considering residual state liability if an individual party cannot cover the full cost of damages.¹⁸⁹ This may discourage states from ratifying the liability rules, because states do not want to absorb excessive costs not covered by the LMO industry. The current draft does not include any provisions for limiting liability but proposes states create a fund to redress uncompensated damages. This lack of defined liability limits is not advisable because, as has been shown with the Basel Protocol, states hesitate to ratify agreements unless liability limits exist.¹⁹⁰

B. *Deciding the Standard of Liability*

Almost all existing civil liability regimes adopt a strict liability standard that channels liability to the responsible party.¹⁹¹ Often environmental damage, such as unintentional genetic drift from LMOs, occurs without intent, awareness or negligence. When tort law is the only route to compensation, this situation leaves the injured with an impossible burden of proof if they must establish standards of reasonable care and breach.¹⁹² Strict liability removes the requirement that plaintiffs must prove fault and in-

intergovernmental and non-governmental organizations, the private sector and other sources will be invited to contribute").

187. MOAHWG-5, *supra* note 58, at 27.

188. Jacobsson, *supra* note 160, at 6.

189. COP-MOP 4, *supra* note 62, at 98.

190. Boyle, *supra* note 100, at 14 (explaining that states may be held responsible if acting in the chain of transport); *see also* Basel Protocol, *supra* note 125, art. 12(2) (where there are no liability caps when negligent actions occur). Because states can be held liable as actors and because parts of the Basel Protocol do not have liability caps, states can be exposed to unlimited liability).

191. Boyle, *supra* note 100, at 13 ("The choice of strict, or in exceptional cases absolute, liability is an invariable feature of all the international liability conventions."); Cullet, *supra* note 174, at 111. These regimes include the Oil Pollution Damage Regimes, the Nuclear Damage Regimes and the Basel Protocol. *See supra* Part IV.

192. *See* Boyle, *supra* note 100, at 13 (explaining the rationales for non-fault liability in international environmental law).

stead requires that the injured only show a causal link between the damage and the defendant.

The Basel Protocol is unique in applying a negligence standard to parties who act contrary to the provisions of the Basel Convention, but a strict liability standard for harms without fault.¹⁹³ Parties found liable under the negligence standard can be assessed an unlimited amount of damages, whereas parties found liable under strict liability are liable only up to a certain capped amount.¹⁹⁴ This dichotomy would be appropriate for the Cartagena Protocol as well. The threat of unlimited liability for adverse effects stemming from a manufacturer's lack of compliance with the Cartagena Protocol would significantly encourage manufacturers to follow the Protocol's provisions, like the AIA and risk assessments. *Capped* redress for injured parties that cannot prove fault would prevent the biotechnology industry from becoming an insurer of safety, but still provide some compensation for damages.

The Liability Working Group considered strict liability, mitigated-strict liability and fault-based liability regimes at its most recent meeting in March 2008.¹⁹⁵ It presented these options to the Bonn delegation in May 2008.¹⁹⁶ The mitigated-strict liability regime closely mirrors the Basel Protocol and this Comment's recommendation to use fault-based criteria when a party has violated other Cartagena Protocol provisions, and strict liability when no violations have occurred. The Liability Working Group also suggested an automatic switch to strict liability under the mitigated regime when the LMO is identified as ultrahazardous or if national law has been violated.¹⁹⁷ In both strict and fault-based parts, the mitigated regime channels liability to the party who caused the damage.¹⁹⁸ One drawback to the Liability Working Group's current draft is that there is no defined damage cap for the strict liability part of the regime,¹⁹⁹ although there are exemptions to liability if caused by acts of war, *force majeure*, or

193. See *supra* Part IV.A.

194. See *id.*

195. MOAHWG-5, *supra* note 58, at 19-20.

196. COP-MOP 4, *supra* note 62, at 94-95.

197. MOAHWG-5, *supra* note 58, at 20; COP-MOP 4, *supra* note 62, at 94.

198. MOAHWG-5, *supra* note 58, at 20; COP-MOP 4, *supra* note 62, at 94.

199. COP-MOP 4, *supra* note 62, at 96 ("Domestic law may provide for financial limits for strict liability[, provided that such limits shall not be less than [z] special drawing rights].").

a proven intervention by a third party.²⁰⁰ The lack of defined damage caps reduces the likelihood of ratification because neither states nor individual actors want to be liable for extraordinary damages associated with LMOs.

C. *Quantifying Injury and Damages*

Civil liability regimes are well equipped to redress adverse effects to human health, property and the environment.²⁰¹ Therefore, quantifying and redressing damage to human health should not be a problem for the Cartagena Protocol's regime. But no civil liability regime ever has addressed harms to biodiversity, loss of genetic variability, or adverse effects to ecosystems.²⁰² Article 14 of the CBD (the parent treaty and catalyst to the Cartagena Protocol) defined what constitutes redressable injury to biodiversity, but relied on a vague "significant impact" standard.²⁰³ This standard is based on an imprecise evaluation and fails to give parties adequate notice.²⁰⁴ The CBD suggests that in-kind restitution can substitute when restoring biodiversity is not possible.²⁰⁵ Although valuing biodiversity damage is difficult, the Cartagena Protocol's main purpose will be frustrated if the liability regime fails to do so.²⁰⁶

This Comment argues that allocating damages for environmental harms protects biodiversity, even if not redressing all genetic variability benefits. Adopting a liability regime that redresses

200. COP-MOP 4, *supra* note 62, at 95.

201. *See* Cullet, *supra* note 174, at 113 ("Damage to the environment has usually been taken into account through the consideration of damages to persons and property as well as economic interests."); *see supra* Part IV.

202. Cullet, *supra* note 174, at 113 ("[E]ven newer treaties do not usually take into account compensation for non-economic components of the environment where measures to restore the environment cannot be taken.").

203. UNEP, *Liability and Redress in the Context of Paragraph 2 of Article 14 of the Convention on Biological Diversity: An Analysis of Pertinent Issues*, U.N. Doc. UNEP/CDB/EG-L&R/1/2/Rev.1 (Aug. 2005), available at <http://www.cbd.int/doc/meetings/lr/eglr-01/official/eglr-01-02-rev1-en.doc> [hereinafter CBD Article 14 Eval.].

204. The "significant impact" standard is based on evaluation of the extent, magnitude, duration, and reversibility of the impact and the sensitivity and rarity of the resources. *See id.* at 6 (conceding that biodiversity is a broad concept and "variability among living organisms" is difficult to quantify).

205. *Id.* at 8.

206. The Cartagena Protocol explicitly states that "the objective of this Protocol is to contribute to ensuring an adequate level of protection in the field of the safe transfer, handling, and use of living modified organisms resulting from modern technology that may have adverse effects on the *conservation and sustainable use of biological diversity*." Cartagena Protocol, *supra* note 16, art. 1 (emphasis added).

the more straightforward human, property and environment damages may be preferable to attempting to define and redress biodiversity damage. Although not addressing biodiversity skirts the specific purpose of the Cartagena Protocol, the goal of the Liability Working Group is to adopt a liability regime that has the potential for ratification. Holding exporters strictly liable for an amorphous biological standard would likely limit parties' willingness to ratify the agreement.

The draft produced at the March 2008 meeting of the Liability Working Group and refined at the Fourth Meeting indicates that biodiversity damages will be included in the liability regime.²⁰⁷ The draft text attempts to limit the uncertainty in the proposed definition of biodiversity by requiring a claiming party to show measurable, significant harm to the conservation and sustainable use of biological diversity.²⁰⁸ The Liability Working Group also includes optional phrasing that would require biodiversity damage to result in loss of income or impaired property in order for it to be redressable.²⁰⁹ These two standards of biodiversity harm are more quantifiable than trying to determine the loss of variability to species and redress equal to the costs of restoration, rehabilitation or loss prevention.

D. *Proving Causation*

The Liability Working Group recognized the significant lag time between the transport of LMO seeds and potential harm.²¹⁰ During this time, other intervening forces may affect biodiversity and human health, making it difficult for the injured party to determine the harm's cause. The Cartagena Protocol should follow the nuclear treaty commentators' suggestion that the injured party need only show a causal connection between the damage and the incident.²¹¹ Proof of negligence is not required. A reversed burden of proof would give LMO manufacturers the opportunity to refute their involvement with particular damages from biotechnology, but the injured parties would not have to affirmatively establish causation beyond showing that biotech-

207. COP-MOP 4, *supra* note 62, at 93. The draft also indicates that economic damages and "loss of or damage to cultural, social and spiritual values, or other loss or damage to indigenous or local communities, or loss of or reduction of food security" may be included as redressable injuries.

208. MOAHWG-5, *supra* note 58, at 9; COP-MOP 4, *supra* note 62, at 94.

209. MOAHWG-5, *supra* note 58, at 9; COP-MOP 4, *supra* note 62, at 94.

210. Cook, *supra* note 68, at 374.

211. HUNTER, *supra* note 2, at 992; *see supra* Part IV.B.

nology caused their injury. The draft proposed by the Liability Working Group at the Fourth Meeting requires that causation standards and the burden of proof follow relevant domestic law.²¹² This proposal does not adequately advise parties of their possible liability, because domestic laws differ. As such, the Liability Working Group should create a clearer picture of causation, or eliminate fault-based causation, before attempting to ratify the liability regime.

The Liability Working Group should also permit the statute of limitations to run from when the injured party reasonably should have recognized the damage, rather than from when LMO transport occurred. The 2008 draft ties the statute of limitations to domestic law, which does not put parties on notice of their potential liability.²¹³ The Liability Working Group obliquely references a limitation period anywhere from three to twenty years.²¹⁴ The Liability Working Group must resolve these details before ratification.

VI. CONCLUSION

This Comment advocates that the Cartagena Protocol adopt a mitigated-strict liability regime with a supplementary compensatory fund. The strict liability part of the regime should have capped damages. The negligence part of the regime should be able to impose unlimited damages on responsible parties. The biotechnology industry and their exporters should be required to invest in liability insurance at least to the amount in the strict liability damage cap. States that are parties to the Cartagena Protocol and exporting members of the agricultural biotechnology industry should be required to contribute to a supplementary fund that will allocate compensation to injured parties if they are left without recourse because the responsible party is insolvent.

The Liability Working Group's proposals at the May 2008 Meeting of the Parties indicates that some of these suggested provisions will be adopted in their proposed regime, but the current draft lacks a damage cap, does not define causation or the statute of limitations, and requires redressing ill-defined bi-

212. COP-MOP 4, *supra* note 62, at 89, 94.

213. COP-MOP 4, *supra* note 62, at 87, 91.

214. COP-MOP 4, *supra* note 62, at 91.

odiversity damages. These qualities may make the draft more difficult to ratify than other civil liability regimes.

Although the Liability Working Group may present a final draft proposal in 2010, there is no guarantee the regime will actually enter into force. Many of the established civil liability regimes, including the Basel Protocol, are not active, because the regimes lack the required number of party ratifications. The Cartagena Protocol entered into force in 2003 when the fiftieth party ratified the document. For a proposed liability regime to take effect, the Conference of Parties will have to establish a number of signatories necessary for ratification and then wait for these parties to ratify the agreement. The length of this process is unknown, but if other civil liability regimes are a guide, ratification may be close to impossible. In order to achieve some kind of liability and redress system in the near future, the Conference of Parties may have to reconsider the work of the Liability Working Group and resort to a much less comprehensive option.