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THE PROBLEM OF SOCIAL COST IN A GENETICALLY MODIFIED AGE

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THE PROBLEM OF SOCIAL COST IN A GENETICALLY MODIFIED AGE

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*Genetically modified pollen drifting onto the field of a neighboring farm may cause substantial harm. If the bystander farmer is growing non-genetically modified crops, she may suffer a pecuniary loss due to genetic 'pollution.' If the pollen is patented, the patentee may also claim harm stemming from the unauthorized distribution of its proprietary genetic material. Disputes arising from pollen drift present classic legal questions arising under the law of neighbors and classic economic questions broached most famously by Ronald Coase in his essay on *The Problem of Social Cost*. The application of the Coase Theorem and its most applicable corollary strongly suggest that: 1) balancing rules under nuisance law should be applied on a case-by-case basis to determine whether any particular genetic polluter should be liable for damages caused by pollen drift; and 2) most bystander farmers should have viable defenses to patent infringement. Venerable legal principles applied to this new problem suggest the same two conclusions. Proving both propositions provides a textbook demonstration for the usefulness of economic analysis and solves a world-wide multi-billion dollar legal problem.*

One fundamental impetus for the development of modern law stems from the need to settle disputes between neighbors. Indeed, the focus of the most-cited article¹ in law review history, Ronald Coase's *The Problem of Social Cost*,² is firmly on the issue of how the law

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¹ Fred R. Shapiro, *The Most-Cited Law Review Articles Revisited*, 71 CHI.-KENT L. REV. 751, 766 (1996).

² See R. H. Coase, *The Problem of Social Cost*, in *THE FIRM, THE MARKET AND THE LAW* 95-156 (1988), reprinted from 3 J.L. & ECON. 1 (1960)

should deal with someone who interferes with the use of a neighbor's property. The myriad of uses to which Coase's analysis has been put over the last 40 years³ has obscured the relatively straightforward nature of the question that interested him: Should the law force an entity to bear the full cost its behavior imposes on society? When one neighbor harms another, should the law impose liability in the form of a damages action, or in the form of a tax (as suggested famously by Pigou⁴) or, perhaps, do nothing at all?

The original conundrum contemplated by Coase arises with spectacular clarity in the context of the emerging problem of pollen drift. Genetically modified (GMO) crops constitute a significant segment of agricultural production,⁵ and pollen from these crops drifts inexorably across property lines. Consider the situation faced by farmers in the United States who grow non-genetically modified (non-GMO) crops for buyers in jurisdictions that heavily regulate or forbid the sale of genetically modified food products, like in the European Union ("EU") or Japan, or who sell to purveyors of organic food products in the United States or elsewhere. The market for non-GMO crops is enormous,⁶ and such goods often command a premium price,⁷ but

³ See, among many, Paul E. McGreal & DeeDee Baba, *Applying Coase to Qui Tam Actions Against the States*, 77 *Notre Dame Law Rev.* 87 (2001) or David Dudley, *The Coase Theorem as Applied to Trade Barriers and Optimal Adjustment Strategies*, 19 *U. Pa. J. Int'l Econ. L.* 1029 (1988). Westlaw currently retrieves 70 law documents in its law journal database (JRL) that contain the words Coase or Coasean in their titles.

⁴ See A.C. Pigou, *The Economics of Welfare* (4th ed. 1932), discussed in Coase, *supra* note 2, at 133-153.

⁵ See *infra* note X.

⁶ See *infra* notes X-Y and accompanying text. Japan and the EU are two obvious markets, but even large American buyers, like Gerber baby foods, are going non-GMO. See Drew Kershen, *The Risks of Going Non-GMO*, 53 *Okla. L. Rev.* 631, 633 (2000) ("In September 1999, Gerber announced that its baby food products would no longer use any ingredients from genetically modified crops."). See also "Frito Lay Asks Farmers to Plant Only Non-GMO Corn in 2000," *Bloomberg Business Newswire*, Jan. 27, 2000.

due to the widespread planting of GMO crops,⁸ non-GMO farmers run the constant risk of contamination by pollen from patented genetically modified plants.⁹ If a farmer has a forward contract for non-GMO corn for sale in Europe, and her corn fields are pollinated by a neighbor's genetically modified crop, then the anticipated premium¹⁰ from selling the non-GMO crop will be lost. More importantly, the non-GMO farmer may find herself unable to sell the contaminated crop at all. If her plants are now found to contain patented cell structures claimed by the patentee of the GMO corn, then the farmer is arguably a patent infringer and selling her crop without the patentee's permission will be fraught with risk.

The possibility of patent law exacerbating the harm done to the victim of this type of pollution adds an intriguing twist to the original problem. Although the fact of contamination through pollen drift is very real for non-GMO farmers, the danger posed by patent law may seem

⁷See FAO, World Markets for Organic Fruit and Vegetables (Int'l Trade Center 2001) (premium for organic products in the United States range from 11-121%); *see also infra* note 18 (study finding that Japanese college students were willing to pay 33-40% more for non-GMO soybean oil); Flood, *supra* note , at 474 (noting price of organic corn at \$4 per bushel, while genetically modified corn sold for \$1.67). *See also* Scanlon, *supra* note , at 1 ("Farmers who cultivate organic crops stand to earn a substantial premium in these markets if their crops can pass a rigorous testing procedure for GMO's. It is this market premium available on organic crops that makes the concept of 'pollen drift' such a significant threat to organic farmers.").

⁸See CENTER FOR FOOD SAFETY, MONSANTO VS. U.S. FARMERS 8 (2005) (GMO crops make up 85 percent of United States soy acreage, 45 percent of the corn acreage, 76 percent of the cotton acreage, and 84 percent of the canola acreage.)

⁹See Grossman, *supra* note , at 229 One incident of cross-pollination involved Bt corn, cultivated in Texas, that contaminated the fields of a certified organic farmer. Terra Prima, a Wisconsin food processing company, had used the organic farmer's corn to make organic tortilla chips, which were shipped to Europe. DNA testing revealed traces of Bt corn, and the food company had to destroy 187,000 bags of chips, worth over \$500,000. *See also* Repp, *supra* note , at 591-92 (describing other incidents of contamination).

¹⁰*See supra* at note .

far-fetched because, in most areas of the law, innocent bystanders¹¹ have a complete defense.¹² Patent law, however, is based on the concept of strict liability.¹³ If a department store sells an infringing product, for example, the store is liable whether it knew the product was infringing or not.¹⁴ A scientist working in her lab is guilty of patent infringement even if she has no idea that the new compound she has just synthesized happens to encompass the claims of an existing patent.

Monsanto, the world's leading agricultural biotech corporation,¹⁵ has been particularly active in using patent law to police anyone it finds to be growing its patented plants—including bystanding farmers.¹⁶ For instance, in the famous Schmeiser¹⁷ litigation, Monsanto, and other

¹¹Whenever we use the phrase “bystanding farmer,” we refer to a farmer whose fields have been contaminated by unwanted genetic material against the will of the farmer.

¹² See *infra* notes X – Y and accompanying text (discussing innocent bystanders in context of criminal law).

¹³ See *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512, 1527 (Fed. Cir. 1995) (“Infringement . . . is a strict liability offense . . . and a court must award damages adequate to compensate for the infringement, . . . regardless of the intent, culpability, or motivation of the infringer.”).

¹⁴See Roger D. Blair & Thomas F. Cotter, *An Economic Analysis of Seller and User Liability in Intellectual Property Law*, 68 U. Cin. L. Rev. 1 (1999) (“Because patent infringement [like copyright and trademark infringement] is a strict liability tort, the patentee may enjoin the unauthorized manufacture, use, or sale of the invention, regardless of the infringer's state of mind.”).

¹⁵ Monsanto has 85% of its research and development budget, or \$430 million annually, invested in biotechnology. See *Monsanto Co., 2004 Annual Report*, at www.monsanto.com/monsanto/layout/investor/financial/annual_reports.asp. Monsanto's GMO crops have been more successful than any other biotech company's, supplying the technology for 90% of the world's GMO crops. See *CENTER FOR FOOD SAFETY, MONSANTO VS. U.S. FARMERS 10* (2005). Monsanto holds 647 biotech plant patents, more than any other biotech company. *Id.*

¹⁶See Kershen, *supra* note , at 582-83. See *CENTER FOR FOOD SAFETY, supra* note X, at 4.

commentators, took the position that a bystanding farmer would be liable for patent infringement stemming from windblown GMO pollen.¹⁸ In fact, Monsanto's lead in its industry is certainly due in part to its use of forceful investigations and prosecutions against those it suspects of patent infringement, regardless of whether such infringers are willful or are even aware of their alleged infringement.¹⁹ In short, Monsanto is in the unique position of being able to take a problem that it created – the contamination of non-GMO plants by pollen drift from GMO plants – and use it to its advantage by prosecuting those bystanding farmers whose crops become contaminated.²⁰

Although some articles have discussed the phenomenon of pollen drift,²¹ none have

¹⁷ *Monsanto Canada Inc. v. Schmeiser*. 2004 SCC 34, D.L.R. (4th) 271, 320 N.R. 201, 1.S.C.R. 902 (2004).

¹⁸ *See id.* at X. *See also* Leora Broydo, December 13, 2000 <http://www.motherjones.com/news/feature/2000/12/schmeiser.html> (“In many ways, the law is on Monsanto's side in this case. Under patent law, it doesn't really matter whether Schmeiser knew what he was doing or not, he's still an infringer,” says Dan Burk, a professor at the University of Minnesota Law School who specializes in biotechnology and intellectual property law.”) Although the defendant canola farmer claimed to be an innocent bystander, the court found that he deliberately planted seeds that he knew to be infringing. The seeds might have been innocently produced by Schmeiser's plants due to pollen drift, but the court found it unnecessary to determine how the infringing seeds were produced in the first place, given that Schmeiser knowingly saved and deliberately planted them.

¹⁹ *See* CENTER FOR FOOD SAFETY, *supra* note X, at 4.

²⁰ Monsanto devotes 75 full-time employees and \$10 million per year to prosecutions and investigations. It is believed that actions and investigations by Monsanto against farmers number into the thousands, with most settling outside of court in confidential agreements. *Id.* at 4. Generally, the company initiates between 500 and 600 new investigations each year, many of which are the result of tips called in to the company's toll-free hotline. *Id.* Farmers report that investigators often go onto the lands without permission, sometimes arrive with police escorts, or sometimes even conduct clandestine surveillance of the farmers' premises. *Id.* at 24. In one account, a farmer relates that the company informed him that it spent over \$250,000 hiring the Pinkerton private investigation firm to look into his practices. There have been approximately 90 actual lawsuits filed by Monsanto against United States farmers, involving 147 farmers and 39 farm companies in 25 different states. *Id.* at 5.

²¹ *See* Norman Siebrasse, *The Innocent Bystander Problem in Patenting of Higher Life Forms*, 49 McGill L. J. 349 (2004); Drew Kershon, *Of Straying Crops and Patent Rights*, 43

undertaken any sort of economic analysis or even accurately analyzed the important patent law issues presented. Commentators have done a better job canvassing the potential for state law counterclaims to be made by bystanding victims of pollen drift,²² but without reference to the much-needed economic framework provided by *The Problem of Social Cost*. In the first part of this article, we apply the Coase Theorem and its most useful corollary to the problem of pollen drift. We conclude that the liability of pollen polluters should be governed by balancing rules under nuisance law, to be applied on a case-by-case basis, rather than a blanket liability or immunity rule. We also conclude that truly bystanding non-GMO farmers should have viable defense to patent infringement because liability would result in the application of a reverse Pigovian tax that cannot be justified under accepted economic theory. Only a contextual approach can account for the wide variety of costs that must be identified before determining whether liability for genetic pollution is socially desirable.

Washburn L. J. 575 (2004); Marcia E. DeGeer (comment), Can Roundup Ready Seeds Ever Be Corralled?: Restraining Pollen Drift Through Criminal Sanctions, 29 New Eng. J. on Crim. & Civ. Confinement 255 (2003); Carie-Marie Flood, Pollen Drift and Potential Causes of Action, 28 J. Corp. L. 473 (2003); Stephan Scanlon (comment), Should Missouri Farmers of Genetically Modified Crops Be Held Liable for Pollen Drift and Cross-Pollination, 10 Mo. Env't'l L. & Pol'y Rev. 1 (2003); Hilary Preston (note), Drift of Patented Genetically Engineered Crops: Rethinking Liability Theories, 81 Tex. L. Rev. 1153 (2003); Maria Lee & Robert Burrell, Liability for the Escape of GM Seeds: Pursuing the "Victim"?, 65 Mod. L. Rev. 517 (2002); Margaret R. Grossman, Biotechnology, Property Rights and the Environment, 50 Am. J. Comp. L. 215 (2002); A. Bryan Endres, "GMO:" Genetically Modified Organism or Gigantic Monetary Obligation? Liability Schemes for GMO Damage in the United States and the European Union, 22 Loy. L.A. Int'l & Comp. L. Rev. 453 (2000); Richard A. Repp (comment), Biotech Pollution: Assessing Liability for Genetically Modified Crop Production and Pollen Drift, 36 Idaho L. Rev. 585 (2000); Thomas P. Redick & Christina Bernstein, Nuisance Law and the Prevention of "Genetic Pollution": Declining a Dinner Date With Damocles, 30 Environmental L. Rep. 10328 (2000).

²²See Kershon, *supra* note 5, at 600-605; Redick & Bernstein, *supra* note 5, at 10339-52; Preston, *supra* note 5, at 1166; Repp, *supra* note 5, at 600-19; Scanlon, *supra* note 5, at 6-10; Flood, *supra* note 5, at 482-496; Endres, *supra* note 5, at 482-93; Grossman, *supra* note 5, at 227-38; Lee & Burrell, *supra* note 5, at 529-535.

In the rest of this article we demonstrate that existing legal doctrines support the adoption of the framework we advocate. In order to do that more effectively, we briefly provide the background science of genetically modified plants and how their patented characteristics can be adventitiously transferred.²³ We also highlight the consequences of pollen drift by canvassing the multi-billion dollar market for non-GMO crops. Then, we discuss the common law nuisance and trespass doctrines that may provide farmers with an affirmative cause of action when pollen drift causes a reduction in the value of a planted crop.²⁴ Finally, we discuss patent law defenses that may be available to patent infringement defendants who characterize themselves as victims of pollen drift (bystanding farmers).²⁵ We find in the voluntary act doctrine and the doctrines of patent misuse, unclean hands, and *volenti non fit injuria*, significant opportunities for true bystanding farmers to rebut patent infringement claims. In the spirit of truly descriptive law and economics analysis, we conclude that applicable common law and equitable doctrines appear to be efficient.

I. THE ECONOMICS OF NEIGHBORING FARMERS

Coase begins *The Problem of Social Cost* with a succinct reminder of his primary concern, “[t]hose actions of business firms which have harmful effects on others.”²⁶ He then notes the conventional wisdom of the time, which held that liability (or some sort of tax) should

²³ See *infra* notes X – Y and accompanying text.

²⁴ See *infra* notes X – Y and accompanying text.

²⁵ See *infra* notes X – Y and accompanying text.

²⁶ Coase, *supra* note 2 at 95.

necessarily be imposed on those who cause damage to their neighbors.²⁷ Through a series of examples, the most prominent of which involve damage done to neighboring farmers by wandering cattle and incendiary railroad sparks,²⁸ he shows that in a world without transactions costs the automatic imposition of liability is socially undesirable (e.g. has negative welfare effects). If transacting is costless, neighbors will agree to an arrangement that maximizes social welfare, regardless of whether one neighbor has the legal right to harm or the other has the legal right to be free from harm. This is the primary thrust of the Coase Theorem, although it is not labeled as such in his original paper.²⁹ Since it is hardly intuitive, we apply Coase's insight about a world without transactions costs to several scenarios involving pollen drift. Then we move on to the real world, a world of costly transactions, which Coase also discusses at length in his seminal paper. In that world, the initial assignment of rights, and therefore the liability rule chosen, matters significantly.

A. Pollen Drift in a World with No Transaction Costs

Let us imagine an organic farmer, first farming alone, then confronted with a neighbor who plants GMO corn. We illustrate that assuming zero transactions costs, the net social

²⁷ *See. id.*

²⁸ *See id.* at 97-104 (discussing cattle straying onto a farmer's land and destroying crops) and at 137-43 (discussing sparks from a railway that destroy a farmer's crop).

²⁹ In a subsequent essay, Coase ascribes the naming of his theorem to George Stigler. See R. H. Coase, *Notes on the Problem of Social Cost*, in *THE FIRM, THE MARKET, AND THE LAW* 158 (1988). He summarizes "the essence of the Coase Theorem" as "the delimitation of rights is an essential prelude to market transactions . . . the ultimate result (which maximizes the value of production) is independent of the legal decision." *Id.* Stigler's formulation, acceptable to Coase, is somewhat different, ". . . under perfect competition private and social costs will be equal." *Id.*

benefit³⁰ from their farming operations are the same regardless of the liability rule chosen.

1. *Solo Farmer.* The first player is an organic farming operation that plants non-GMO corn on ten acres of land. Without interference, the organic farming firm expends \$20 producing 30 bushels of corn that will sell for \$4 per bushel. In order to get the \$4 per bushel price, the farmer must not only plant non-GMO seed, but must also forego the use of pesticides, herbicides, and non-organic fertilizer. The net value of the corn produced is \$100.

Scenario 1.0: Solo Farming

Organic Farmer

10 Acres/30 Bushels

(\$4/bushel x 30) - \$20 cost of production [C.O.P.] = \$100

2. *Two Farmers/No Liability.* When a GMO farming firm moves next to the organic firm, the scenario changes. The GMO firm also plants 10 acres of corn, but its corn is genetically modified to be highly productive if expensive herbicides, pesticides, and chemical fertilizers are used properly. The GMO firm will harvest 100 bushels, but its costs of production are high (\$100) and it can only sell its corn for \$2 per bushel.³¹ The net value of the corn it produces is therefore \$100.³² Unfortunately for the neighboring organic firm, GMO pollen blown from the new farm contaminates its crop. This means that the organic farm will now only be able to collect the \$2 per bushel price for GMO corn when it takes its 30 bushel harvest to market. Its profit will only be \$40 (\$60 - \$20 C.O.P.), unless the law provides it some sort of

³⁰ In this section we will generally ignore third-party wealth effects, such as the effect of legal rules governing pollen drift on global plant diversity or on the income of patentees. Those issues are addressed at the end of this section.

³¹ See *supra* note X (discussing the lower price received by sellers of GMO corn).

³² Although it is not necessary to assume that both organic and non-organic farmers acting alone will earn the same, setting the values equal allows us to disregard altruistic reasons why a farmer might chose one form of farming over the other.

remedy. Under a regime which imposes no liability on the GMO farmer, the net value of corn produced by the two firms is \$140, as illustrated below:

Scenario 2.0: No Liability

GMO Farmer

10 Acres/100 Bushels

$(\$2/\text{bushel} \times 100) - \$100 \text{ C.O.P.} = \$100$

Organic Farmer

10 Acres/30 Bushels

$(\$2/\text{bushel} \times 30) - \$20 \text{ C.O.P.} = \$40$

Joint Production = \$140

Note that the organic farming firm should be willing to pay up to \$60 to the GMO farmer not to plant GMO seed that will contaminate its fields and drive down the price it can get for its corn. For example, assume that the GMO firm could switch to a non-GMO seed that would reduce its production from 100 to 80 bushels (and lower its costs of production to \$90 because the seed is cheaper. If transactions between the farmers are costless, then we might well see the organic farmer paying, for example, \$30 to the GMO farmer to plant the alternative non-GMO seed. In that case, the GMO farmer still makes \$100, while the organic farmer will make \$70. We assume that the GMO farmer who switches to a non-GMO seed does not also become an organic farmer, which would require him to forego the use of pesticides, herbicides, and artificial fertilizers, a much more costly transformation.³³ Notice that under these assumptions, the net value of production in this case rises to \$170, as illustrated below:

Scenario 2.1: No Liability + Low Switching Costs

³³ If he could switch all the way to organic farming, as in Scenario 2.3, *infra*, he would receive \$4 per bushel instead of \$2.

GMO Farmer

10 Acres/80 Bushels

(\$2/bushel x 80) - \$90 C.O.P.+ \$30 = \$100

Organic Farmer

10 Acres/30 Bushels

(\$4/bushel x 30) - \$20 C.O.P. - \$30 = \$70

Joint Production = \$170

In order to understand the importance of our present assumption of zero transactions costs, we must note that the value of joint production would fall back to \$140 if the cost of negotiating a deal between the GMO and organic farmer were more than \$30.³⁴ If the cost were greater than \$20, a deal could not be made that would benefit both parties; therefore, there would be no agreement and the resulting joint production would be the same as Scenario 2.0.

Consider one final permutation of the no-liability scenario. In Scenario 2.1 above, the GMO farmer's cost of switching to a different activity (planting an alternative seed), was \$30. If switching costs are sufficiently low for the organic farming firm, it might be induced--without having to transact with its neighbor--to plant GMO seeds. Under a zero switching costs scenario, the joint value of the corn produced will be \$200, as illustrated below:

*Scenario #2.2: No Liability + Zero Switching Costs***GMO Farmer**

10 Acres/100 Bushels

(\$2/bushel x 100) - \$100 C.O.P. = \$100

Ex-Organic Farmer

10 Acres/100 Bushels

(\$2/bushel x 100) - \$100 C.O.P. = \$100

Joint Production = \$200

To summarize, under a regime of no liability for pollen contamination, the joint value of

³⁴ This is because the organic farmer will spend no more than \$60 to prevent \$60 worth of damage, and the GMO farmer must be paid at least \$30 in order to change. Therefore, any negotiation that costs more than \$30 will not be undertaken by the organic farmer.

corn produced will be \$140, \$170, or \$200, depending on the relative switching costs assumed in the above hypotheticals.

3. *Two Farmers/Liability*. Under an alternative legal regime of liability for pollen contamination, the joint values of the corn produced will be exactly the same given the same set of assumptions. Consider first how liability would change the outcome for the GMO farming firm. It would still produce 100 bushels of corn that it could sell for \$2 per bushel, but it would have to pay \$60 in damages to the organic farmer who was forced to sell his 30 bushels for the \$2 per bushel GMO price, as opposed to the \$4 per bushel organic price. The damages paid to the organic farmer will allow him to receive the net \$100 profit he was making before his neighbor arrived. The value of their joint production is \$140, as illustrated below:

Scenario 3.0: Liability

GMO Farmer

10 Acres/100 Bushels

$(\$2/\text{bushel} \times 100) - \$100 \text{ C.O.P.} - \$60 = \40

Organic Farmer

10 Acres/30 Bushels

$(\$2/\text{bushel} \times 30) - \$20 \text{ C.O.P.} + \$60 = \100

Joint Production = \$140

Given the above scenario, the GMO farming firm is likely to consider alternatives to planting GMO corn seeds in order to avoid paying the \$60 in damages to the organic farmer. If, as assumed in scenario 2.1, it can switch to a non-GMO seed and produce 80 bushels of corn instead of 100, it will have an incentive to do so. Note that the joint value of production would rise to \$170, as illustrated below:

Scenario 3.1: Liability + Low Switching Costs

GMO Farmer

10 Acres/80 Bushels

(\$2/bushel x 80) - \$90 C.O.P. = \$70

Organic Farmer

10 Acres/30 Bushels

(\$4/bushel x 30) - \$20 C.O.P. = \$100

Joint Production = \$170

Note here that the GMO farmer was induced by the liability rule to change its behavior without having to transact with the organic farmer. In other words, the efficient joint production of \$170 was obtained without a transaction at all. This was not true on the parallel facts of Scenario 2.1, where the organic farmer had to negotiate with the GMO farmer to switch to a non-GMO seed. In other words, in a world with sufficiently high transactions cost, the value of joint production may be different in Scenario 2.1 (\$170 with no transaction costs, but \$140 with significant transaction costs) and Scenario 3.1 (\$170 regardless of transaction costs). This is why the assumption of zero transactions costs matters so much for the Coase Theorem when it posits that the choice of liability or no liability is irrelevant to net social welfare. When transactions costs are accounted for, the choice of a rule of liability or no liability may well affect social welfare.³⁵

Finally, it is worth considering one more permutation within the liability scenario. If switching costs were sufficiently low, the GMO farming firm might be induced to change its practices entirely and become an organic farmer, which would mean not only foregoing GMO seeds, but also not using chemical herbicides, pesticides, and fertilizers. In the unlikely case where switching costs are zero for the GMO firm, the joint production in subsequent years might rise to \$200, as illustrated below:

Scenario 3.2: Liability + Zero Switching Costs

³⁵ Coase emphasizes this point. *See supra* note 2, at 115 (noting that when transactions costs are taken into account, “the initial delimitation of legal rights does have an effect on the efficiency with which the economic system operates”).

Ex-GMO Farmer
10 Acres/30 Bushels
(\$4/bushel x 30) - \$20 C.O.P. = \$100

Organic Farmer
10 Acres/30 Bushels
(\$4/bushel x 30) - \$20 C.O.P. = \$100

Joint Production = \$200

To summarize, under a regime of liability for pollen contamination, the joint value of corn produced will be \$140, \$170, or \$200, depending on how costly it is for the GMO farmer to switch from GMO farming to alternative farming techniques.

4. *Conclusions.* First, the magnitude of switching costs will affect the value of joint corn production between the neighbors, ***but the choice of liability or no liability has no effect on net corn production***, which will always be \$140, \$170, or \$200 given the assumed level of switching costs. In other words, although each farmer may care deeply about which rule is adopted, the legal system arguably should not because the net corn production under either legal regime is the same. Second, as seen in the discussion of Scenarios 2.1 and 3.1, the assumption of zero transactions costs is critical to the validity of the first conclusion. Both scenarios were based on identical factual assumptions, but in a world of high transactions costs, we saw a \$30 difference in net social welfare (\$170 v. \$140) depending on the liability rule adopted. We shall explore the world of transaction costs in more detail below. This is how the Coase Theorem works in a nutshell: In a world with no transactions costs, there seems to be no economic reason to impose liability on the pollen polluter. The tax on harm caused by neighbors suggested by Pigou is not justified.

We must note that we have not only ignored transactions costs, but also third party wealth effects. The choice of liability rules may affect parties outside the two-player paradigm employed above. A rule of no liability, for example, might force most organic farmers to switch

to GMO farming, resulting in crop monocultures that are vulnerable to catastrophic failure or that threaten genetic or ecological diversity. A rule of liability for pollen drift, on the other hand, might affect the net income of firms that sell patented GMO seeds. We consider these sorts of externalities in Part D. below.

B. Pollen Drift in a World with High Transactions Costs

To quote Professor Coase, a world without transactions costs “is, of course, a highly unrealistic assumption.”³⁶ It is frequently very costly for parties to come to an agreement, and in the case of pollen drift, it may be very difficult for the victim of airborne contamination to even identify the proper part(ies) with whom to negotiate. In the case of a crop like corn, which casts its pollen for miles,³⁷ it may be impossible for an organic farmer to identify and bring to the table all the possible GMO farming firms that might be the cause of contamination. It’s no surprise that Coase himself uses airborne pollution as an example of a nuisance which raises the specter of prohibitively high transaction costs. He describes the number of the parties potentially affected by a belching smoke stack and notes that the airborne pollutants would “affect a vast number of people engaged in a wide variety of activities.”³⁸ In general, he concludes that transacting is “often extremely costly, sufficiently costly at any rate to prevent many transactions that would be carried out in a world in which the pricing system worked without cost.”³⁹

As we explain in the previous section, when transacting is costly, as it is very likely to be

³⁶ Coase, *supra* note 2, at 114.

³⁷ *See supra* note X.

³⁸ *Id.* at 117.

³⁹ *Id.* at 114. (“In order to carry out a market transaction, it is necessary to discover who it is that one wishes to deal with, to inform people that one wishes to deal and on what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on.”)

in the pollen drift context, the choice of liability rules may affect social welfare. For this reason Coase argues that “[o]nce the costs of carrying out market transactions are taken into account . . . the initial delimitation of legal rights does have an effect on the efficiency with which the economic system operates.”⁴⁰ When transactions are costless, neighbors can negotiate around whatever liability rule is imposed on them. The rule will affect the distribution of wealth between the parties, but net social welfare will remain the same. When transacting is costly, we must be careful in advocating one rule over another, because the parties may not be able to adjust to maximize their joint production. This is the primary corollary of the Coase Theorem. As Coase warns, unless the efficient arrangement of rights is that “established by the legal system, the costs of reaching the same [efficient] result by altering and combining rights through the market may be so great that this optimal arrangement of rights, and the greater value of production which it would bring, may never be achieved.”⁴¹ We see how this warning plays out in the illustrations below and then apply the framework to the specific question of what legal rules should govern the problem of pollen drift.

1. *Assigning Rights in Context.* Depending on the individual facts of a particular pollen drift case, society should sometimes prefer a rule of liability for contamination and other times prefer a rule of no liability. Take for example the fact situation discussed above in Scenarios 2.1 and 3.1. In both those hypotheticals, the organic farming firm would suffer a \$60 loss if its crop were contaminated by a neighbor’s GMO pollen. We assume now that the cost of negotiating an agreement for the organic farmer to pay the polluter \$30 to switch to an alternative non-GMO seed would be too high, given the practicalities of meeting, negotiating,

⁴⁰ *Id.* at 115.

⁴¹ *Id.*

drafting, inspecting, and monitoring the agreement. In addition, the distance that corn pollen travels, it may be very difficult for the organic farmer to discover beforehand whose pollen will cause the contamination. Or more than one GMO farmer may be nearby, complicating negotiations. If transaction costs are sufficiently high, then the value of the joint corn production would be \$140 if there is no liability for the contamination, as illustrated below:

Scenario 4.0 No Liability

GMO Farmer

10 Acres/100 Bushels

$(\$2/\text{bushel} \times 100) - \$100 \text{ C.O.P.} = \$100$

Organic Farmer

10 Acres/30 Bushels

$(\$2/\text{bushel} \times 30) - \$20 \text{ C.O.P.} = \$40$

Joint Production = \$140

If, however, we impose liability on the GMO farmer for damage done to the organic farmer, then the GMO farming firm will have a monetary incentive to switch to the alternative non-GMO seed. If it does, then the value of joint production rises to \$170, as illustrated below:

Scenario 4.1 Liability

GMO Farmer

10 Acres/80 Bushels

$(\$2/\text{bushel} \times 80) - \$90 \text{ C.O.P.} = \$70$

Organic Farmer

10 Acres/30 Bushels

$(\$2/\text{bushel} \times 30) - \$20 \text{ C.O.P.} + \$60 = \100

Joint Production = \$170

On these facts, it is clear that society should prefer a rule of liability for the contamination because net welfare will be higher. As we see below, however, it would be dangerous to generalize from this result. As Coase suggests, different a context may require a different

assignment of rights.

For example, consider the following example that accounts for the fact the soybean pollen does not travel nearly as far as corn pollen.⁴² We offer the case of an organic soybean farming firm that produces 30 bushels of beans on 10 acres after expending \$20 in production costs and receives \$4 per bushel for its crop before a GMO soybean enterprise begins farming on a neighboring field. The GMO farming firm also plants 10 acres. It produces 100 bushels after expending \$100 in production costs, for which it receives \$2 per bushel. If GMO pollen contaminates the organic farming firm, it will lose \$60 in profits. The contamination could be averted if the GMO farmer switches to an alternative seed. If GMO firm switches, it will produce 20 fewer bushels, save \$10 in its cost of production, and receive \$30 less in income. Because soybean pollen does not travel nearly so far as corn pollen, the contamination could be averted by the organic farmer by leaving fallow a ten-foot strip of land adjoining the GMO farmer's property. The cost to the organic farmer of leaving the strip of land fallow is \$20. If the GMO farmer is liable for the contamination, it will switch to the non-GMO corn and the value of the joint corn production will be \$170, as illustrated below:

Scenario 5.0 Liability

Ex-GMO Farmer

10 Acres/80 Bushels

(\$2/bushel x 80) - \$90 C.O.P. = \$70

Organic Farmer

10 Acres/30 Bushels

(\$4/bushel x 30) - \$20 C.O.P. = \$100

Joint Production = \$170

If the GMO farming firm is not liable, then it has no incentive to switch to non-GMO

⁴² See infra note X

seeds and it will produce a crop worth \$100. The organic farmer, worried about damage caused by contamination will leave fallow a ten-foot strip of land at a cost of \$20, dropping the value of its production to \$80. Note that joint production in this case rises to \$180, as illustrated below:

Scenario 5.1 No Liability

GMO Farmer

10 Acres/80 Bushels

$(\$2/\text{bushel} \times 100) - \$100 \text{ C.O.P.} = \$100$

Organic Farmer

10 Acres/30 Bushels

$(\$4/\text{bushel} \times 30) - \$20 \text{ C.O.P.} - \$20 = \80

Joint Production = \$180

Under the facts of our soybean hypothetical, joint production is maximized by the adoption of a rule of non-liability. Unlike in our corn example, net social welfare is maximized if the GMO farmer is not held liable for pollen drift contamination.

In a world without transactions costs, the choice of rules would not matter. In scenario 4.0 (no liability), the organic farmer would pay the GMO farmer to switch to a non-GMO seed and then joint production would be the same as in scenario 4.1 (liability). In scenario 5.0 (liability), the GMO farmer would pay the organic farmer to leave a strip of land fallow and joint production would be the same as in scenario 5.1 (no liability). In the real world of high transaction costs, however, the choice of rules will have a significant effect on net social welfare. Sometimes it makes economic sense to hold neighbors liable for contamination caused by drifting pollen; sometimes it does not. As Coase explains, “Whether or not [a liability rule] is desirable or not depends on the particular circumstances.”⁴³

C. Implications for Common Law Adjudication

⁴³ *Id.* at 144.

Coase discusses at length many common law cases involving neighbors who do harm to each other.⁴⁴ Consistent with his theoretical analysis, when transaction costs must be accounted for, the criterion of efficiency justifies liability in some cases and in others it does not.⁴⁵ Indeed, a case-by-case analysis of problems involving neighbors seems to be the only feasible approach, considering the numerous facts necessary to making the proper decisions in the scenarios set forth above. We had to examine farming methods, typical crop yields, costs of production, market values, the availability of alternative seeds and protective measures, and the magnitude of each farmer's switching costs. The change in a single factor, for example from corn to soybeans, can generate a different optimal arrangement of rights between the two parties.

We suggest, therefore, that any common law method of adjudication that is sensitive to the relevant factors identified above has the potential to establish efficient rules for liability or non-liability. We will discuss in Part III below whether the nuisance, trespass, and strict liability doctrines employed by the American law of neighbors are up to the task, but first we must apply the Coasean framework to the complex questions raised when the patentee of the GMO product claims to have suffered harm that deserves recompense. Discussing patent law is important, because if patent law imposes liability on bystanding farmers, then their costs of production will rise dramatically and the equilibria described above will be upset. To the extent they represent efficient results, measuring the intrusion of patent law into the game becomes critically important.

D. Implications for Patent Law

⁴⁴ *Id.* at 105-114 & 120-32.

⁴⁵ See Coase, *supra* note 2, at 131 (discussing representative common law cases and concluding, "It is all a question of weighing up the gains that would accrue from eliminating these harmful effects against the gains that accrue from allowing them to continue.")

Most GMO seeds and the pollen that GMO plants produce are patented.⁴⁶ So far, we have ignored the interests of patentees claiming a property right in proprietary genetic material cast to the wind.⁴⁷ Unless the GMO farm is owned by a biotech research firm like Monsanto, it's unlikely that the GMO farmer will also be the owner of the patent on the GMO seed, plant, and pollen. So, the possible claims of a third party, the patentee, must be considered..

Patent law gives the patent owner the exclusive right to use, make, sell, offer to sell, and import the invention subject to the patent.⁴⁸ Patent law is based on notions of strict liability; neither the infringer's knowledge, nor her intent, is relevant.⁴⁹ Patent law does not excuse unwitting or inadvertent infringement. A brief look at U.S. Patent No. 6,114,610 demonstrates the plausibility of the claim that even a bystanding farmer should be liable. The patent is owned by Monsanto Corporation and "relates to the seeds of inbred corn line ASG27, to the plants of inbred corn line ASG27 and to methods for producing a corn plant produced by crossing the inbred line ASG27 with itself or another corn line [and] to hybrid corn seeds and plants produced

⁴⁶ *See, for example*, the seed corn patent described in footnotes XXX-XXX and accompanying text.

⁴⁷ As long as the bystander affected by pollen drift views the genetically modified organism as harmful contamination, this seems appropriate. In the case of an organic farmer who does not want the genetic material, then the patent owner has not been damaged by losing a potential sale. A recipient of pollen drift might be a beneficiary, however, if it welcomed the new genetic material. This was allegedly the case in *Monsanto v. Schmeiser*, where Monsanto claimed the farmer took deliberate advantage of Round-Up Ready plants that were pesticide resistant.

⁴⁸ *See* 35 U.S.C 271(a).

⁴⁹ *See* *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512, 1527 (Fed. Cir. 1995) ("Infringement . . . is a strict liability offense . . . and a court must award damages adequate to compensate for the infringement, . . . regardless of the intent, culpability, or motivation of the infringer.").

by crossing the inbred line ASG27 with another corn line.”⁵⁰ In addition to claiming the plant,⁵¹ its seeds,⁵² hybrid plants⁵³ and hybrid seeds,⁵⁴ the patent covers the pollen of the plant,⁵⁵ the method for cross-breeding a hybrid,⁵⁶ and various gene conversions⁵⁷ of the patented plant.

Given the broad scope of the Monsanto’s claims, it is relatively easy to see how a bystander farmer could unwittingly violate the patentee’s statutory rights. If the wind blows the patented pollen onto a bystander farmer’s corn plants and those plants are pollinated, then the farmer has arguably used the pollen in violation of the Monsanto patent. The pollinated plants would then produce hybrid seeds in potential violation of Monsanto’s method patent for hybridization and its product patent for hybrid seeds. If the plants are harvested and the hybrid seed sold, a further violation of Monsanto’s right to sell the patented seeds may occur. Finally, if hybrid seeds are saved and replanted, a further infringing use could be alleged. Any infringement patent gives its owner the right to injunctive relief, most importantly enjoining the sale of the harvested crops.⁵⁸ Patent owners may also recover damages or a reasonable royalty

⁵⁰See Abstract, U.S. Patent No. 6,114,610 (Sept. 5, 2000). The designation ASG27 is identified more particularly by reference to the sample deposited in an official seed bank under ATCC Accession No. PTA-459.

⁵¹*Id.* at Claim 2.

⁵²*Id.* at Claim 1.

⁵³*Id.* at Claim 13.

⁵⁴*Id.* at Claim 12.

⁵⁵*Id.* at Claim 3.

⁵⁶*Id.* at Claim 11.

⁵⁷*Id.* at Claims 19-29.

⁵⁸ See 35 U.S.C. 271.

for the infringement.⁵⁹

Although the legal argument for liability for infringement is plausible, the Coasean analysis conducted above suggests that a liability rule of uniform applicability is not justified economically. Remember that the primary argument in *The Problem of Social Cost* is against the automatic levying of a Pigovian tax (a real tax or the imposition of legal liability) on a firm that causes harm to another. As we have seen, it often makes economic sense to allow one firm to engage in an activity that harms another without forcing that firm to internalize its costs. For example, in Scenario 5.1, net social welfare was maximized by a rule of no liability for a GMO soybean farmer. Once we account for transaction costs, optimizing social welfare will sometimes demand a liability rule and sometimes not. It follows that the automatic levying of a Pigovian tax on the passive recipient of pollen drift cannot be justified, and therefore, liability for bystander farmers in all cases cannot be justified.

1. *Farmers Benefiting From Pollen Drift.* According to Coase, if transaction costs are high, then different contexts should demand differing liability approaches. Consider Farmer A who plants 10 acres with herbicide resistant GMO corn seed. After expending \$100 on operating costs (seed, pesticides, and herbicides), he will harvest 100 bushels which he can sell for \$2 per bushel. His \$100 in operating costs includes a \$20 royalty payment to the inventor of the herbicide resistant seed. A neighbor, Farmer B, plants 10 acres with cheaper non-GMO seed. In year one, after expending \$90 for seed, pesticides, and herbicides, he will harvest 85 bushels of corn which he can sell for \$2 bushel. During the growing season, pollen from the Farmer A's GMO corn fertilizes Farmer B's corn. After the harvest, Farmer B saves enough hybrid seed to plant the following year. In year two, after expending only \$80 for pesticide and herbicides,

⁵⁹ *Id.*

Farmer B harvests 100 bushels that he can sell for \$2 per bushel. In year two, Farmer A makes the same \$100 profit that he made in year one, while Farmer B makes \$120. His \$100 operating costs include a \$20 royalty payment to Patentee, the inventor of the herbicide resistant seed who developed the seed after expending \$35 on research and development. If Farmer B is not liable for patent infringement to the inventor of the herbicide resistant seed, then the value of joint production of Farmer A, Farmer B, and the Patentee is \$205, as illustrated below:

Scenario 6.0 No Liability

Farmer A

10 Acres/100 Bushels
 (\$2/bushel x 100) - \$100 C.O.P. = \$100

Farmer B

10 Acres/100 Bushels
 (\$2/bushel x 100) - \$80 C.O.P. = \$120

Patentee

1 Royalty Payment
 \$20 - \$35 R & D Costs = (-\$15)

Joint Production = \$205

Note that imposing liability for patent infringement will not change the value of the joint production of the three parties.

Scenario 6.1 Liability

Farmer A

10 Acres/100 Bushels
 (\$2/bushel x 100) - \$100 C.O.P. = \$100

Farmer B

10 Acres/100 Bushels
 (\$2/bushel x 100) - \$100 C.O.P. = \$100

Patentee

2 Royalty Payments
 \$40 - \$35 R & D Costs = \$5

Joint Production = \$205

At first glance, there seems little reason to require a transfer payment from Farmer B to the Patentee. If joint production is not increased, a deadweight loss is created by requiring a sterile transfer. Nonetheless, even though the imposition of liability for infringement does not increase the net value of the joint production, a plausible economic argument can be made that unless the patentee can recover its research and development costs by collecting royalties for the use of its invention, it will have inadequate incentives to invent the herbicide resistant seed. This sort of negative externality is relevant to Coasean analysis. The hypothetical is designed to accentuate this point. If the seed company knows that it cannot collect the second royalty, its research and development costs (\$35) will exceed its expected return (\$20 from Farmer A) and it may not invent the seed. This externality is “harm” in the sense Coase uses the term in his article. Without the herbicide resistant seed, both farmers will be forced to use the non-GMO seed planted by Farmer B initially, and the patentee will save the \$35 expended on research and development. The value of joint production will fall to \$195 without the availability of the GMO seed, as illustrated below:

Scenario 6.2 GMO Seed Never Invented

Farmer A

10 Acres/100 Bushels
(\$2/bushel x 85) - \$90 C.O.P. = \$80

Farmer B

10 Acres/100 Bushels
(\$2/bushel x 85) - \$90 C.O.P. = \$80

Patentee

0 Royalty Payments
R & D Costs Saved = \$35

Joint Production = \$195

A comparison of scenarios 6.2 and 6.3 seems to make a strong case for liability. Forcing the transfer payment will stimulate production of the herbicide resistant seed, which will in turn increase the net value of corn production by \$20, to \$205. It appears that net social welfare is increased. Scenario 6.2 assumes, however, that the patentee will not do anything socially useful with the \$35 R & D expenditure that it has saved. This is a highly unrealistic assumption. If those savings can be invested to produce value that exceeds the \$20 corn production gain, then society should prefer that the herbicide resistant seed not be invented. This question of marginal utility pinpoints one reason why economists are so hesitant to argue that patent law is efficient; it is extremely difficult to account for the alternative uses to which inventive resources might be put.⁶⁰

The argument in favor of liability, therefore, is linked to the assertion that patent law provides efficient incentives to invent. It certainly does in our hypothetical, but the matter is far from undisputed.⁶¹ We could easily change the facts so that the incentive effect is missing.⁶²

⁶⁰ Cf. Richard A. Posner, *ECONOMIC ANALYSIS OF LAW* 37 (3d ed. 1986) (noting that “the costs of the patent system include . . . inducing potentially excessive investment in inventing”); Janusz A. Ordover, *Economic Foundations and Considerations in Protecting Industrial and Intellectual Property*, 53 *Antitrust L. J.* 503, 507 (1984) (patent law “may lead to excessive investment in the creation of intellectual and industrial property”). *See also* Paul J. Heald, *The Vices of Originality*, 1991 *Sup. Ct. Rev.* 143, 157 (1991) (“In other words, a work should be [patentable] only if necessary to encourage the work, and the work is more socially useful than whatever else the [inventor] would chose to do, for example, child rearing or brick masonry.”)

⁶¹ *See* Paul J. Heald, *A Transaction Costs Theory of Patent Law*, 66 *Ohio St. L. J.* 473, 499 (discussing “empirical studies demonstrating . . . the poor correlation between R & D and patenting shown in recent studies on the impact of the Federal Circuit on the behavior of inventive firms . . . and the prevalence of patenting despite low levels of licensing, use, and highly uncertain prospects of super-competitive profits . . .”). *See id.* at 499-506 (collecting studies critical of the incentive theory of patent law). For the most famous statement of skepticism, see SENATE COMM. ON THE JUDICIARY, 85TH CONG., AN ECONOMIC REVIEW OF THE PATENT SYSTEM: STUDY NO. 15 OF THE SUBCOMM. ON

Nonetheless, at least in some cases, one can argue that the negative externality caused by the bystander farmer's use without compensation should be internalized in the form of a rule requiring a transfer payment to the Patentee.

By recharacterizing the fact situation as presenting a positive externality (higher corn production for Farmer B) generated by the inventive effort of the Patentee, a similar argument can be offered why the Farmer B should be liable. Demsetz has argued that systems of private property are more efficient than systems of common property.⁶³ If we let Farmer B benefit from the Patentee's inventive efforts without paying, then we are treating the herbicide resistant genetic material as common property. Liability would privatize the genetic material and allow the inventor of the herbicide resistant seed to recover the benefit conferred on Farmer B. According to Demsetzian analysis, forcing a transfer payment from Farmer B in the amount of the benefit will arguably optimize social welfare.⁶⁴ In Demsetz's view, the value of the additional corn that Farmer B harvests in year two is a *positive* externality created by the

PATENTS, TRADEMARKS, AND COPYRIGHTS 80 (Comm. Print 1958) (reporting Fritz Malchup's study)

If we did not have the patent system, it would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting one. But since we have had a patent system for a long time, it would be irresponsible, on the basis of our present knowledge, to recommend abolishing it.

⁶² For example, if the inventor's research and development costs are fifty dollars, and the two farmers constituting the entire potential market would not be willing to pay more than a \$20 royalty each, a liability rule will not stimulate the invention of the new seed. Or, if the inventor is himself a farmer who can make a substantial profit over his R&D costs by inventing the new seed, then making other farmers liable provides no added incentive. The seed would be invented even in the absence of liability.

⁶³ See Harold Demsetz, *Toward a Theory of Property Rights*, 57 *Am. Econ. Rev. Papers & Proc.* 347 (1967).

⁶⁴ *Id.*

Patentee's inventive efforts that should be captured by the Patentee. Professor Frischman describes Demsetz's normative thesis as arguing that "the emergence of private property rights to enable the internalization of externalities is desirable (in an economic framework, social welfare maximizing)."⁶⁵ It is hotly disputed whether Demsetz' theory of property should be extended to spillovers created by intangible public goods like inventions,⁶⁶ but his approach does provide another argument in favor of liability.

Coase and Demsetz really present two sides of the same coin. Externalities, whether described as positive or negative, get treated the same way by economists. One can argue that the infringing farmer should internalize the negative effect its behavior has on R & D incentives, or one can argue that the Patentee should internalize the positive effect its inventiveness has on the infringing farmer. In either case, liability is premised on the notion that the Patentee will make a sub-optimal level of R & D expenditures. If patent law has a significant incentive effect on R & D expenditures and those expenditures are not wasted, then a plausible argument can be made that a benefiting bystanding farmer should have to make a transfer payment to the Patentee.

2. *Farmers Harmed by Pollen Drift*. Although forcing the transfer payment of \$20 from Farmer B to the Patentee in the above scenario may be justified as the recovery of a benefit conferred on Farmer B by the inventive efforts of the Patentee, the same cannot be said in the

⁶⁵ See Brett M. Frischmann, *Evaluating the Demsetzian Trend in Copyright Law 2* (copy on file with the author). See also Richard A. Epstein, *The Allocation of the Commons: Parking on Public Roads*, 515, 515-16 (2002) ("Demsetz argued that . . . systems of private property generally outperformed systems of common property, because when individuals internalize both the costs and benefits of their decisions they are more likely to advance the social interest . . .").

⁶⁶ See *id.* See Brett M. Frischmann & Mark A. Lemley, *Spillovers*, Working Paper (2005); Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 *Tex. L. Rev.* 1031 (2005), and Brett M. Frischmann, *An Economic Theory of Infrastructure and Commons Management*, 89 *Minn. L. Rev.* 917 (2005).

case of the organic farmer who is harmed by pollen drift. In such a case, there is no benefit conferred and the economic justification for the transfer payment is missing. A transfer payment would be sterile, imposing a deadweight loss on society.

Remember from our discussion above that imposing liability on opportunistic farmers who benefit from pollen drift is based on contested assumptions about the incentive effects of patent law and the desirability of internalizing the positive wealth effects of production. Both of these theories are premised on the notion that a patentee should be able to capture *the benefits* generated by the invention. In the case of the organic farmer, the invention confers no benefit; in fact, it imposes a cost. Imposing liability in the case of a bystanding non-GMO farmer would constitute a reverse Pigovian tax, forcing someone who has suffered a harm to make a transfer payment to the party who caused the injury. There is no positive externality to be internalized. Both theories also presume that liability takes the place of voluntary transactions that would have been entered into in the market. For example, given his expected benefit, Farmer B should have been willing to pay up \$20 for the use of the herbicide resistant seed in our prior scenario. The farmer behaved opportunistically and avoided the payment, but imposing liability would mimic the sort of transaction that normally occurs on the market--just look at how Farmer A behaved. In the case of the organic farmer, however, imposing liability would not mimic a transaction that would otherwise be entered into. The farmer does not want to use the invention. In fact, the organic farmer is willing in Scenario 2.1 to pay to *avoid* having to use the GMO product.

We conclude, therefore, that there is no economic justification for imposing liability on a bystanding farmer who is harmed by pollen drift, while we concluded earlier that an opportunistic farmer who takes advantage of wind-blown genetic material should be liable. This is consistent with Coasean analysis which suggests that “Whether or not [a liability rule] is

desirable or not depends on the particular circumstances.”⁶⁷ In addition, we note that the equilibria between the neighboring farmers describe above remains constant. Where the bystander farmer is harmed, patent law plays no role. From the standpoint of the opportunistic beneficiary, there is no harm between the neighbors to complain of, and the scenario falls outside the two neighbor nuisance model that we describe.

II. GMO CROP PATENTS AND NON-GMO MARKETS

In Parts III and IV we examine the common law and statutory rules that govern the problem of pollen drift. In order to understand the importance of getting both the economics and the law correct, we will briefly examine the technology relevant to the problem and take a snapshot of the potentially affected markets.

A. GMO Crops

The technology that produces GMO crops works to alter certain traits of the plant, such, as size, color, lifespan, and resistance to certain pests or chemicals. Scientists begin by isolating the gene that produces the particular trait. Then, the new gene is integrated in the new plant, and the plant begins producing proteins that control the desired trait. Thus, if a plant has been genetically modified, successive generations will begin to exhibit the trait that the scientists desired it to have. As scientists have developed GMO crops in recent years, and those same crops have begun to find their way to the world market for food, the issues surrounding GMO crops have heated up. On one side are biotech companies and other advocates of GMO crop technology, who tout the benefits of increased yields and convenience. For example, because herbicides do not discriminate – that is, they will kill weeds *and* surrounding crops – spraying

⁶⁷ *Id.* at 144.

Roundup or other herbicides is a delicate and time-consuming practice.⁶⁸ Herbicide resistant crops, like Monsanto's Roundup Ready series, can save farmers time and money because the farmer does not have to spray carefully around his crops.⁶⁹ In addition, plants that are genetically modified to repel insects save farmers from having to spray crops with expensive insecticides.⁷⁰

Beyond the basic convenience of GMO crops, advocates boast that GMO crops have the potential to be a major factor in alleviating some of the world's hunger. GMO crops might be created to grow larger and faster, and have more vitamins and minerals.⁷¹ In developing countries with severe food shortages and populations with malnutrition, these characteristics of GMO crops could arguably effect beneficial change.⁷²

GMO crops, despite their claimed advantages, do have significant opposition. Critics cite the many risks of GMO crops: human allergies, plant resistance to pesticides and antibiotics, and the general loss of biodiversity.⁷³ There are also environmental risks to consider. For example, recent studies indicate that Bt corn could be responsible for the deaths of Monarch Butterfly larvae.⁷⁴ Additionally, some warn that the insecticide-ready GMO crops could actually *increase*

⁶⁸ Carie-Megan Flood, Pollen Drift and the Potential Causes of Action, 28 J. Corp. L. 473, 477-478 (2003).

⁶⁹ *Id.*

⁷⁰ *Id.*

⁷¹ *Id.* at 478-479.

⁷² *Id.* at 479.

⁷³ See Hilary Preston, *Drift of Patented Genetically Engineered Crops: Rethinking Liability Theories*, 81 TEX. L. REV. 1153, 1153-54 (2003) (describing critics' positions against GMO crops).

⁷⁴ Flood, *supra* note X at 479.

the population of harmful insects and could create “superbugs”.⁷⁵ Likewise, some scientists worry that herbicide-ready GMO crops could contaminate the surrounding weeds, creating “uncontrollable ‘superweeds.’”⁷⁶

The potential human health risks of GMOs have also been debated. One possibility is that people may develop allergic reactions to certain GMO food products that contain foreign materials, for example, from products like corn or beans that have been modified with peanuts or Brazil nuts.⁷⁷ Critics concerns are magnified by the fact that GMO foods do not currently have to be labeled in this country; thus, American consumers are often not warned that they are ingesting a product that may produce a harmful allergic reaction.⁷⁸ Beyond this immediate concerns lies what is perhaps the most controversial aspect of GMO crops – the unknown. The technology employed to produce GMOs is simply too new to provide reliable information about the long term effects of crop usage.⁷⁹ Although regulators have deemed biotech crops safe for the time being, opponents are concerned that there simply is not enough information to back that conclusion.

Despite strongly voiced opposition, biotech crops have managed to secure a large part of

⁷⁵ *Id.* at 480.

⁷⁶ *Id.* at 479-80.

⁷⁷ Marcia Ellen DeGeer, *Can Roundup Ready Seeds Ever Be Corralled?: Restraining Genetic Drift Through Criminal Sanctions*, 29 NEW ENG. J. ON CRIM. & CIV. CONFINEMENT 255, 272 (2003). The author cites the example of Pioneer Hi-Bred’s 1996 development of a GMO soybean that contained a Brazil nut gene that increased the protein content. The GMO soybean thus exhibited the allergen qualities of the Brazil nut, qualities which have the potential to be fatal in allergic humans. *Id.*

⁷⁸ *Id.* at 272-73.

⁷⁹ See Richard A. Repp, *Biotech Pollutions: Assessing Liability for Genetically Modified Crop Production and Genetic Drift*, 36 IDAHO L. REV. 585, 587 (2000) (stating that long term studies regarding GMO products’ impacts are unavailable).

the domestic market for crops and crop commodities. There are currently four main GMO crops utilized in the United States: soy, cotton, corn, and canola.⁸⁰ Presently, GMO crops make up 85 percent of United States soy acreage, 45 percent of the corn acreage, 76 percent of the cotton acreage, and 84 percent of the canola acreage.⁸¹

Interestingly, corn pollen poses special problems because it is especially susceptible to pollen drift. Spherical corn pollen particles are much larger than pollen produced by other plants, allowing them to travel farther on the breeze. Pollen from corn also finds its way to the ground at a rate of about one foot per second, much faster than other types of pollen. A single corn plant produces between four and five million particles of pollen. If even if a small amount of a cornfield's pollen drifts to nearby fields, the potential for cross-pollination can be quite serious. Corn has been described by one scientist as "basically just broadcasting piles of pollen out into the air and hoping it lands where it's needed."⁸²

In the case of soybeans, a relatively small buffer zone between GMO and non-GMO crops may be effective to prevent unwanted pollinization.⁸³ Corn pollen, however, travels much farther distances, making buffer zones costly, if not economically unfeasible altogether. One buyer of organic corn seed reports that some of his growers have chosen urban environments, like Chicago, as the safest places to grow without the risk of contamination.⁸⁴ Pollen pollution

⁸⁰ See CENTER FOR FOOD SAFETY, *supra* note X, at 8.

⁸¹ *Id.* at 8-9.

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⁸⁴ See Comments of Glenn Roberts, Founder, Anson Mills, President & CEO, Carolina Gold Rice Foundation, at Seeds of Resistance/Seeds of Hope Conference, Athens, Georgia, April 8, 2004.

has been reported as far away as the highlands of Mexico, although the source of that pollution is unclear.⁸⁵

In 2000, pollen drift was one of the factors leading to the spread of StarLink corn, a genetically modified corn approved only for animal consumption. StarLink was planted on less than one percent of the United States corn acreage in 2000, but appeared in ten percent of the crop harvested in that same year. The discovery of StarLink in human food sources led to massive recalls of food products and plummeting export sales.⁸⁶ Although one cause of the StarLink crisis was improper handling of the crops, experts say that pollen drift compounded the problem.⁸⁷

B. The Market for Non-GMO Food Products

Were it not for the growing importance of world markets for non-GMO food products, the problems posed by pollen drift might not be so acute. Defining the size of the market for non-GMO products is complicated by the fact that no international agency keeps direct statistics. In most cases, the market for organic products has to serve as a proxy because, by most current definitions, organic products cannot contain genetically modified materials.⁸⁸ Counting only sales of organic products, however, significantly undercounts the size of non-GMO markets around the world, because many non-GMO farmers are not organic farmers. Japan and the EU, for example, place restrictions on GMO food products, but they do not demand that farmers grow organically. Farmers who want to satisfy the huge demand for non-GMO soybeans and

⁸⁵See Rafi, "Nine Mexican States found to be GM contaminated" at <http://www.etcgroup.org/article.asp?newsid'410>.

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⁸⁸See <http://www.intracen.org/mds/slides/organic/sld003.htm>.

soybean oil in Japan,⁸⁹ for example, or who wish to sell in a variety of product markets in the EU where GMO goods are banned, may use synthetic pesticides, herbicides, or fertilizers to grow their crops. A look the growing worldwide market for organic goods can at least set a baseline. A 2004 survey reveals that 24,070,010 hectares are currently under organic cultivation around the world.⁹⁰ In 2002, the global market for organic food products topped \$23 billion⁹¹ and was growing at a rapid rate, between 8-12 % per year in Europe and North America.⁹² From 1992-97, certified organic acreage in the United States grew by 44% and organic cropland by 111%.⁹³ Over 12,000 stores in the United States specialize in selling organic foods,⁹⁴ but conventional supermarkets have begun to market organics to a significant extent. As of 2000, over 42% of all organic foods were sold in chain supermarkets.⁹⁵

The market for organic foods is growing at a rapid pace, but undoubtedly slower than the overall market for non-GMO goods. Considering EU and Japanese restrictions on GMO imports⁹⁶ and the effect of labeling laws in those jurisdictions,⁹⁷ farmers will have increasing

⁸⁹See Richard Moore, Preserving Soybean Biodiversity in Japan: Reconsidering GMO, Pesticide-Free, Low Input, and Organic, in Virginia Nazarea & Robert Rhoades, *Seeds of Resistance/Seeds of Hope: Crossing Borders in the Repatriation and In Situ Conservation of Traditional Plants* (2006) (“US soybean exports represent a \$5.2 billion market, predominately in Japan and Europe, where there is the most opposition to GM products.”).

⁹⁰See Helga Willer & Minou Youssefi (eds), *The World of Organic Agriculture: Statistics and Emerging Trends* 15 (IFOAM 2004).

⁹¹See *id.* at 21.

⁹²See *id.* at 22-23.

⁹³See *supra* note 4.

⁹⁴See *supra* note 20..

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incentives to avoid planting GMO crops. Even in the United States, the incentives are significant. A recent study reveals that in American supermarkets, the price premium for organic versus conventional fresh produce was from 11 to 121%.⁹⁸ At one conventional supermarket chain, the premium price for organic produce was 36.8%.⁹⁹ Pollen drift poses a significant threat to farmers who wish to take advantage of this price premium.

III. THEORIES OF TORT RECOVERY FOR NON-GMO FARMERS

Tort law is likely to grant significant relief to bystanding farmers who suffer harm when their crops are pollinated from GMO crops. The three primary theories are (1) private nuisance,¹⁰⁰ (2) strict liability,¹⁰¹ and (3) trespass to land,¹⁰² and at least three other theories are possible: (4) public nuisance,¹⁰³ (5) negligence,¹⁰⁴ and (6) interference with personal property

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⁹⁸*See supra* note 4.

⁹⁹*See id.*

¹⁰⁰ *See infra* notes ___ - ___ and accompanying text

¹⁰¹ *See infra* notes ___ - ___ and accompanying text

¹⁰² *See infra* notes ___ - ___ and accompanying text

¹⁰³ Nuisance law distinguishes between public and private nuisances: a public nuisance affects the safety or health of members of the general public, while a private nuisance affects individuals or a group of individuals in some private way not felt by the public at large. Under public nuisance, the bystanding farmer must demonstrate an unreasonable interference with a right of the general public, coupled with special harm to plaintiff. Restatement (Second) of Torts §§ 821B, 821C (1979). Special harm is easy to satisfy through proof lost revenues when plaintiff sells the crop. *See Huggin v. Gaffney Development Co.*, 229 S.C. 340, 92 S.E.2d 883 (1956) (finding special harm where obstruction of roadway resulted in crop loss). The argument that GMO pollen injures the general public is harder. The typical public nuisance involves health risks or general annoyance to the community. *See generally* William L. Prosser & W. Page Keeton, PROSSER & KEETON ON THE LAW OF TORTS §90 (5th ed. 1984); *see, e.g.*, *Seigle v. Bromley*, 22 Colo. App. 189, 124 P. 191 (1912) (finding interference with public health in

(trespass to goods or conversion).¹⁰⁵ We focus on the primary theories sequentially although, as will become obvious, categories overlap, and doctrinal confusion as to the scope of the categories and their interrelationships is pervasive.

With respect to the substantive elements of the tort causes of action, it makes no difference whether the farmer is a plaintiff, or instead is a defendant asserting the action as a cross- or counterclaim in a patent infringement action brought by the owner of the patent on the neighboring GMO crops. For ease of description, we hereafter refer to the bystanding farmer as “plaintiff.” In either type of case, a direct action, cross- or counterclaim, the bystanding farmer must make a decision as to whom to sue. For all the tort claims, the logical defendant is the nearby landowner whose GMO crop has tainted the bystanding farmer’s crop. Sometimes there will be multiple defendant landowners, and sometimes the sources of the GMO pollen will not be immediately obvious when the farmer discovers the injury. Expert evidence, including DNA

presence of hogpen); *King v. Kline*, 6 Pa. 318 (1847) (finding interference with public safety in keeping of a vicious dog); *State v. Chrisp*, 85 N.C. 528 (1881) (finding interference with public morals in use of public profanity); *Town of Davis v. Davis*, 40 W. Va. 464, 21 S.E. 906 (1895) (finding interference with public peace in loud noise); *Sloan v. City of Greenville*, 235 S.C. 277, 11 S.E.2d 573 (1959) (finding interference with public convenience in obstruction of roadway). If the GMO crops are approved by the government, and plaintiff does not sell her effected crops in a market for which they are not approved, there would appear to be no health or safety risk. In *In re StarLink Corn Products Liability Litigation*, 212 F. Supp. 2d 828 (N.D. Ill. 2002), however, the court refused to grant summary judgment for defendants on a public nuisance claim. Plaintiffs asserted that commingling of StarLink corn after harvesting had polluted the entire U.S. corn supply. The court considered the alleged contamination of the general food supply, not the damage to plaintiffs’ individual crops, to be the public nuisance. *Id.* at 848.

¹⁰⁴ The negligence claims most likely to be asserted are a failure of the creator and seller of GMO seeds to warn their purchasers of the risk of injuring neighboring GMO farmers through cross pollination, and the failure of those parties and the GMO farmer to employ adequate buffer zones. On occasion, some courts tie negligence and private nuisance together, but they are analytically distinct. Nuisance is an intentional tort; however, negligence decisionmaking closely resembles nuisance balancing.

¹⁰⁵ See *infra* notes ___ - ___ and accompanying text.

analysis,¹⁰⁶ may help to resolve causation issues. If tort liability for damages exists, multiple landowner defendants may be jointly and severally liable, or a court may apportion liability.¹⁰⁷

Neighboring GMO farmers are the primary defendants for all of the tort actions. Involvement of other parties, including the patent owner, as tort defendants is trickier. The bystanding farmer may assert that the patent owner is liable for damages. When the manufacturer or seller of patented seeds is someone other than the patent owner (as is often the case), the seed manufacturer or seller is another potential tort defendant. Compared to the primary defendants, different legal analysis applies with respect to these “secondary defendants” who are involved in the inventing, promoting, and marketing of GMO products. The patent owner and seed seller are likely to defend on the basis that they lose control of the seeds when they are delivered to purchasing farmers. They do not make decisions as to planting or cultivation of the crops, or the use of buffer zones near boundary lines. They are not aware of the farmers’ local conditions, including wind patterns and the presence of nearby organic or other non-GMO farmers. Such defenses have sometimes succeeded when farmers have asserted claims for crop damage from drift of herbicides and pesticides against manufacturers and sellers. Courts have reasoned that improper application of those products by other persons (the farmer or someone hired to apply the product) caused the harm – not the products themselves, which are safe if properly used.¹⁰⁸

Conversely, secondary defendants, but not the end users of the product (the GMO

¹⁰⁶ See Redick, *supra* note X, at ____.

¹⁰⁷ If a bystanding farmer asserts a counterclaim in a patent infringement case, the GMO farmers will not be parties in the original action. The farmer may have to add one or more GMO farmers as cross-defendants.

¹⁰⁸ See * FIND CASES

farmers), may have tort liability if the underlying theory is negligence.¹⁰⁹ The secondary defendants may have a greater appreciation of the risks that their GMO product poses to nearby non-GMO farmers than the GMO farmers who buy and plant the patented seeds. Their superior knowledge would mean that, under standard tort law principles, they may have a duty to warn the GMO farmers of the risks and how to control, manage, and minimize those risks by, for example, leaving appropriate buffer zones. A failure to warn, or inadequate warning, might be grounds for negligence-based liability on the secondary defendants, even when the injured party is not the seed buyer, but bystanders.

A. Private Nuisance

Today nuisance is the most common legal remedy for activities that adversely affect a property owner's land.¹¹⁰ Of the various tort theories, nuisance provides pollen drift plaintiffs with the best opportunity for recovery. All injured bystanding farmers should not necessarily recover. Nuisance liability for pollen pollution should attach under a balancing approach that examines a multitude of facts that are particular to both of the farming operations.¹¹¹ This regime allows courts to fashion liability rules that are responsive to efficiency considerations, including switching costs and the role that transaction costs may place in blocking wealth-enhancing exchanges by the parties.¹¹²

Nuisance law is highly flexible and adaptable. With that virtue comes indeterminacy.

¹⁰⁹ *See supra* note __.

¹¹⁰ *See* Jacqueline P. Hand & James Charles Smith, *Neighboring Property Owners* 14-17 (1988).

¹¹¹ *See infra* notes __ and accompanying text.

¹¹² *See supra* notes __ and accompanying text.

Nuisance law, long ago called by Prosser an “impenetrable jungle,”¹¹³ is riddled with uncertainty. Not only do courts differ as to the overall scope of the field, they display markedly different ideas about the nature of the landowner’s right that ought to be protected by nuisance. Due to the amorphous nature of nuisance, there is more state-by-state variation in legal approach than for most other basic fields of tort law. Therefore, we base the following discussion on some general propositions for which there is broad, but far from universal, consensus.

Nuisance is often said to be a relative concept; it is a relative tort; it gives rise to a relative property right. It balances the gravity of the injury to the plaintiff against the utility of the defendant’s conduct to arrive at a judgment as to whether a nuisance has taken place.¹¹⁴ This oversimplifies, but a core of relativity does exist. When a set of facts falls within the core, balancing (by the court, the finder of fact, or both) takes place. The defendant’s conduct is found to be a nuisance if it is said to be *unreasonable*, considering all the facts and circumstances, including the plaintiff’s position.

Nuisance, however, has two other zones, lying on opposite sides of the balancing core. These zones may ultimately either insulate the defendant from liability, or may impose liability on the defendant regardless of the reasonableness of the activity. Both of these zones give us bright-line rules. The first zone is what we may call *nuisance immunity*. Certain landowner activities are regarded as sufficiently beneficial or benign that courts virtually never castigate them as nuisances. Such activities are privileged and are not subject to nuisance balancing. An important caveat is that for some types of activities the landowner must conduct the activity in a non-negligent fashion. In a case falling within the nuisance immunity zone, the defendant is free

¹¹³ William L. Prosser, *Handbook of the Law of Torts* 549 (1941).

¹¹⁴ [Restatement section?]

from nuisance liability.

Second, there is the nuisance *per se* doctrine. Certain conduct, perceived as generally undesirable or high risk, is always wrongful. If an owner or possessor of land has engaged in that conduct, a neighbor can get relief (enjoin the nuisance or collect damages), without the need to prove that the conduct is unreasonable. Nuisance *per se* is properly seen as a species of strict liability, even though many courts choose not to discuss it in those terms. We also discuss nuisance *per se* later in connection with strict liability.¹¹⁵

Nuisance Immunity	Nuisance Balancing	Nuisance Per Se: Strict Liability
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1. *Immunity cases.* Different types of activities qualify for nuisance immunity. One example is the refusal of American courts to grant relief for improvements that block views¹¹⁶ or deprive a neighbor of sunlight or air.¹¹⁷ Another is the doctrine of aesthetic nuisance, which holds that improvements or landscape modifications cannot constitute a nuisance if the only harm to neighbors is aesthetic blight.¹¹⁸ Thus, the ugliest grain silo in the world, even when

¹¹⁵ See *infra* notes ___ and accompanying text.

¹¹⁶ See, e.g., 44 Plaza, Inc. v. Gray-Pac Land Co., 845 S.W.2d 576, 578 (Mo. App. E.D. 1992) (“landowner’s otherwise lawful acts in blocking view of another’s property do not give rise to cause of action for nuisance”); Hay v. Weber, 48 N.W. 859, 860 (Wis. 1891) (holding obstruction of view is “too remote and speculative to constitute the basis of a private action” for nuisance).

¹¹⁷ See, e.g., Sher v. Leiderman, 181 Cal. App. 3d 867, 875 (1986) (“blockage of light to a neighbor's property, except in cases where malice is the overriding motive, does not constitute actionable nuisance, regardless of the impact on the injured party's property or person.”).

¹¹⁸ See, e.g., Parkersburg Builders Material Co. v. Barrack, 191 S.E. 368, 369 (Va. 1972) (“courts of equity have hesitated to exercise authority in the abatement of nuisances where the subject matter is objected to by the complainants merely because it is offensive to the sight”); Ness v. Albert, 665 S.W.2d 1 (Mo. App. 1983) (“unsightliness, without more, does not create an actionable nuisance”); Houston Gas & Fuel Co. v. Harlow, 297 S.W. 570, 572 (Tex. Civ. App.

located next to a neighbor's boundary and shadowing her sundeck, is not actionable.¹¹⁹

For our purposes, a small body of old cases involving noxious plants, sometimes judicially identified as “weeds,” provides the closest analogy. These cases immunized owners of weed-infested properties from nuisance liability when the weeds germinated and “polluted” nearby crops. In a representative case, an Iowa court held that a farmer whose lands were “greatly damaged” by a cocklebur infestation had no cause of action.¹²⁰ The line of authority in the case reports died out close to a century ago, probably for two reasons. First, the common-law nuisance no-duty-to-control-weeds rule became entrenched. New challenges by injured landowners may have seemed pointless. Second, and more importantly, the no-duty rule led to legislative intervention. Local governments first enacted weed control ordinances during the late 19th century to protect farmers' crops from the spread of weeds.¹²¹ Subsequently, weed

1927) (holding unsightly structure does not constitute nuisance); *Perry Mount Park Cemetary Ass'n v. Netzal*, 264 N.W. 303 (Mich. 1936) (stating that “mere esthetics is beyond the power of the court to regulate”); *Whitmore v. Brown*, 65 A. 516, 521 (Me. 1906) (holding unsightly wharf not infringement on neighbor's legal rights).

¹¹⁹ See James Charles Smith, *The Law of Yards*, ___ *Ecology L.Q.* ___ (2006).

¹²⁰ In *Harndon v. Stultz*, 100 N.W. 851, 852 (Iowa 1904), defendant “allowed cocklebur and other noxious weeds to grow in large quantities” near the boundary line. Due to wind and a natural watercourse, the weed spread to plaintiff's lands, “whereby the same has been greatly damaged.” *Id.* Rejecting plaintiff's claim for damages and an injunction, the court observed, without further analysis: “The proposition is unique, to say the least. It is not suggested that the growing by one upon his own land of cocklebur and weeds is without legal right” *Id.*

¹²¹ E.g., Act of March 6, 1889, Ind. Acts ch. 82, at 146 (codified at Ind. Code Ann. § 8-3-7-1 (Burns 1998)); Johnson Grass Act, 1901 Tex. Gen. Laws ch. 117, at 283 (codified at Tex. Rev. Civ. Stat. Ann. § 6401 (Vernon 1926)). See *Chicago, T.H. & S. Ry. v. Anderson*, 242 U.S. 283 (1916) (upholding constitutionality of Indiana law); *Missouri, K. & T. Ry. v. May*, 194 U.S. 267 (1904) (upholding Texas law). These statutes usually delegated to local government the power to enact ordinances specifying the types of prohibited vegetation, the landowner's duty to eliminate them, procedures for official notice to offending landowners, and enforcement mechanisms.

ordinances spread to urban and suburban settings.¹²²

At first blush, the noxious plant cases might support immunizing the GMO crop defendants from liability. Both fact patterns involve an invasion by reproductive parts of plants: seeds and pollen. There are, however, two critical distinctions. First, some courts have considered relevant the question whether the plants on the defendant's land grew accidentally, or whether the defendant purposely planted them. English cases involving poisonous trees and thistles illustrate the distinction. Landowners who plant yew trees are liable in nuisance for harm to livestock if branches and leaves project over the boundary.¹²³ But landowners who allow thistles to grow on their land are not liable when they spread, injuring a neighbor's land.¹²⁴ The general principle is the familiar one that discriminates between a person's action and inaction. This rests on the commonsense notion that ordering a person to take preventative measures is more onerous than ordering a person to stop doing something that injures another person. With respect to the bystanding farmer, the prototypical defendant has intentionally planted the GMO crops. They are not weeds that accidentally infiltrated the defendant's land.

A second distinction between the noxious plant cases and GMO pollen drift concerns the legal status of the invading substances. In the noxious plant cases, as in standard pollution cases,

¹²² See Smith, *supra* note ** [Law of Yards].

¹²³ *Crowhurst v. Amersham Burial Bd.*, 4 Ex. Div. 5 (Exch. 1878) (plaintiff's horse died from eating yew tree leaves). Distinguishing *Crowhurst*, the court in *Ponting v. Noakes*, 2 Q.B. 281 (Q.B.D. 1894), denied recovery when plaintiff's colt extended its head across a boundary fence to eat leaves that were wholly on defendant's land. The English courts viewed the cases as raising questions about the scope of *Rylands v. Fletcher*, 3 L.R.-E & I. App. 330 (H.L. 1868). In the former, but not the latter case, the defendant allowed a dangerous thing to escape from his land.

¹²⁴ *Giles v. Walker*, 24 Q.B.D. 656 (1890) (after defendant burned gorse to improve land for grazing, numerous thistles emerged; jury found defendant to be negligent, but appellate court reversed).

the defendant polluter does not assert an ownership interest in the emitted material.¹²⁵ Certainly, these substances were owned by the polluter prior to their escape from the polluter's land. Afterwards, legal ownership is abandoned. In the usual cases pollutants like weed seeds and pollen, leaves, dirt, dust, or smoke almost invariably have no value. But if a victim of pollution can "harvest the pollution" and find an economically valuable use for it, she is free to keep the substance. Surely the polluter, as original owner, cannot get it back and has no claim for compensation. Suppose a landowner's operations propitiously emit gold dust through the air or water, which a neighbor captures. Now it's her property.

Conversely, retained ownership of a thing that enters a neighbor's tract generally makes the owner liable for damages. This is why owners of domesticated animals are usually strictly liable when they stray; and why in contrast, landowners are not liable if unconstrained wild animals exit their land and damage a neighbor's land.¹²⁶ If owners of wandering livestock forfeited ownership of their animals to the neighbors, perhaps the neighbors would not have damage actions. In many cases, the victims of animal trespass would consider the exchange a fair quid pro quo; the animals' value would equal or exceed the injury caused by the animals.¹²⁷

In the GMO pollination situation, the defendant who holds a valid patent is like the owner

¹²⁵ See *Gulf, C. & S. F. Ry. Co. v. Oakes*, 58 S.W. 999, 1001 (Tex. 1900) (pointing out that after Bermuda grass invades neighbor's land, neighbor owns it completely, and can do with it what he pleases).

¹²⁶ See Prosser & Keeton on the Law of Torts 538-43 (5th ed. 1984); Robert C. Ellickson, *Order Without Law: How Neighbors Settle Disputes* 52-62 (1991).

¹²⁷ A classic case dealing with migrating oil and gas demonstrates the impact of liability of the decision as to whether the original owner has retained ownership of the escaped property. *Hammonds v. Central Kentucky Gas Co.*, 75 S.W.2d 204 (Ky. 1934) (company that reinjects natural gas into depleted underground reservoir is not liable in trespass to neighbors who owns part of the reservoir because company has lost ownership of gas; gas is like wild animal released into natural habitat).

of straying domestic animals. The GMO farmer is sending a substance on her neighbor's land, but the patentee still claims to retain ownership of it. Due to patent law, the neighboring farmer cannot feel free to use the pollen however she sees fit. Just as a neighbor cannot capture and sell livestock that have entered her land, she cannot intentionally capture and utilize the patented pollen.¹²⁸ Because of the three-party nature of the pollen drift scenario, the retained ownership distinction made in the old wandering livestock cases is not precisely on point. Nonetheless, we feel relatively certain that common-law principles do not justify granting nuisance immunity to GMO defendants, especially in a light of a recent pollen drift case that applies a balancing approach.¹²⁹ This means that in nuisance litigation, defendants are not entitled to summary judgment, provided plaintiffs have alleged, and can introduce evidence of, substantial harm and causation (that defendants are the source of the offending GMO pollen).

2. *Right-to-farm Acts.* Although GMO defendants have no plausible claim to common-law nuisance immunity, a legislature may choose to confer immunity, provided it acts in a constitutionally valid manner.¹³⁰ Since the 1970s, all states have enacted right-to-farm

¹²⁸ It makes no difference that the GMO crop farmer lacks the contractual right to let her neighbor use the patented goods that have escaped. First, in buying seeds, she bargained for limited rights to use the patent. Second, the patent owner will often be a co-defendant, and that owner could choose to make the patented product freely available to non-GMO farmers who are subjected to pollen invasion.

¹²⁹ Cite to *Starlink*, where the liability of neighboring farmers on nuisance grounds seems to be taken for granted in the larger discussion whether GMO seed distributors and manufacturers are liable.

¹³⁰ See *Bormann v. Bd. of Supervisors*, 584 N.W.2d 309 (Iowa 1998) (local government's approval of agricultural area designation for 960 acres, which entitles owners to statutory immunity, is unconstitutional taking of neighbors' property). In addition, an extensive legislative grant of immunity to GMO defendants might violate federal due process. See John C.P. Goldberg, *The Constitutional Status of Tort Law: Due Process and the Right to a Law for the Redress of Wrongs*, 115 *Yale L.J.* 524 (2005).

statutes¹³¹ that shield agricultural operations from nuisance liability under certain circumstances. Despite the substantial diversity among the states in statutory content, as well as divergences in judicial interpretation, few GMO defendants will be able successfully to invoke a right-to-farm statute as an affirmative defense.

Right-to-farm laws protect farms from nuisance liability by insulating existing farm operation when a nuisance arises from the changing nature of the surrounding area.¹³² The prototypical conflict addressed by right-to-farm acts involves a homeowner, recently resettled from the city or suburbs, complaining about agricultural odors or other agricultural externalities. The right-to-farm law enacts a “coming to the nuisance” defense, preserving existing agricultural uses, no matter how fervently the city slickers complain that they cannot enjoy their newly acquired properties.¹³³ Because right-to-farm laws are targeted at these specific factual situations, some courts have held that right-to-farm acts do not apply to actions brought by agricultural plaintiffs.¹³⁴ It is also generally likely that the complaining farmer will have historically used his neighboring land for farming purposes, thus not changing the nature of the surrounding area.¹³⁵ In other words, when farmers sue farmers, the common law often applies; there is no statutory immunity. A Washington case is illustrative. In *Buchanan v. Simplot*

¹³¹ Alexander A. Reinert, Note, The Right to Farm: Hog-tied and Nuisance-bound, 73 N.Y.U.L. Rev. 1694, ** n.76 (citing 50 state statutes).

¹³² Margaret Rosso Grossman, Biotechnology, Property Rights and the Environment, 50 AM. J. COMP. L. 215, 233-34 (2002).

¹³³ *Id.*

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¹³⁵ *Id.*

Feeders Limited Partnership,¹³⁶ farm owners brought a nuisance action complaining about manure dust, flies and odors from a neighboring cattle feedlot and a meat processing plant, both of which had recently expanded in scale of operation. Finding the Washington right-to-farm statute to be ambiguous, the court interpreted it to apply only to conflicts stemming from urban encroachment. Thus, it did not immunize agricultural enterprises from nuisance actions brought by an agricultural or other rural plaintiff.¹³⁷ In contrast, a California court concluded that its state right-to-farm act conferred immunity upon a rice farmer when a neighboring plaintiff farmer complained that the rice farming caused excessive water seepage, damaging plaintiff's row crops.¹³⁸

A number of other requirements for statutory immunity may disqualify some GMO defendants. First, the GMO farming activity may have to meet a minimum time period for operation before it achieves immunity. In California, the period is three years.¹³⁹ Second, if the bystander farmer's use commenced prior to the GMO farming, immunity is unlikely.¹⁴⁰ This factor, which reflects the "coming to the nuisance" origin of the right-to-farm acts, often will have decisive impact.¹⁴¹ Frequently the bystander farmer will have begun organic or non-GMO

¹³⁶ 952 P.2d 610 (1998).

¹³⁷ *Id.* at **.

¹³⁸ *Souza v. Lauppe*, 69 Cal. App. 2d 494 (Cal. Ct. App. 1997) (affirming summary judgment for defendant; plaintiff had recently switched from rice to row crops; seepage was not noticeable while plaintiff grew rice).

¹³⁹ *Id.* See Cal. Civ. Code § 3482.5.

¹⁴⁰ For example, the Vermont right-to-farm statute protects agricultural activities that are "established prior to surrounding non-agricultural activities." 12 Vt. Stat. § 5753.

¹⁴¹ In *Souza*, *supra* note **, the plaintiff's recent switch from rice farming to row crops constituted the statutory required "changed condition in or about the locality." In *Buchanon*, the court counted in the plaintiffs' favor their ownership and operation of their farm since 1961:

farming before, sometimes long before, the defendant introduced GMO crops to the neighborhood. Third, the defendant's agricultural use may have to meet industry standards.¹⁴² Compliance with federal regulations may not suffice. The Michigan act points to state regulatory norms.¹⁴³ The California statute is more diffuse, pointing to undefined local norms.¹⁴⁴ This probably means that no immunity is available unless GMO farming is commonly practiced in the locality. If it is rare (e.g., defendant is the only local GMO farmer), by definition defendant has departed from the industry standard.

3. *Nuisance Balancing*. Nuisance's large middle zone, classically called *nuisance*

[I]t is the Buchanan family farm that is being forced out by the expanding cattle feedlot and industrial-like beef processing facility. . . . [The statute] should not be read to insulate agricultural enterprises from nuisance actions brought by an agricultural or other rural plaintiff, especially if the plaintiff occupied the land before the nuisance activity was established.”

952 P.2d at **. See also *Trickett v. Ochs*, 838 A.2d 66 (Vt. 2003) (buyers of apple orchard, who expanded their activities by adding on-site facilities for apple waxing and storage, not entitled to statutory immunity).

¹⁴² Some right-to-farm acts expressly provide that the defendant's activity must be conducted without negligence. E.g., Ind. Code § 32-30-6-9(a) (act “does not apply if a nuisance results from the negligent operation of an agricultural or industrial operation or its appurtenances”). Often this will serve as a proxy for compliance with industry custom and standards.

¹⁴³ Mich. Comp. L. § 286.473 (“farm or farm operation” is not nuisance if it “conforms to generally accepted agricultural and management practices according to policy determined by the Michigan commission of agriculture. Generally accepted agricultural and management practices shall be reviewed annually by the Michigan commission of agriculture and revised as considered necessary.”)

¹⁴⁴ Cal. Civ. Code § 3482.5(a)(1) (emphasis added) provides:

No agricultural activity, operation, or facility, or appurtenances thereof, conducted or maintained for commercial purposes, and in a manner consistent with proper and accepted customs and standards, *as established and followed by similar agricultural operations in the same locality*, shall be or become a nuisance, private or public, due to any changed condition in or about the locality, after it has been in operation for more than three years if it was not a nuisance at the time it began.

per accidens (in contrast to the bright-line nuisance *per se* rule), balances a number of factors to determine which party has a property entitlement. Often but not always the decision maker is the jury or other trier of fact; whether a nuisance exists is said to be a mixed question of fact and law.¹⁴⁵ The nature of the balancing test is flexible enough to allow a court to consider the factors relevant to liability identified in Part I of this article, e.g. farming methods, typical crop yields, costs of production, market values, the availability of alternative seeds and protective measures, and the magnitude of each farmer's switching costs.¹⁴⁶ This is not to say that judges will inevitably render wealth-enhancing decisions, but the balancing approach authorizes the use of the economic tools necessary for efficient results.

In the 19th century, American courts began to depart from the classic view of nuisance, which held a defendant liable for all substantial harms caused by its invasions.¹⁴⁷ Industrialization gave rise to a growing numbers of conflicts between industrial defendants and their neighbors. Judges became reluctant to assess damages against emerging industries. They avoided damage liability by refocusing nuisance doctrine. If the defendant was acting reasonably in devoting its land to an industrial activity, the defendant was privileged to continue without having to pay its neighbors. This new perspective led to the modern, expanded view of reasonableness. A nuisance exists only if the gravity of the harm outweighs the benefits flowing from the defendant's conduct.

The Restatement of Torts follows the modern, post-industrial view and applies a

¹⁴⁵ E.g., *Escobar v. Continental Baking Co.*, 596 N.E.2d 394, 396 (Mass. App. 1992) (reversing trial court finding that nighttime noise from deliveries to bakery was unreasonable and thus nuisance because it is "mixed question of law and fact").

¹⁴⁶ See *supra* notes XX-YY and accompanying text.

¹⁴⁷ See Morton J. Horwitz, *The Transformation of American Law 1780-1860*, at 70-101 (1977).

reasonableness filter to both parties' conduct. With respect to the gravity of the harm, it calls for evaluation of:

- (a) The extent of the harm involved;
- (b) the character of the harm involved;
- (c) the social value that the law attaches to the type of use or enjoyment invaded;
- (d) the suitability of the particular use or enjoyment invaded to the character of the locality; and
- (e) the burden on the person harmed of avoiding the harm.¹⁴⁸

With respect to the utility of the defendant's conduct, the Restatement points to:

- (a) the social value that the law attaches to the primary purpose of the conduct;
- (b) the suitability of the conduct to the character of the locality; and
- (c) the impracticability of preventing or avoiding the invasion.¹⁴⁹

The Restatement approach may have the virtue of being flexible and adaptable, but it does not compel any particular result in any imaginable nuisance dispute. Multi-factor analysis incorporating these eight variables produces a level of indeterminacy that is difficult to surpass.¹⁵⁰ However, the flexibility inherent in the approach allows for the incorporation of the economically relevant factors we have identified. As Coase noted after his discussion of common law nuisances cases taking a balancing approach, "The economic problem in all cases of harmful effects is how to maximize the value of production . . . courts have often recognized the economic implications of their decision and are aware (as many economists are not) of the

¹⁴⁸ Restatement (Second) of Torts § 827 (1979).

¹⁴⁹ Restatement (Second) of Torts § 828 (1979).

¹⁵⁰ Many scholars see legal indeterminacy as a vice. *See, e.g.,* Richard A. Posner, *Conventionalism: The Key to Law as an Autonomous Discipline?*, 38 U. TORONTO L. J. 333, 340 (1988) (arguing that economic analysis can save the law from the "horrors of indeterminacy."); Susan Rose-Ackerman, *Against Ad-Hocery: A Comment on Michelman*, 88 Colum. L. Rev. 1697 (1988). Others see it as a virtue, at least in some contexts. *See* Marc R. Poirier, *The Virtue of Vagueness in Takings Doctrine*, 24 Cardozo L. Rev. 93 (2002) (arguing that in context of takings and nuisance law, vagueness and chaos are "precisely what enables them to anchor civil society's ongoing social process of creating and revising other, more crystallized expressions of property law").

reciprocal nature of the problem.”¹⁵¹

In justifying their outcomes, modern courts have often applied the Restatement nuisance criteria. To the extent that nuisance law has a modicum of certainty and predictability, it comes from outside the Restatement, from reported cases. This means that trial courts and appellate courts are constrained in their nuisance decision making only by in-state judicial precedents. This is especially significant for the issue at hand – under modern nuisance balancing, will courts (should courts?) find GMO defendants liable when their pollen contaminates the crops of bystanding farmers? Because there are no judicial precedents, the question is wide open. Any competent judge can write an opinion, using the Restatement factors (or equally malleable factors set forth in state decisional law) to announce or to reject liability, or to validate a jury verdict in either direction. This, of course, creates room for the consideration of farming methods, typical crop yields, costs of production, market values, the availability of alternative seeds and protective measures, and the magnitude of each farmer’s switching costs, that should be relevant in determining liability.

Doctrinal indeterminacy has one highly importance consequence for GMO nuisance litigation. Although some of the Restatement considerations do not raise issues that are purely factual (some present mixed questions of fact and law), in almost every case, fact finding will be necessary. Cases will survive motions for summary judgment and proceed to the jury (or to the court as fact finder if there is no jury). A summary dismissal will take place only when the bystanding farmer sued the wrong defendant, or has failed to allege substantial economic harm

¹⁵¹ See Coase, *supra* note 2, at 114 & 120. See also *id.* at 120-121 (“Furthermore, from time to time, they take these economic implications into account, along with other factors, in arriving at their decisions. The American writers [citing Prosser] on this subject refer to the question in a more explicit fashion than do the British. [And] in the reports of individual cases, it

caused by cross-pollination.

The one reported American case, *In re StarLink Corn Products Liability Litigation*,¹⁵² demonstrates how easily bystanding farmers can survive the summary judgment stage. Corn farmers brought actions against the developer and distributor of StarLink corn, asserting multiple claims including private nuisance, public nuisance, negligence, strict liability, and conversion.¹⁵³ Plaintiffs did not sue the nearby StarLink corn farmers. StarLink corn is genetically engineered to produce a protein, Cry9C, that is toxic to certain insects.¹⁵⁴ Because Cry9C has attributes similar to human allergens, the Environmental Protection Agency approved StarLink for animal feed and other uses, not including human consumption.¹⁵⁵ Due to cross pollination, StarLink allegedly contaminated “the entire United States’ corn supply,” causing a drop in value of U.S. corn.¹⁵⁶

The *StarLink* district court dismissed certain claims, but not the nuisance claims. The court cursorily observed, “We agree that drifting pollen can constitute an invasion, and that contaminating neighbors' crops interferes with their enjoyment of the land. The issue is whether defendants are responsible for contamination caused by their product beyond the point of

is clear that the judges have had in mind what would be lost as well as what would be gained . . .”).

¹⁵² 212 F. Supp. 2d 828 (N.D. Ill. 2002).

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sale.”¹⁵⁷ The court assumed, without further discussion, that the *StarLink* plaintiffs could assert a valid nuisance claim against their neighbors. All of the court’s attention was directed to defendants’ claim “that they cannot be liable for any nuisance caused by StarLink because they were no longer in control of the seeds once they were sold to farmers.” The court denied the motion to dismiss, concluding that defendants’ design of the StarLink technology, distribution of the seeds, and an alleged failure to comply with EPA requirements might constitute substantial contribution to the nuisance.¹⁵⁸

B. Strict Liability

Another potential cause of action available to non-GMO farmers is strict liability resulting from activities of the defendant that are deemed “abnormally dangerous.”¹⁵⁹ In theory, strict liability requires no fuzzy balancing of interest, no negligence on the part of a defendant, and no bad intent on the part of the defendant. Where applicable, it might provide another useful legal tool for bystanding farmers.

There is no ready answer to the question whether private nuisance, in whole or in part, is a strict liability tort. It turns on two variables: how broadly one defines “nuisance”; and how one perceives “strict liability.” The Restatement authors define nuisance expansively as any

¹⁵⁷ *Id.* at 845. To the same effect, later in the opinion the court observed, “Residue from a product drifting across property lines presents a typical nuisance claim.” *Id.* at 847.

¹⁵⁸ The court discussed cases involving asbestos and guns, where some courts imposed but others rejected nuisance liability for manufacturers beyond the point of sale. The court concluded that the StarLink nuisance claim was stronger because the asbestos and gun cases did not involve injuries to neighbors’ of purchasers of the product.

¹⁵⁹ Restatement (Second) of Torts § 520 (1979). See A. Bryan Endres, *GMO: Genetically Modified Organism or Gigantic Monetary Obligation? The Liability Schemes for GMO Damage in the United States and the European Union*, 22 LOY. L.A. INT’L & COMP. L. REV. 453, 488 (2000); Repp, *supra* note X, at 616-20.

“nontrespassory invasion of another’s interest in the private use and enjoyment of land.”¹⁶⁰ Other authorities define nuisance more narrowly, as an intentional tort.¹⁶¹ One view of strict liability limits that field to harms caused accidentally and without negligence.¹⁶² For our purposes, these questions of theory and doctrinal definition make no practical difference. Since the American acceptance of *Rylands v. Fletcher*,¹⁶³ it has been abundantly clear that one landowner can be strictly liable for harm caused to a neighbor, whether the rule is seen as a species of nuisance or just plain strict liability.

The strict liability theory is attractive to bystanding farmers because, unlike a negligence theory, strict liability does not require proof of fault so long as the activity is considered abnormally dangerous.¹⁶⁴ The rationale behind the doctrine of strict liability is that there are certain activities that present such serious danger that those persons engaging in such activities should automatically bear the costs of any injury resulting therefrom.¹⁶⁵

To determine whether an activity is abnormally dangerous, the Restatement calls for

¹⁶⁰ Restatement (Second) of Torts § 821D (1979).

¹⁶¹ *E.g.*, Prosser & Keeton on the Law of Torts 652-53 (5th ed. 1984).

¹⁶² *See* Prosser & Keeton on the Law of Torts 534-36 (5th ed. 1984).

¹⁶³ L.R. 3 H.L. 330(1868) (identifying in English courts the doctrine of strict liability for inherently dangerous activities). Shortly after the *Rylands* decision, some American courts rejected the doctrine. *See* *Brown v. Collins*, 53 N.H. 442 (1873) (calling absolute liability not suitable for a society with “modern, progressive, industrial pursuits). For a modern example of the American application of the *Rylands* doctrine, see *Siegler v. Kuhlman*, 502 P.2d 1181 (Wash. 1972). For a discussion of the several landmark strict liability torts cases, see R. Perry Sentell, *Torts in Verse: The Foundational Cases*, 39 Ga. L. Rev. 1197, 1312-25 (2005).

¹⁶⁴ *See* Flood, *supra* note X, at 487 (“[e]xamples of abnormally dangerous activities include ‘storing and using explosives, spraying pesticides, spilling toxic substances, allowing the escape of sewage, and allowing the escape of noxious or poisonous gases, fumes or vapors.’”).

¹⁶⁵ *Id.* at 488.

courts to consider six factors:

- (a) existence of a high degree of risk of some harm to the person, land or chattels of others;
- (b) likelihood that the harm that results from it will be great;
- (c) inability to eliminate the risk by the exercise of reasonable care;
- (d) extent to which the activity is not a matter of common usage;
- (e) inappropriateness of the activity to the place where it is carried on; and
- (f) extent to which its value to the community is outweighed by its dangerous attributes.¹⁶⁶

Courts should consider all six factors, but some may weigh more heavily than others and it is not required that all six be present.¹⁶⁷ Although the theory of strict liability has been used less frequently than other theories of recovery (because the six elements are somewhat difficult to prove), it remains a viable and attractive option to the plaintiff, simply because a finding of strict liability ensures recovery without any proof of fault.¹⁶⁸

Conceivably, those who participate in the production of GMO crops might sometimes be held strictly liable for losses caused to neighbors under the *Rylands* doctrine or its Restatement six-factor derivative.¹⁶⁹ To illustrate application of the six factors in pollen drift cases, the

¹⁶⁶ See Endres, *supra* note X, at 488.

¹⁶⁷ *Id.*

¹⁶⁸ See Repp, *supra* note X, at 617.

¹⁶⁹ Restatement (Second) of Torts § 519 (1979):

(1) One who carries on an abnormally dangerous activity is subject to liability for harm to the person, land or chattels of another resulting from the activity, although he has exercised the utmost care to prevent the harm.

(2) This strict liability is limited to the kind of harm, the possibility of which makes the activity abnormally dangerous.

pesticide drift cases provide an analogy.¹⁷⁰ Two of the leading cases, one from Washington and the other from Wisconsin, reached opposite conclusions. In *Langan v. Valicopters, Inc.*,¹⁷¹ pesticides applied by helicopter drifted across a farm boundary, falling on plaintiff's organic crops. Laboratory testing proved that the Langan's crops were contaminated with Thiodan, a chemical used to prevent Colorado beetle infestations, and resulted in the decertification of plaintiff's entire crop of tomatoes and beans as eligible for sale as organic produce.¹⁷² Plaintiff recovered compensatory damages in the amount of \$5500 for the market value of the crops based on a jury instruction calling for strict liability for damage proximately caused by the pesticides.¹⁷³ The Supreme Court of Washington affirmed, applying the Restatement strict liability factors as discussed in the following sections.¹⁷⁴

1. *Risk of harm.* The *Langan* court found it “undisputed” that crop dusting did present a high degree of risk of harm.¹⁷⁵ It concluded that the practice presented three “uncertain

¹⁷⁰ For discussion of the pesticide cases, see Robert F. Blomquist, *Applying Pesticides: Toward Reconceptualizing Liability to Neighbors for Crop, Livestock and Personal Damages from Agricultural Chemical Drift*, 48 Okla. L. Rev. 393 (1995).

¹⁷¹ 567 P.2d 218 (Wash. 1977).

¹⁷² *Id.* at 220.

¹⁷³ The court charged: “If you find that defendants' chemicals fell upon plaintiffs' crops, you are instructed that as a matter of law the defendants are liable for such damage to plaintiffs' crops, if any, as you find was proximately caused by defendants' spray application.” *Id.* at 220.

¹⁷⁴ Restatement (Second) of Torts § 520 (1979) (In determining whether an activity is abnormally dangerous, the following factors are to be considered: (a) existence of a high degree of risk of some harm to the person, land or chattels of others; (b) likelihood that the harm that results from it will be great; (c) inability to eliminate the risk by the exercise of reasonable care; (d) extent to which the activity is not a matter of common usage; (e) inappropriateness of the activity to the place where it is carried on; and (f) extent to which its value to the community is outweighed by its dangerous attributes.)

¹⁷⁵ *Langan*, 567 P.2d at 222.

and uncontrollable factors: (1) the size of the dust or spray particles; (2) the air disturbances created by the [applying aircraft]; and (3) natural atmospheric forces.”¹⁷⁶ The court noted that it is virtually impossible to control or limit the risk of drift posed by crop dusting.¹⁷⁷ It seems likely that a court would recognize similar “uncertain and uncontrollable factors” in the pollen drift situation: (1) the size of the pollen particles is very small like pesticides; and (2) pollen drifts in the air just like pesticides by way of “normal atmospheric forces” like wind.¹⁷⁸ Like crop dusting, the planting of GMO seeds bears a high risk of harm that cannot be eliminated because the contamination is aided by natural uncontrollable forces like wind and insect pollination.¹⁷⁹

2. *Likelihood of great harm.* In determining whether the gravity of the harm will be great, the *Langan* court noted that it is important to consider the use of the adjoining land.¹⁸⁰ In other words, in order for there to be great harm, the adjoining landowner must use her land in such a way that the chemicals will cause harm.¹⁸¹ For example, where an adjoining landowner keeps hogs on the property, the likelihood of harm resulting from the neighbor’s dusting of arsenical is great.¹⁸² The court found that in the *Langan*’s situation, there was the likelihood for great harm because the organic farmer risks losing his certification if nonorganic materials are

¹⁷⁶ *Id.*

¹⁷⁷ *See id.* (noting that use of helicopters reduces but does not eliminate risk of drift).

¹⁷⁸ *See Flood, supra* note X, at 489.

¹⁷⁹ *Id.*

¹⁸⁰ *Langan*, 567 P.2d at 222,

¹⁸¹ *Id.*

¹⁸² *Id.* (citing [McPherson v. Billington, 399 S.W.2d 186 \(Tex.Civ.App.1965\)](#)).

applied to the crops. Without the certification, the farmer would suffer economic damages when he could not sell the crops in the organic market.

The court's analysis of the likelihood of great harm for the organic farmer is analogous to that which would apply to a pollen drift scenario. Under the various rules governing the certification of organic crops, genetic contamination equates to the application of nonorganic materials to the crops; "[c]urrently, no private or governmental certification program for organic food allows use of GMO seeds."¹⁸³ Thus, the organic farmer whose crops are GMO-contaminated could easily prove the gravity of the harm by way of their economic losses.

3. *Exercise of reasonable care.* Concerning the defendant's inability to eliminate the risk by the exercise of reasonable, the *Langan* court simply noted that the same factors that produced a high degree of risk of harm were not possibly eliminated by the use of reasonable care.¹⁸⁴ In the context of corn pollen drift, GMO farmers probably similarly cannot completely eliminate the high risk of harm. With a crop like soybeans, however, GMO farmers may be able to employ small, effective buffer zones. Thus, it is likely that the use of reasonable care on the part of the GMO farmer will depend on the type of crop planted.

4. *Common usage.* In determining whether the activity was a matter of common usage, the *Langan* court employed the Restatement's approach that "[a]n activity is a matter of common usage if it is customarily carried on by the great mass of mankind, or by many people in the community."¹⁸⁵ The court rejected defendants' argument that crop dusting was "common usage," militating against strict liability, observing: "Although we recognize the prevalence of

¹⁸³ Flood, *supra* note X, at 490.

¹⁸⁴ Langan, 567 P.2d at 222-23.

¹⁸⁵ Langan, 567 P.2d at 223 (quoting Restatement (Second) of Torts § 520 (i) (1964)).

crop dusting and acknowledge that it is ordinarily done in large portions of the Yakima Valley, it is carried on by only a comparatively small number of persons (approximately 287 aircraft were used in 1975).”¹⁸⁶ Given the popularity of some GMO crop strains,¹⁸⁷ an argument in favor of common usage could be supported by a defendant, especially in the case of soybeans and canola, where 85% of acreage is planted in GMO strains.¹⁸⁸

5. *Inappropriateness of activity in the place.* In considering the element of appropriateness, the *Langan* court found simply that the use of pesticides near organic farming operations is an activity that is inappropriate in that place.¹⁸⁹ In the pollen drift situation, the activity of planting non-GMO crops in a place where the pollen could drift and contaminate non-GMO crops could similarly be considered an inappropriate activity.

6. *Value to community.* Although the court in *Langan* found that spraying pesticides was valuable in that it increased yields and thus food production for the community, it eventually concluded that the appropriate analyses included a look at who was to bear the burden of even beneficial activities.¹⁹⁰ The plaintiffs were innocent bystanders, and a balancing of the equities required that the defendants, who bore the benefits of the activity, be also made to bear the risks.¹⁹¹ Similarly, in the pollen drift situation, the benefits of GMO crops to the community

¹⁸⁶ 567 P.2d at 223.

¹⁸⁷ Presently, GMO crops make up 85 percent of United States soy acreage, 45 percent of the corn acreage, 76 percent of the cotton acreage, and 84 percent of the canola acreage. See CENTER FOR FOOD SAFETY, *supra* note X, at 8-9.

¹⁸⁸ *Id.*

¹⁸⁹ *Langan*, at 491-92.

¹⁹⁰ *Id.* at 492.

¹⁹¹ *Id.*

may include increased food supply, but ultimately it is the innocent bystander non-GMO farmer who is harmed, and it is the GMO farmer who benefits monetarily from the GMO crops. Under the *Langan* approach, the GMO farmer and the GMO biotech companies should bear the risks that accompany GMO farming since they are the parties who profit from the operations.

Although the *Langan* case provides a useful strict liability analogy to the pollen drift scenario, the fact remains that most cases brought to recover damages caused by pesticide drift proceed on a theory of negligence. While the case was once seen as a potential watershed movement toward the application of strict liability to an abnormally dangerous activity, it has in reality been embraced by few courts.¹⁹² In one of the few reported cases to discuss strict liability, the Wisconsin high court rejected strict liability and required a showing of negligence. In *Bennett v. Larsen Co.*,¹⁹³ a corn farmer sprayed his fields with pesticides to combat corn borers and earworms. Plaintiffs were beekeepers, with some of their hives near the corn fields. The pesticide labels indicated that the product may kill honeybees in substantial numbers. This happened. The court permitted plaintiffs' negligence claim to go forward, but rejected their claim of strict liability:

[P]esticide application to control severe pest infestations is a common activity which is necessary to ensure healthy crop growth. Testimony revealed that several canning companies in the Outagamie County area each year sprayed pesticides on their corn in order to avoid the potential complete destruction of their crops by corn borers and earworms. We conclude that the application of pesticides is a necessary and beneficial activity to ensure the production of adequate and healthy food and that its value to the people of this state outweighs the potential for harm. Accordingly, we hold that pesticide application is not an ultrahazardous activity warranting the application of strict liability for resulting harm.¹⁹⁴

¹⁹² *Id.* at 493.

¹⁹³ 348 N.W.2d 540 (Wis. 1984).

¹⁹⁴ *Id.* at 553. Factually, *Langan* is closer to our case of the bystander farmer than *Bennett*. Bees are much more mobile than crops. In *Bennett*, there is no evidence that

Those jurisdictions that impose strict liability on pesticide applicators, like Washington, are more likely to hold GMO producers strictly liable than those jurisdictions, like Wisconsin, that refuse to do so. One explanation for the divergence between Washington and Wisconsin may lay in the way they view the consideration of “common usage” as an element in the strict liability formulation. One particular element of importance in the GMO context is the “common usage” test. In *Bennett*, the question appears to be whether it is a common practice among agriculturalists in the community. In *Langan*, the question appears to be whether applying pesticides is a common practice among the general population in the community (like driving a car). Obviously, the test applied could lead to substantially different results when turning to the question whether GMO farming constitutes a common usage, which it surely is in many agricultural communities in the United States.¹⁹⁵

Another form of strict liability might be found in cases applying “nuisance per se,” although courts rarely integrate strict liability terminology into their opinions. When nuisance

defendants’ pesticides left their own fields, drifting onto plaintiffs’ land. The court rejected a prior line of cases holding in favor of pesticide appliers, stating:

[C]ourts have premised their decisions that pesticide users are not liable for damage to bees on the sprayed property on the theory that bees are trespassers. We do not think that a trespass analogy is correct for this situation. Bees are by nature foragers that fly to and from fields wherever there is nectar and pollen. There are no means to keep them from foraging, except for short periods of time, and there is no way for land possessors to prevent bees from entering their property.

Id. at 547 n.3. The *Bennett* court, therefore, appears not to have based its rejection of strict liability on the location of the bees when they were poisoned. It seemingly rejects strict liability for pesticide application as a general proposition, not limited to the context of bee deaths. Nonetheless, the Wisconsin court plainly could hold for an organic crop farmer in a case factually like *Langan*, distinguishing *Bennett* without having to overrule.

¹⁹⁵ GMO crops make up 85 percent of United States soy acreage, 45 percent of the corn acreage, 76 percent of the cotton acreage, and 84 percent of the canola acreage. See CENTER FOR FOOD SAFETY, *supra* note X, at 8-9.

per se is found, the defendant's conduct is deemed wrongful, with no need to balance the utility of that conduct against the harm to the plaintiff.¹⁹⁶ There is some confusion in the cases as to whether the nuisance per se doctrine sanctions only conduct that is bad everywhere – no matter where the defendant's property is located – or whether it includes conduct that is wrongful because of the nature of the neighborhood where it takes place.¹⁹⁷ For example, a crack house is a nuisance per se due to its illegality in all neighborhoods.¹⁹⁸ In contrast, a dynamite factory located in a residential neighborhood would constitute a nuisance per se, but probably not if that same factory located in an industrial zone.¹⁹⁹ It is highly unlikely that growing GMO crops in a rural area, generally used for or suitable for agricultural purposes, will constitute a nuisance per se.²⁰⁰

¹⁹⁶ A nuisance per se generally equates to a summary judgment case for the plaintiff. If the facts pleaded as to the defendant's engaging in a particular activity are true, and the plaintiff owns a protectable property interest, then the defendant has committed a nuisance. If plaintiff does not prove damages, however, plaintiff will be limited to nominal damages and injunctive relief.

¹⁹⁷ Sometimes, a distinction is made between nuisance per se, where the action constitutes a nuisance no matter what the circumstances or where it occurs, and a nuisance per accidens, where the action becomes a nuisance because of the surroundings in which it occurs. *Miller v. Cudahy Co.*, 592 F. Supp. 976, 1004 (D. Kan. 1984); *Miniat v. McGinnis*, 762 S.W.2d 390, 391 (1988); *Kays v. City of Versailles*, 22 S.W.2d 182, 183 (1929); *Suddeth v. Knight*, 314 S.E. 2d 11, 14 (Ct. App. 1984); *Engle v. Scott*, 114 P.2d 236, 238 (1941); *Twitty v. State*, 354 S.E.2d 296, 301 (1987); *Home Sales, Inc. v. City of North Myrtle Beach*, 382 S.E.2d 463, 468 (Ct. App. 1989); *Spears v. Goldberg*, 11 S.E.2d 532, 532 (1940).

¹⁹⁸ *See United States v. Wade*, 152 F.3d 969 (D.C. Cir. 1998).

¹⁹⁹ The ultimate difference that the classification makes is not in the remedy afforded, but in the proof required. *Borgnemouth Realty Co. v. Gulf Soap Corp.*, 31 So. 2d 488, 490 (1947); *Robinson v. Westman*, 29 N.W.2d 1, 2 (1947). Nuisance per se requires only proof of the act itself, while nuisance per accidens requires proof of the act and its consequences.

²⁰⁰ Growing GMO crops in a place where one would not expect to find them (a protected wilderness, or a small parcel in a residential neighborhood) might raise a question. However, in such settings it is not clear who or what would suffer harm from the GMO pollen.

A Texas case of the same vintage as the old weed cases illustrates the aversion some courts might have to imposing strict liability on GMO defendants. Like the weed cases, *Gulf, C. & S.F. Ry. v. Oakes*²⁰¹ is a “plant pollution” case, but it is much closer to our problem because it considers the spread of a *cultivated* plant that injures the grower’s neighbor. Long ago, Texas railways planted Bermuda grass to protect their embankments from erosion. Bermuda grass spreads by runners. Depending upon soil conditions and other factors, sometimes it spreads aggressively. Once it invades farm fields adjoining the railroad rights-of-way, it interferes with crops and is difficult to eradicate. At trial, the Oakes recovered damages at trial for the injurious spread of Bermuda grass from the railroad’s land. The trial judge had instructed the jury that the railroad was liable for the injury if it had planted the grass and the grass, “by its nature, was calculated and liable to spread to and upon adjacent lands, and damage and injure the same.” On appeal, the court reversed the verdict. The Oakes argued that the absolute liability doctrine of *Rylands v. Fletcher* supported the trial court’s instruction. In the words of *Rylands*, they claimed that Bermuda grass is a thing “which, though harmless while it remains there, will naturally do mischief if it escape out of his land.” The Texas court, however, expressed general dissatisfaction with *Rylands* as a general principle, refusing to apply it to Bermuda grass:

[W]e think it cannot be laid down as a rule of law, applicable to all circumstances and situations, that one who plants Bermuda grass upon his premises makes himself liable for any damage that may result to his neighbor, nor, on the other hand, that he may not be liable under some circumstances and conditions. As is said in some of the authorities, there must, in such inquires where rights and interests seem to conflict, be a balancing of them.²⁰²

²⁰¹ 58 S.W. 999 (Tex. 1900).

²⁰² *Oakes* may represent a refusal to transplant the English poisonous tree cases. See ***supra*. In rejecting strict liability, the *Oakes* court left scant guidance as to how a trial court was to determine whether a particular Bermuda grass invasion was, or was not, a nuisance. At the end of the opinion, the court suggested that the question should be whether the railroad, “in

A bystanding farmer in Texas, therefore, may find that she must bring her claim under the nuisance balancing test on the restatement, rather than under strict liability or nuisance per se.

Our economic analysis set forth at the beginning of the paper suggests that nuisance balancing is the most promising proper approach. The strict liability test may not be sensitive enough to the variable factors that bear on wealth maximization. A strict liability approach might save substantial judicial costs, however, if nuisance balancing decisions consistently established a uniform liability rule over time.

C. Trespass

The intrusion of GMO pollen across boundary lines arguably constitutes trespass to land under the law of some states. The non-GMO farmer may claim that the invading pollen has interfered with her right to exclusive possession of her farmland. Despite the hope that the law of trespass may offer non-GMO farmers, traditional definitions of the scope of the cause of action counsel against liability in trespass. Traditionally, courts have distinguished trespass from nuisance, defining their elements strictly to avoid overlap between the two theories.²⁰³ A

planting the grass, acted as a person of ordinary prudence would have done under the same circumstances,” and that this means that “the ground of liability, if one can be shown, would be negligence or other culpable conduct.” *Id.* at 1002-03.

Oakes can be distinguished from an invasion of GMO pollen because the injured neighbor acquires complete ownership of the invading Bermuda grass. The *Oakes* court mentioned this fact as a consideration: “Grass, when it spreads upon and takes root in the adjacent soil, becomes the property of the owner thereof, and he may do with it as he will, and hence there is no direct violation of his absolute right to the sole use and possession of his property.” *Id.* at 1001. In contrast, as mentioned above, the bystanding farmer does not acquire full property rights in the patented pollen.

²⁰³ The original distinction was between the original “criminal” trespass and trespass on the case. See Prosser & Keeton on the Law of Torts 28-30 (5th ed. 1984) (explaining that distinction is between trespass for immediate injury and case for some secondary causation). The authors state:

trespass consists of an intentional, unauthorized entry of a person or a tangible object on the land of another.²⁰⁴ The invasion must be direct and immediate.²⁰⁵ Any other intentional interference, if wrongful, is a nuisance.²⁰⁶ Trespass is commonly said to protect an owner's interest in exclusive possession,²⁰⁷ while nuisance protects the owner's interest in use and enjoyment.²⁰⁸ It is often unclear whether courts intend this last distinction to be an additional test, or whether it is just a way to describe a difference in practical impact that usually flows from the two types of interferences.

The traditional "direct and immediate" invasion requirement probably would insulate GMO defendants from trespass liability for two reasons. First, the passage of time between the planting of the GMO crop and its pollination makes the harm less "immediate." Second, the wind is an intervening force serving as the moving agent, making the invasion less "direct." Modern commentators, however, have suggested eliminating the "direct and immediate"

The classic illustration of the difference between trespass and case is that of a log thrown into the highway. A person struck by the log as it fell could maintain trespass against the thrower, since the injury was direct; but one who was hurt by stumbling over it as it lay in the road could maintain, not trespass, but an action on the case.

Id.

²⁰⁴ *Baumann v. Snider*, 532 S.E.2d 468, 472 (Ga. App. 2000).

²⁰⁵ *Id.*

²⁰⁶ *Id.*

²⁰⁷ *See* Prosser & Keeton on the Law of Torts §13 (5th ed. 1984) (stating that trespass requirement is that invasion interferes with right of exclusive possession).

²⁰⁸ *See* Prosser & Keeton on the Law of Torts §87 (5th ed. 1984) (stating that "essence of a private nuisance is an interference with the use and enjoyment of land").

requirement,²⁰⁹ and many modern courts have agreed.²¹⁰ Thus, the process by which GMO pollen arrives on the land of non-GMO farmers may not preclude trespass liability in some jurisdictions.

Under the modern view of trespass liability, the plaintiff farmer would have to prove three elements: (1) invasion, (2) causation, and (3) harm.²¹¹ With respect to the invasion itself, a key factor of GMO pollen is its small size. Before the middle of the last century, invasions of airborne pollutants, dust, smoke, and particulates were not trespasses. Only tangible objects large enough to be seen by the naked eyes resulted in trespass liability. More recently, a number of state courts have rejected the traditional distinction, imposing liability in trespass for airborne contaminants.²¹² Other courts, however, have decided to maintain the traditional distinction.²¹³

²⁰⁹ Restatement (Second) of Torts § 158 (1965) provides, “One is subject to liability to another for trespass . . . if he intentionally (a) enters land in the possession of the other, or causes a thing or a third person to do so . . .” A comment explains:

In order that there may be a trespass under the rule stated in this Section, it is not necessary that the foreign matter should be thrown directly and immediately upon the other's land. It is enough that an act is done with knowledge that it will to a substantial certainty result in the entry of the foreign matter. Thus one who so piles sand close to his boundary that by force of gravity alone it slides down onto his neighbor's land, or who so builds an embankment that during ordinary rainfalls the dirt from it is washed upon adjacent lands, becomes a trespasser on the other's land.

Id. cmt. i.

²¹⁰ See e.g., *Adams v. Cleveland-Cliffs Iron Co.*, 602 N.W.2d 215 (Mich. App. 1999) (adopting Restatement test); *Lunda v. Matthews*, 613 P.2d 63, 66 (Or. App. 1980) (“direct or indirect is immaterial”); see also, Richard A. Repp, *Biotech Pollution: Assessing Liability for Genetically Modified Crop Production and Genetic Drift*, 36 IDAHO L. REV. 585, 600 (2000) (claiming modern view is that direct and indirect distinction is of no consequence in trespass actions).

²¹¹ *Repp*, *supra* note X, at 600.

²¹² E.g., *Borland v. Sanders Lead Co.*, 369 So. 2d 523 (Ala. 1979) (smelter's emission of lead particulates and sulfoxide gases may constitute trespass); *Martin v. Reynolds Metals Co.*, 342 P.2d 790 (Or. 1959) (holding that aluminum plant's emission of fluoride particulates is

In most states, there is no modern case law. Courts that have allowed trespass actions for the invasion of traditional industrial pollutants obviously will be predisposed to apply the same rule for bystanding farmers whose crops are damaged by GMO pollen. Conversely, courts that reject trespass for industrial pollutants will almost certainly do so for pollen.

The judicial reform to trespass law in the traditional pollution context is often not as important as one might expect. Normally, all trespasses to land are wrongful. For remedies, normally all victims can get damages (including nominal damages if no actual loss is proven) and injunctive relief if the trespass is continuing. Reformist courts, however, have not been willing to protect landowners from pollution to that extent. They usually choose not to give landowners the right to collect damages, no matter how beneficial the activity that gave rise to pollution, or the right to force the polluter to cease the activity, with no balancing of utilities.²¹⁴

The second element of the trespass action – causation by one particular defendant GMO farmer – could prove difficult for the bystanding farmer.²¹⁵ It is important that the non-GMO farmer prove that he himself did not introduce the GMO pollen to the non-GMO field, for

trespass). See Scanlon, *supra* note X, at 6-9 (discussing various tests applied by several states in determining whether airborne particles can result in a direct physical interference).

²¹³ *E.g.*, Adams v. Cleveland-Cliffs Iron Co., 602 N.W.2d 215 (Mich. App. 1999) (dust, noise, and vibrations from iron ore mine do not result in trespass). See Borland, *supra* note ** (plaintiff must prove substantial damage). In the leading case of Martin, *supra* note**, the consequence of allowing trespass was to allow the plaintiff to use a six-year statute of limitations, avoiding the two-year statute applicable to nuisance.

²¹⁴ See Borland, *supra* note ** (plaintiff must prove substantial damage). In the leading case of Martin, *supra* note **, the consequence of allowing trespass was to allow the plaintiff to use a six-year statute of limitations, avoiding the two-year statute applicable to nuisance.

²¹⁵ See Repp, *supra* note 182, at 602-03 (explaining challenges facing non-GMO farmers with regard to causation element).

example, by planting already-contaminated seed.²¹⁶ Additionally, genetic testing will likely be required to prove that one particular defendant is responsible for the contamination.²¹⁷ In an area with just one GMO farmer, this testing will likely successfully prove whether the singular defendant is responsible.²¹⁸ However, where there are multiple GMO farmers in the surrounding areas, the testing will likely not be accurate enough to prove causation.²¹⁹ Therefore, additional circumstantial evidence in the form of expert testimony will be necessary to prove the causation element.²²⁰

If the plaintiff farmer can meet the invasion and causation elements, he must still prove actual damages in order to prevail in a trespass action.²²¹ The plaintiff can do this in a number of ways. He could show that his land has been damaged such that it is unfit for its prior intended purpose.²²² This option is most likely to happen where the plaintiff is an organic farmer, and proves that his land has been harmed such that subsequent harvests are not marketable under the strict standards of the industry.²²³ Additionally, the plaintiff could offer evidence to prove that

²¹⁶ *Id.* at 603.

²¹⁷ *Id.*

²¹⁸ *Id.*

²¹⁹ *Id.*

²²⁰ *See id.* The author suggests expert testimony could be used to establish the drift pattern in certain atmospheric conditions or the defendant's growing practices, noting however, that circumstantial evidence alone will make a difficult case for the bystander farmer. *Id.* at 604.

²²¹ *Id.*

²²² *Id.*

²²³ *Id.*; see also *supra* notes X-Y and accompanying text (discussing market for non-GMO and organic foods).

the contamination resulted in actual crop failure or damage.²²⁴

In cases seeking recoveries for the unwanted spraying of pesticides and herbicides, plaintiffs have focused on negligence and strict liability. Rarely have they advanced trespass claims. One exception is *Schronk v. Gilliam*,²²⁵ in which defendants' airplane flew over plaintiffs' land, dropping pesticides that damaged plaintiffs' crops.²²⁶ The court affirmed a jury verdict based on trespass, ruling that plaintiff did not have to prove negligence. *Schronk* is an authority that may support trespass liability for GMO defendants, but it might be distinguished on the basis that the contaminant was released aircraft in the airspace over the crops.²²⁷

As an alternative to trespass to land, bystanding farmers might claim injuries to their crops constitute intentional interference with personal property. In *StarLink Corn Products*, the plaintiff pleaded conversion. The court rejected this claim for two reasons. First, the defendant, in contaminating the plaintiff's corn, had not taken possession of the corn away from the plaintiff. Second, the contamination had not rendered the corn valueless. The owners had sold their corn, but at reduced prices in markets where the corn would be devoted to uses other than

²²⁴ *Id.* at 605.

²²⁵ 380 S.W.2d 743 (Tex. Civ. App. 1964).

²²⁶ Defendants wanted to spray cotton on other lands. It is not clear from the opinion whether the pesticides were discharged accidentally, or whether the pilot intentionally discharged them due to a mistaken belief that he was over the cotton.

²²⁷ The court observed:

Whether the situation is viewed as a wrongful act after rightful entry, or as a trespass ab initio, is not important. The entry of the fuselage, at even a privileged altitude, was accompanied by active and continuous spraying of the poisonous substance which constituted as much a part of the flight as if appellants' aircraft had been dragging a great scythe across the land below it. In our opinion an actionable trespass was established, and no allegation of negligence was required.

Id. at 745.

human consumption. In rejecting conversion, the StarLink Corn Products court said that trespass to chattels (not asserted by the plaintiff) might be appropriate.²²⁸

D. Legislative Efforts to Combat Pollen Drift

The phenomenon of pollen drift has led advocates and opponents of GMO crops to search for solutions to the growing problem of contamination. Members of at least two state legislatures have attempted to pass reform measures that would regulate the use of GMO crops in those states. For example, in North Carolina, a state in which farmers are growing approximately 3 million acres of GMO crops each year, an attempt was made this year to give the North Carolina Department of Agriculture the sole authority to regulate and institute bans on GMO crops.²²⁹ The measure was proposed after several counties in other parts of the country instituted bans on GMO crops. Certain farm groups and the state government seek to place control over biotech crops in the hands of the state government *only*, making North Carolina a “biotech-friendly state.” Opponents of the measure claim that it would protect no one but Monsanto and other similar biotech companies. They cite the pollen drift phenomenon as a significant reason to be critical of the state’s acceptance of GMO crops. As of the writing of this article, the bill was still being debated by the North Carolina Senate.

²²⁸ Standing crops usually are viewed as real property, not chattels. They become chattels when severed from the real estate (i.e., harvested). Arguably, plaintiff’s standing crops should be treated as chattels because plaintiff’s intended to harvest them and sell them as commodities. It is not likely to matter significantly whether a court proceeds under trespass to chattels, rather than trespass to land. With respect to the measurement of damages, the analysis is simpler using trespass to chattels. Plaintiff will want to collect damages equal to the reduced market value on the crop, based on prices in the commodities markets. This treats the injured property as chattels, not as land. The traditional measure of damages for trespass to land is the difference in the market value of the land before and after the trespass. In our context, a court ought to measure damages for trespass to land based upon the reduced market value of the harvested crops. A court should quickly conclude this is appropriate, but perhaps some court might hesitate.

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On the other hand, in 2005, Vermont considered the proposed Farmer Protection Act, which would have effectively held biotech seed companies liable for damages resulting from pollen drift contamination. Additionally, it would prevent biotech companies from suing bystanding farmers, those unwilling and unintentional patent infringers who Monsanto and similar companies currently investigate and prosecute. Similar bills had been proposed and subsequently defeated in Montana and North Dakota, and although the Vermont House adjourned for the summer without considering the bill, its supporters anticipate a different fate for the bill in Vermont when it is taken up later this year. The chances look good: 17 out of 30 Senators and 54 out of 150 Representatives have signed on as co-sponsors of the bill.

In addition to legislative efforts to control the proliferation of GMO crops and the problems that accompany them, some biotech companies have used science to combat the pollen drift problem. For example, in 2005 Hoegemeyer Hybrids developed a new product called “PuraMaize,” which controls pollen drift by rejecting any pollen that is not its own (“non-reciprocal pollen cross-sterility”). By using this seed, farmers can effectively grow GMO and non-GMO crops side-by-side without any fear of contamination. The company received a United States patent in April 2005 and currently has patents pending in countries around the world. It will be available commercially nation-wide in 2007.²³⁰

Although science may someday develop technology to diminish the effects of pollen drift, it seems unlikely that state legislatures will be able adequately to address the problem in the meantime. A legislature might, acting in what Coase refers to as its capacity as a “super firm,”²³¹ correctly evaluate externalities outside the competence of the common law judge, for example,

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²³¹ See Coase, *supra* note 2, at 117.

the cost of lost biodiversity potentially caused by a rule of no-liability for pollen drift. If so, a legislature or administrative agency might be the logical forum to address the problem. We suspect, however, that for the time being nuisance balancing provides the most effective tool for considering all the factors relevant to social welfare in the pollen drift context.

IV. PATENT LAW DEFENSES AVAILABLE TO NON-GMO FARMERS

Common law is likely to provide a remedy for many farmers harmed by pollen drift. A bystander farmer, however, may find himself the defendant in a lawsuit brought by the owner of the patent in the drifting pollen. The patent statute provides for strict liability; therefore a bystander farmer is *prima facie* liable for infringement if she inadvertently makes use of patented pollen or grows a patented hybrid. Patent law, however, has long recognized a variety of defenses to infringement. Two existing defenses, unclean hands and patent misuse, may provide significant relief from patent liability for bystander farmers. Two other defenses, the voluntary act doctrine and *volenti non fit injuria*, are logically applicable in patent infringement cases but are not yet judicially recognized in patent litigation. Interestingly, and consistent with the Coasean analysis conducted in Part I, these defenses are most likely available only to a bystander farmer, like our organic farmer, who does not take advantage of the benefits conferred by the adventitious drift of patented pollen. In other words, an economic justification can be offered for the application of these doctrines, even where they seem to test the limits of patent law.

A. Inadvertent Use of Patented Pollen and the Voluntary Act Doctrine

Corn plants exercise no independent judgment over the pollen they use to reproduce. If patented pollen lands on the corn plants of a bystander farmer, it will be used. Although other

defenses discussed below²³² are applicable to cases of inadvertent pollen uptake, the voluntary act defense, inapplicable in the contexts of crop harvesting and selling, helps explain why no patent infringement has occurred when a bystanding farmer inadvertently grows patented crops.

In criminal law, a voluntary act is an absolute requirement for criminal liability,²³³ even where mental state is irrelevant (as is the case with patent law liability). In most states, for example, statutory rape is a strict liability crime—that is, lack of knowledge of the victim’s age is typically not a defense. For example, if a thirty-year-old female teacher has sex with a sixteen-year-old male student, it does not matter if the teacher could reasonably have thought that the student was above the age of consent. However, if the teacher is in the hospital for surgery and the visiting underage student has sex with her when she is still under anesthesia, the teacher is not guilty of statutory rape. It is not the teacher’s lack of knowledge that forms the basis for the defense, but rather the involuntary nature of the teacher’s participation.²³⁴ Cases applying the doctrine typically excuse reflexive acts or those performed during sleep.²³⁵

The voluntary act doctrine should by analogy excuse a farmer whose crops are merely the passive receptors of patented pollen, although the doctrine does not appear by that name in cases excusing civil liability. The parallel defense to strict liability in civil cases seems to be the “act of God” doctrine. As explained in Comment (I) to § 504(3)(c) of the Restatement (Second) of

²³² See *infra* notes X-Y and accompanying text.

²³³ See Wayne Lafave, Criminal Law § 6.1(c) (). See also Kevin Saunders, Voluntary Acts and the Criminal Law: Justifying Culpability Based on the Existence of Volition, 49 U. Pitt. L. Rev. 443 (1988) (“The concept of the voluntary act lies at the very foundation of the criminal law, since ‘there cannot be an act subjecting a person to ... criminal liability without volition.’”). Voluntary inaction, of course, can be criminalized, e.g. failing to file a tax return.

²³⁴ See *id.* (“it is clear that criminal liability requires that the activity in question be voluntary”), citing Model Penal Code § 2.01(1).

²³⁵ See *supra* note 42.

Torts, strict liability (for trespassing livestock, for example) does not extend to damage "brought about by the unforeseeable operation of a force of nature (commonly called an 'act of God') or by the unforeseeable action of another animal or by the unforeseeable intentional, reckless or negligent conduct of a third person."²³⁶ Accordingly, courts have invoked the doctrine, for example, as a defense to strict liability in finding that the owners of reservoirs "cannot be held liable where the escape of water has been caused by third party acts which the owner could neither control nor anticipate."²³⁷ As in criminal law, the lack of volition on the part of the alleged wrongdoer provides the excuse. If a saboteur blows up a dam, the reservoir owner is not liable for damage caused to his neighbor's property by the escaping water.

Similarly, if the livestock of Farmer A rupture the fence of Farmer B, and Farmer B's livestock enter Farmer A's land and do damage, Farmer B is excused. These situations are apposite to the pollen drift context. If the wind blows unwanted pollen onto a bystanding farmer's fields, then the use of that pollen by the farmer's crops is similarly without the farmer's volition and should be excused. Note, however, that neither the voluntary act doctrine (nor the act of God defense) should be applicable to a case where the farmer goes further, by harvesting and selling these unintentionally pollinated crops, or by replanting the seeds resulting therefrom. Selling and planting are voluntary (and infringing) acts; accordingly, any excuse for these activities must be found elsewhere.

B. Harvesting and Sale of Unwelcome Patented Hybrids

²³⁶Restatement (Second) of Torts § 504(3)(c) 1965 & cmt. i. *See also* Richard Wright, the Grounds and Extent of Legal Responsibility, 40 San Diego L. Rev. 1425 (2003).

²³⁷Denis Binder, Act of God or Act of Man: A Reappraisal of the Act of God Defense in Tort Law, 15 Rev. of Litigation 1 (1996), *citing* *Albig v. Municipal Auth.*, 502 A.2d 658, 664 (Pa. Super. Ct. 1985); *Cohen v. Brockton Sav. Bank*, 71 N.E.2d 109 (Mass. 1947); *Box v. Jubb*, 4 Ex. D. 76, 79 (1879).

Notwithstanding the strict liability nature of patent infringement, the harvesting and sale of unwanted hybrid crops by a bystanding farmer may be excusable. The doctrines discussed below have different historical roots, but share an abhorrence of a plaintiff who seeks redress in a situation where she bears primary responsibility for the alleged wrong.

1. *Volenti Non Fit Injuria*. One of the most venerable doctrines in tort law establishes a defense when the plaintiff voluntarily submits himself to injury. Professor Ingman traces its history back to Justinian’s Code which states, “as fraud cannot be committed against anyone who gives his consent, you will in vain complain of it.”²³⁸ Put slightly differently, “he who suffers damage through his own fault has no right to complain of it.”²³⁹ According to Ingman, the defense was well-established in England by the 14th Century,²⁴⁰ and he provides a cogent example of its operation in 1607:

In *Horne v. Widlake*, the plaintiff sued the defendant for trespassing on his land and spoiling his grass. The defendant pleaded that there had been a right of way over the plaintiff’s land which the plaintiff ploughed up and sowed with wheat. . . . The court held against the plaintiff ‘for the defendant’s plea is a good Excuse against the Plaintiff, because the Plaintiff did the first Tort in stopping the ancient Way. . . . [The damage] arises from the Act and Tort of the Plaintiff himself, and *volenti non fit Injuria*.’²⁴¹

The defense is the historical antecedent to modern tort-like rules that excuse invitees from trespassing and professional boxers from committing assault.²⁴² It is also the origin of the

²³⁸ Terrence Ingman, *A History of the Defence of Volenti Non Fit Injuria*, 26 JURID. REV. 1, 1 (1981) (“*nec umquam volenti dolus inferatur, frustra de dol querimini*”);

²³⁹ *Id.* at 2 (“*Quod quis ex culpa suo damnum sentit non intelligitur damnum sentire.*”).

²⁴⁰ *Id.* at 2-3.

²⁴¹ *Id.* at 4 (citing *Horne v. Widlake*, (1607) Yelv. 141).

²⁴² *Id.* at 4-5.

assumption of risk doctrine.²⁴³

The *volenti* doctrine seems directly applicable to the case of the bystanding farmer whose plants are pollinated by unwanted patented GMO pollen. The complained of hybrid seeds are the result of technology that the patent owner has literally scattered to the winds, with knowledge of the most likely consequences.²⁴⁴ Regardless of whether the behavior of a patent owner such as Monsanto is characterized as intentional or reckless with regard to the pollen drift, its own conduct is the primary cause of the alleged wrong. “He who suffers damage through his own fault has no right to complain of it.”²⁴⁵ And, unlike the voluntary act doctrine, which requires a defendant to have remained completely passive, the defense contains no such requirement. In *Horne v. Widlake*, the defendant trampled the plaintiff’s crops, yet still was excused. The same is true in modern assumption of risk cases. Arguably, therefore, the crops can be sold. Interestingly, nothing in the doctrine would distinguish organic from opportunistic farmers.

Finally, it should be admitted that the *volenti* defense has not yet been applied in the context of patent infringement, but technologies that can force infringement on a passive third parties like the bystanding farmer are creatures of recent vintage. There simply has been no good reason for its application until now. Employing it in the case of bystanding farmers would be another in a long line of judicial adaptations of common law and equitable defenses to suits for patent infringement. Chisum in his well-known patent law treatise lists several familiar non-statutory defenses that have found a comfortable home in patent suits, including fraudulent

²⁴³*Id.* at 8-28. See also Charles Warren, *Volenti Non Fit Injuria* in Actions for Negligence, 8 Harv. L. Rev. 457 (1885).

²⁴⁴We assume the patentee has licensed the invention to a seed manufacturer with knowledge of the seeds future manufacture, sale, and use.

²⁴⁵See *supra* note .

procurement, inequitable conduct, laches, estoppel, bad faith enforcement, and misuse.²⁴⁶ *Volenti non fit injuria* should plausibly join the list.

2. *Unclean Hands*. As the origin of the patent misuse doctrine, the equitable defense of unclean hands has already found its way into patent law.²⁴⁷ In an infringement suit by a patent owner against a bystanding farmer, an injunction preventing the farmer from harvesting or selling his crop is likely to be a key element of the requested remedy. Equitable relief, however, is subject to the unclean hands doctrine: “He who comes into Equity must come with clean hands.”²⁴⁸ Professor Chafee explains, “In other words, since equity tries to enforce the good faith of the defendants, it no less stringently demands the same good faith from the plaintiffs.”²⁴⁹ In his exploration of the defense, he identifies the historical core function of the defense as protection of a defendant who was wronged by the behavior of the plaintiff. Although sometimes courts allow defendants to complain of wrongs done to third parties (rather than to the defendant), Chafee notes that “much more severity is shown by law courts to the victims of torts who have themselves been transgressors.”²⁵⁰

In the context of patent infringement claims, any equitable relief sought by a patentee should have to satisfy the unclean hands standard. In fact, Judge Richard Posner of the Seventh Circuit recently acknowledged in a patent infringement case the doctrine’s presence as an

²⁴⁶See Donald S. Chisum, 6 Chisum on Patents §§ 19.03, 19.03[6], 19.04, 19.05, 19.06.

²⁴⁷See *Aptix Corp., et al v. Quickturn Design System, Inc.*, 2001 WL 138051 (Fed. Cir. 11/05/01) (submission of falsified evidence in litigation barred enforcement of the patent against the defendant, but did not render the patent invalid against other parties).

²⁴⁸See Zechariah Chafee, Jr., *Coming into Equity with Clean Hands*, 47 Mich. L. Rev. 877, 877 (1949).

²⁴⁹*Id.*

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equitable defense, saying that “I believe that as a matter of fundamental principle it must be a defense to a charge of patent infringement that the patentee caused the infringement.”²⁵¹ In the case before the district court (where Posner sat by designation), the plaintiff Smithkline held one of several patents on the blockbuster antidepressant Paxil, and claimed that the defendant had infringed that patent. The district court dismissed the plaintiff’s case, finding that Smithkline’s widespread distribution of the drug had contaminated the defendant’s research and production environments through a process of natural crystallization. The defendant could not help but infringe and was therefore excused from liability.²⁵² Posner’s decision was affirmed by the Federal Circuit on other grounds,²⁵³ but the court went on to speak with some approval of Posner’s rationale: “In this unique and unprecedented circumstance, the trial court understandably reached out to find an equitable remedy to protect Apotex.”²⁵⁴

The case of the Paxil defendant and the bystanding farmer fall close to the historical core of the unclean hands doctrine, where the plaintiff complaining of the patent infringement is likely to be the same party primarily responsible for it. Patented seeds are licensed to be sold and planted, and the production of pollen and process of hybridization are common knowledge. Inadvertent contamination is a surprise to no one. Consistent with economic analysis, we would

²⁵¹ See *Smithkline Beechum Corp. v. Apotex Corp.*, 247 F. Supp. 2d 1011, 1043 (N.D. Ill. 2003) (finding that patent had not been infringed, but that even if it had, equitable defense of unclean hands would bar plaintiff’s recovery).

²⁵² *Id.* at 1011.

²⁵³ See *Smithkline Beechum Corp. v. Apotex Corp.*, 365 F.3d 1306 (Fed. Cir. 2004) (finding that the drug had been in clinical trials and thus in “public use”). The case was subsequently affirmed by an *en banc* opinion, but the conclusion was based on yet another ground – “inherent anticipation.” See *Smithkline Beechum v. Apotex Corp.*, 403 F.3d 1331 (Fed. Cir. 2005) (*en banc*).

²⁵⁴ *Id.* at 1316.

suggest that the defense be available to farmers harmed by pollen drift, but not by those that benefit. The unclean hands defense should not be available to an opportunistic farmer whose own hands are arguably “unclean.”

3. *Patent Misuse*. The defense of patent misuse, judicially derived from the doctrine of unclean hands,²⁵⁵ renders a patent unenforceable when the patentee has engaged in conduct designed to “extend[] the patent beyond its lawful scope.”²⁵⁶ As one court put it, the “rationale of the doctrine is a rejection of the concept of the patent as an absolute property right in favor of its definition as a right which must not be exercised in manner not inconsistent with the constitutionally-defined purpose for which it was conferred, i.e., to ‘promote the Progress of the useful Arts.’”²⁵⁷ Chisum suggests that the question to ask in patent misuse cases is whether “the practice in question [should be] treated as an appropriate exercise of the patentee’s statutory patent rights?”²⁵⁸

In the case of inventors of new plants, patent law provides a means by which they can attempt to recoup the costs of research and development. If the new plant constitutes an

²⁵⁵See *Morton Salt v. G.S. Suppiger Co.*, 314 U.S. 488, 492-94 (holding patent unenforceable and linking patent misuse defense to unclean hands doctrine); *C.R. Bard, Inc.v.. M3 Systems, Inc.*, 157 F.3d 1340 (1998) (“[t]he defense of patent misuse arises from the equitable doctrine of unclean hands”); *B. Braun Medical, Inc. V. Abbott Laboratories*, 124 F.3d 1419 (“patent misuse is an extension of the equitable doctrine of unclean hands”); *W.L. Gore & Assoc., Inc.v. Carlisle Corp.*, 529 F.2d 614 (1976) (“The doctrine of patent misuse is an extension of the equitable doctrine which denies judicial relief to one who comes into court with ‘unclean hands’.”).

²⁵⁶Donald Chisum, 6 *Chisum on Patents* §19.04[1][a] at 19-427; Katherine White, *A Rule for Determining When Patent Misuse Should Be Applied*, 11 *Fordham Intell. Prop. Media & Ent. L. J.* 671, 673 (2001) (“The patent misuse doctrine prohibits efforts by a patentee that seek to extend a patent beyond the original scope of the grant.”).

²⁵⁷*Hensley Equip. Co., Inc. v. Esco Corp.*, 383 F.2d 252, 260 (1967).

²⁵⁸See Chisum, *supra* note , at §19.04[2] at 19-442.

improvement over prior similar plants,²⁵⁹ then the inventor should find a ready market for the improved good. Patent law provides a legal means to protect that market. As noted above, Monsanto, has patented a corn plant that resists the herbicide “Roundup.” Many farmers who use Roundup are eager to buy the patented “Roundup-Ready” seeds in order to increase their yields. Patent law gives Monsanto the legal means to assure that it will be the sole source of Roundup-Ready seeds to farmers wanting to plant them. Patent law effectively grants Monsanto exclusive rights to this market.²⁶⁰

Nothing in patent theory, however, suggests that Monsanto should have the legal right to force unwilling farmers to grow Roundup-Ready crops against their will. Were Monsanto able to enjoin the harvesting and sale of all bystanding farmer’s crops, Monsanto would be enlarging its market far beyond what patent law is designed to protect. A bystanding non-GMO or organic farmer has no desire to make, use, sell, offer for sale, or import patented seeds or plants. Given the premium such farmers receive for selling their non-GMO or organic crops,²⁶¹ they vigorously want nothing to do with such seeds or plants. In other words, bystanding farmers do not constitute any part of the market that patent law sets aside for owners of patented pollen, seeds, and plants. A patent infringement suit against a bystanding farmer constitutes an improper attempt on the part of the patent owner to expand the scope of the patent beyond its legal limits—the classic definition of patent misuse. Consistent with our economic analysis, it should be available to victims of pollen drift, but not to opportunistic beneficiaries.

²⁵⁹An invention is patentable whether or not it constitutes an improvement over the prior art (or has any value at all). *See* 15 U.S.C. §§ 101, 102, & 103 (establishing novelty, usefulness, and non-obviousness as prerequisites to obtaining a patent).

²⁶⁰*See* 35 U.S.C. § 271 (detailing the rights of patent owners).

²⁶¹*See supra* note .

The closest analogy in existing law involves cases in which patent owners have attempted to force liability on unwitting users of technology through a standard settings process.²⁶² In *In the Matter of Dell Computer Corporation*,²⁶³ the Federal Trade Commission (FTC) considered Dell's behavior before the Video Electronics Standards Association (VESA). In the course of participating in the VESA standard setting process for a computer bus design, eventually known as the VL-Bus, Dell certified in writing that it held no patents, nor planned to hold any patents, that the VL-Bus would infringe. Free from concerns that computer firms would have to pay Dell a royalty in order to conform to the proposed standard, VESA approved the VL-Bus. Once the standard was in place, however, Dell revealed it held a patent on one key part of the VL-Bus technology. Dell's fraudulent representations before VESA threatened to put all conforming firms in the industry in violation of Dell's patent rights. In order to conform to the standard, Dell's competitors would have to infringe or pay Dell a licensing fee. The FTC found that Dell's behavior was anticompetitive and that its patent rights provided no legal excuse for its behavior.²⁶⁴ As a result, the FTC ordered Dell to license its patented technology free-of-charge to those wishing to conform to the VL-Bus standard.²⁶⁵

It is every patent owner's dream to see its patented technology adopted as the sole acceptable industry standard. Where a standard setting body objectively and with full information adopts a proprietary standard, the patent misuse doctrine is not implicated. When

²⁶²See Janice Mueller, Patent Misuse through the Capture of Industry Standards, 17 Berkeley Tech. L. J. 623, 631 (2002) (arguing that failure to reveal relevant patent rights in the course of standard setting should constitute patent misuse).

²⁶³112 F.T.C. 616 (1996).

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the patent owner acts wrongfully, however, in advocating a proprietary standard, the patent misuse doctrine may render the patent unenforceable against putative infringers who must conform with the standard.²⁶⁶ In the standard settings cases,²⁶⁷ the key factor is the unilateral imposition of legal duties on unwitting parties, just as in the case of the patentee and the bystanding farmer. But the case of the farmer is even more compelling. Sometimes firms can avoid a standard or design around it,²⁶⁸ but the bystanding farmer who discovers that his fields are full of allegedly infringing plants has been completely captured by the patent owner. He has no choice but to plow under his fields or pay a licensing fee.

Some important commentators have expressed doubts about the defense of patent misuse,²⁶⁹ but their complaints are usually directed at the overlap between the typical patent misuse case and anti-trust law.²⁷⁰ The majority of patent misuse cases allege that the patent owner has used the patent to violate anti-trust law, and Professor Lemley's critique of patent misuse doctrine is representative. He argues that in anti-trust-style cases the misuse "sanction bears no relation to the injury caused ... [it] duplicates antitrust remedies in many cases leading

²⁶⁶See Mueller, *supra* note , at 631 (arguing that failure to reveal relevant patent rights in the course of standard setting should constitute patent misuse).

²⁶⁷See also *Rambus, Inc. v. Infineon Technologies AG*, 318 F.3d 1081 (Fed. Cir. 2003) (allegations that advocate for industry standard breached a duty to disclose its pending patent applications); *Talbert Fuel Sys. Patents Co. v. Unocal Corp.*, 275 F.3d 1371 (Fed. Cir. 2002) (allegations that Unocal abused emissions technology standards setting process in California)

²⁶⁸See *In the Matter of Dell*, 121 F.T.C. 616 (order indicates that members delayed implementing the standard or tried to design around it).

²⁶⁹See Patricia Martone & Richard Feustel, Jr., *The Patent Misuse Defense—Does It Still Have Vitality?* 792 PLI/Pat 123 (2004).

²⁷⁰See Robin Feldman, *The Insufficiency of Anti-Trust Analysis for Patent Misuse*, 55 *Hastings L. J.* 399 (2003); Mark Lemley, *The Economic Irrationality of the Patent Misuse Doctrine*, 78 *Cal. L. Rev.* 1599 (1990).

to excessive deterrence ... [and] often pays the sanction as a windfall to an unrelated third party, thereby encouraging infringement while failing to compensate those actually injured.”²⁷¹ Although we are sympathetic to the view that the patent misuse doctrine, to the extent it overlaps with anti-trust law, may be “economically irrational,”²⁷² to use Lemley’s term, the bystanding farmer does not come to court dressed as an anti-trust victim.

First, the bystanding farmer who asserts the patent misuse defense alleges that he is the victim of an illegal nuisance or trespass, not the victim of an illegal monopoly, so there is no duplication with anti-trust remedies. Second, there is no imbalance between the injury caused to the farmer and remedy he seeks. If the misuse defense negates injunctive relief, the farmer is merely freed to sell his crops at the lower GMO price. If he also counterclaims for damages, he will only be entitled to the actual reduction in the value of his crop due to the contamination.²⁷³ There is no double recovery, and the patentee may continue to exploit and protect his natural market for patented seeds and plants--those who affirmative desire to plant them. Finally, there can be no windfall in the situation where the bystanding farmer has gained no advantage in any way by the windblown pollen. On the other hand, a bystanding farmer who takes advantage of the patented technology by either replanting patented seeds or taking advantage of herbicide resistance qualities of the patented hybrids should not be able to assert the defense.

Applying the patent misuse defense in the case of the bystanding farmer would also have the salutary effect of giving some much-needed content to a neglected half of the typical formulation of the doctrine. Chisum gives the universally accepted formulation of the patent

²⁷¹See Lemley, *supra* note 54, at 1600.

²⁷²*Id.* at 1599.

²⁷³See *infra* notes - and accompanying text.

misuse defense: “A patent owner may [not] exploit a patent in an improper manner by violating the anti-trust laws *or extending the patent beyond its lawful scope.*”²⁷⁴ Courts and commentators have had a hard time imagining how a patent owner might extend the scope of its patent in any way other than committing an anti-trust-style violation. The unlawful extension clause in the patent misuse formulation has done little work. The situation of the bystanding farmer, and perhaps the victim of a flawed standard setting process, suggest what an unlawful extension of the patent grant can look like outside the anti-trust setting. Both parties allege wrongs (trespass, nuisance, fraud) that do not require any finding of an actionable monopolization, while still satisfying the core equitable concerns underlying the doctrine.

Patent misuse provides the most doctrinally compelling defense for bystanding farmers who inadvertently commit patent infringement, and it also suggests a scheme of liability consistent with our economic analysis. The organic farmer who is harmed by pollen drift presents a strong case for the application of the patent misuse doctrine. The opportunistic farmer who intentionally exploits pollen drift presents a much weaker case.

CONCLUSION

When Ronald Coase wrote *The Problem of Social Cost*, the archetypical problems between neighbors that concerned him involved wandering cows trampling farmer’s fields and sparks flying off of trains to ignite crops. The widespread drift of genetically modified pollen presents a similar economic problem, but on a much vaster scale that threatens a multi-billion dollar agricultural industry producing organic and other non-GMO crops for markets in Japan, Europe, and the United States. Nonetheless, the simple two-party game modeled by Coase still

²⁷⁴See Chisum, *supra* note , at § 19.04 (emphasis added).

provides valuable insights into how pollen drift disputes between neighbors should be settled. In a world of high transaction costs, nuisance law can provide an effective mechanism for weighing the costs and benefits of liability in any particular case. In order to determine the desirability of imposing liability, a decision maker must consider the farming methods at issue, typical crop yields, variable costs of production, market values of crops, the availability of alternative seeds and protective measures, and the magnitude of each farmer's switching costs. In theory, a common law court applying nuisance balancing doctrines may be better situated to maximize net social welfare than a state or federal legislature.

The federal legislature, however, has spoken, at least as regards the patentability of the GMO pollen that may drift unbidden across property lines. The genetic structure of such pollen is often proprietary, and the strict liability nature of patent infringement arguably establishes a one-size-fits-all rule that disadvantages non-GMO farmers at every turn. Consistent with our economic analysis, we find that equitable doctrines within patent law provide a defense for a bystanding farmer who has been harmed by pollen drift, not for one who has opportunistically benefited. Coase proved that in a world of high transactions costs, a rule that fixes liability without regard to variations in the underlying facts is likely to be inefficient. The nuanced role for patent law that we describe has support in existing doctrine, is consistent with Coase's discussion of social cost, and maintains the game theoretic equilibria we establish in the two-player neighbors pollen drift game.