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**The Debate over Genetically Modified
Crops in the United States: Reassessment of
Notions of Harm, Difference, and Choice**

by

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REASSESSMENT OF NOTIONS OF HARM,
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It is alleged that because millions participate in it, certain reproduction processes are necessary that inevitably require identical needs in innumerable places to be satisfied with identical goods. The technical contrast between the few production centers and the large number of widely dispersed consumption points is said to demand organization and planning by management. Furthermore, it is claimed that standards were based in the first place on consumers' needs, and for that reason were accepted with so little resistance. The result is the circle of manipulation and retroactive need in which the unity of the system grows ever stronger. No mention is made of the fact that the basis on which technology acquires power over society is the power of those whose economic hold over society is greatest. A technological rationale is the rationale of domination itself.¹

In recent years, the development and use of genetically modified agricultural crops has provoked heated debate among scientists, industry leaders, politicians, and the public at large. Major news sources routinely cover issues related to genetic modification, and initiatives in some states to require the labeling of products containing genetically modified ("GM") ingredients have led to greater public awareness and an atmosphere of increasing animosity between critics and proponents of genetic modification.

¹ Max Horkheimer & Theodor Adorno, *The Culture Industry as Mass Deception*, in LITERARY THEORY: AN ANTHOLOGY 1037 (Julie Rivkin & Michael Ryan eds., 1998).

The issue of cloning in general, and of human cloning in particular, further complicates this atmosphere. There is a general feeling of unease that science may be surpassing certain ethical or moral boundaries, and that a Pandora's box is about to be opened. Unfortunately, fair assessment of the debate is hard to come by. Media news sources often use fear to attract viewers or readers, and sensationalistic stories and soundbites do more harm than good.

This Note will consider how the debate over genetically modified crops has evolved, and how policy has responded or failed to respond. It will begin with an overview of genetic modification, and an examination of the pros and cons of this relatively new technology, including an analysis of how the arguments on each side have been framed. The Note will then briefly discuss the current regulatory framework being used in relation to genetically modified crops and products. The Note will end with discussions about the possibilities of labeling such products, and the sources of litigation that arise in the wake of GM agriculture.

The recurring themes that will be encountered are the notions of *harm*, *difference*, and *choice*. In general, these refer to the nature of the harms posed by genetically modified organisms ("GMOs"), the difference between genetically modified products and their non-modified counterparts, and the public's ability to choose between genetically modified and non-modified products. In the context of genetic modification, these concepts will have to be continuously reevaluated in order to meet the legal and ethical questions that are raised. This Note will argue that the current models of regulation provide an insufficient and inappropriate response to the issues surrounding genetic modification, and that legislatures must respond to public concern in a rational and equitable manner.

I. THE DEFINITION OF GENETIC MODIFICATION

Genetic modification, or genetic engineering, is generally defined as a recombinant DNA (rDNA) technology, whereby a segment of DNA from one organism is extracted and spliced into a recipient organism's preexisting DNA.² Proponents of GMOs point out that genetic "modification" of one sort or another has been practiced by mankind for centuries, first in the form of selective breeding, and later in the form of crossbreeding.³ This argu-

² John Charles Kunich, *Mother Frankenstein, Doctor Nature, and the Environmental Law of Genetic Engineering*, 74 S. CAL. L. REV. 807, 809 (2001).

³ See, e.g., J. Howard Beales III, *Modification and Consumer Information: Modern Bio-*

ment maintains that GMO technology is really nothing new, but merely a modern version of an ancient technique.⁴ The argument goes on to say that since mankind has been selectively choosing the genetic traits of his crops for hundreds of years, this new technology does not raise any new ethical or safety issues.⁵ Instead, GMO technology merely gives the modern world a greater ability to control the process and to make more exacting choices of genetic traits.⁶

The flaws of this perspective are multifold. First, and most obviously, the new rDNA technology allows traits from one species to be spliced into an unrelated species, even from animal to plant.⁷ This type of modification was unthinkable using traditional crossbreeding.⁸ Second, the rDNA technique involves the placement of a strand of DNA, representing the desired trait, into the recipient organism's DNA.⁹ While proponents of genetic modification point out that this technique allows more control over the addition of desired traits,¹⁰ the technique also opens up an entirely new set of variables. An organism's DNA, according to some scientists, is mostly made up of "junk DNA" that serves no purpose in the development of the organism. Recent research, however, shows that the interactions between strands of DNA (genes) is highly sophisticated and interconnected. It is thus impossible to completely control a particular trait simply by isolating a particular strand.¹¹ In other words, no strand is an island, and we do not yet have the knowledge to account for all the possible influences one strand has throughout the entire chain of DNA.

There are also quantitative differences between rDNA technology and traditional techniques. The new technology allows for a far greater number of organisms to be produced at a far greater speed compared to traditional methods, and the collective impact of these organisms presents problems for risk assessment.¹²

technology and the Regulation of Information, 55 FOOD & DRUG L.J. 105, 106 (2000) (arguing that genetic engineering is conceptually similar to crossbreeding within plant species).

⁴ Jonathan H. Adler, *More Sorry than Safe: Assessing the Precautionary Principle and the Proposed International Biosafety Protocol*, 35 TEX. INT'L L.J. 173, 177-78 (2000).

⁵ *Id.* at 179.

⁶ *Id.*

⁷ Kunich, *supra* note 2, at 812.

⁸ *Id.*

⁹ *Id.* at 809.

¹⁰ Adler, *supra* note 4, at 179.

¹¹ RONNIE CUMMINS & BEN LILLISTON, *GENETICALLY ENGINEERED FOOD: A SELF-DEFENSE GUIDE FOR CONSUMERS* 24 (2000).

¹² Kurt Buechle, Note, *The Great, Global Promise of Genetically Modified Organisms: Overcoming Fear, Misconceptions, and the Cartagena Protocol on Biosafety*, 9 IND. J. GLOBAL LEGAL STUD. 283, 308 (2001).

II. WEIGHING THE EVIDENCE: THE PROS AND CONS OF GENETIC MODIFICATION

With the passage of time comes the emergence of new technologies, and the world has changed drastically as a result of the adoption of such developments. It is almost certain that the recent advances in genetics will create new opportunities, especially in the realms of health care and reproductive technology. Any thing or process containing DNA will fall under a far greater degree of our control, and there is little doubt that lives will be changed, often for the better, because of our ability to map and manipulate genetic sequences.

The question is when and how this new knowledge should be used. Not all advances in technology are beneficial in all areas of life. Benefits and risks must be taken into account, as well as matters of practicality and efficiency. The adoption of the newest technology is not always the most effective solution to a problem, and "technology for technology's sake" may be more of a marketing tool than a strategy for living.

The risks and benefits of genetic modification of crops must be examined before a reasoned policy is developed. Furthermore, if we are to adopt this new technology, it should be done deliberately and purposefully. Action should not be taken simply because it can be, nor should inertia be the driving force behind the decision.

In order to judge the wisdom of adopting the technology of genetically modified crops, a series of questions must be asked. First, it must be determined whether biotechnology is more cost-effective than alternatives such as water and chemical management of the environment. Second, it must be determined whether biotechnology is superior to traditional techniques. Third, it must be determined if there are negative agronomic consequences, whether consumers will accept the new products, and if the products will result in significantly improved conditions.¹³

A. *The Advantages of Genetically Modified Crops*

In theory, GM crops offer the opportunity of increased production using a smaller amount of land.¹⁴ These increased yields would be a result of the increased pest and disease resistance of the crops, as well as herbicide tolerance whereby farmers could ac-

¹³ Ellen Messer, *Food Systems and Dietary Perspective: Are Genetically Modified Organisms the Best Way to Ensure Nutritionally Adequate Food?*, 9 IND. J. GLOBAL LEGAL STUD. 65, 73 (2001).

¹⁴ Buechle, *supra* note 12, at 290.

tively spray fields without fear of reducing crops yields.¹⁵ As a result of this efficiency, GMO supporters argue that genetically modified crops feed starving populations, reduce pesticide and herbicide use, and conserve environmental resources.¹⁶ Moreover, “[c]onsumers [are said to] benefit from cheaper, better tasting foods that will taste better and last longer.”¹⁷

While these advantages would be appealing, the state of affairs thus far has failed to convince GMO critics. The increased yields promised by use of GM crops have not yet manifested.¹⁸ There have been instances where GM crops have provided less efficient yields than expected.¹⁹ The issue of decreased herbicide use is also up for debate, as herbicide-resistant crops may in fact encourage farmers to use more herbicides without risk to their yields.²⁰ Furthermore, while crops may be modified to become more pest-resistant, insects will eventually become resistant to the products themselves.²¹ Pests will likely form a resistance to the *Bacillus thuringiensis* (“Bt”) toxins used in modified crops. Plants are genetically modified to produce the naturally occurring pesticide in large amounts. Since organic farmers rely on the use of a sprayed form of Bt, a natural pesticide that organic certification allows, the concern is that this technique will soon be ineffective because of the widespread use of Bt-modified crops.²²

The altruistic advantage of feeding starving populations with genetically modified crops is also received with skepticism. It is generally accepted that starving populations are not a result of a lack of food production, but rather a result of the means of distribution.²³ Genetically modified crops are thus “an attempt to impose a technological solution to a social problem.”²⁴ Even if genetically modified crops were successful in increasing production, it is doubtful that there would be any significant impact on starving populations.

The promise of genetically modified crops fortified with added nutrients encounters the same problem. Areas suffering

¹⁵ Thomas O. McGarity, *Seeds of Distrust: Federal Regulation of Genetically Modified Foods*, 35 U. MICH. J.L. REFORM 403, 412 (2002).

¹⁶ *Id.* at 409.

¹⁷ *Id.*

¹⁸ *Id.* at 412.

¹⁹ Neil D. Hamilton, *Legal Issues Shaping Society's Acceptance of Biotechnology and Genetically Modified Organisms*, 6 DRAKE J. AGRIC. L. 81, 93 (2001).

²⁰ Sophia Kolehmainen, *Precaution Before Profits: An Overview of Issues in Genetically Engineered Food and Crops*, 20 VA. ENVTL. L.J. 267, 285 (2001).

²¹ Hamilton, *supra* note 19, at 93.

²² Kunich, *supra* note 2, at 810-11.

²³ Messer, *supra* note 13, at 68.

²⁴ *Id.* at 67-68.

from nutrient deficiencies are usually the victims of food distribution problems, and no amount of added nutrients can address these issues of access.²⁵ Furthermore, even in prosperous nations where a nutritious diet is readily available, consumers often choose innutritious alternatives. It is unlikely that GM produce would change such behavior.

The promise of an improved product for the consumer is also open to debate. So far, the producers of genetically modified seeds have not concentrated on developing better taste or quality.²⁶ In the context of industrialized agriculture, taste and quality have been sacrificed for hardiness and uniformity; there is no reason to believe that this will not continue to be the case with regard to genetically modified crops.

B. The Disadvantages of Genetically Modified Crops

The possible disadvantages of GM crops generally fall within three areas of concern: effects on human health, effects on the environment, and effects on agriculture. While these effects are not unrelated, they will each be discussed separately below.

1. Effects on Human Health

One of the prime concerns about the effect of genetically modified crops on human health is that of food allergies. A product that would not cause an allergic reaction in its unmodified form may contain an added protein that is a food allergen for some consumers.²⁷ The possibility of a food allergen may be predictable if the added DNA comes from a food that is known to commonly produce such reactions, such as peanuts. The allergenicity of non-food proteins that may be used in genetic modification is largely unknown, however, and successful testing ordinarily requires human volunteers, which is expensive. Although the likelihood that any particular protein in a genetically modified food is an allergen is relatively small, it is also unlikely that such an allergy would be discovered without extensive testing.²⁸

Another common concern involving GM crops is the high level of natural pesticides that some crops are engineered to produce. The presence of *Bacillus thuringiensis* ("Bt") toxins is a common concern due to the large number of crops modified to produce the pesticide. Although testing has revealed no adverse

²⁵ Kolehmainen, *supra* note 20, at 287.

²⁶ McGarity, *supra* note 15, at 409-10.

²⁷ Buechle, *supra* note 12, at 293.

²⁸ McGarity, *supra* note 15, at 419-20.

health effects in the short term, some scientists have speculated that there may be risks at higher exposure levels, as well as to individuals with compromised immune systems. Furthermore, the effects of long-term exposure are unknown.²⁹

Other areas of concern involve changes in the metabolic and chemical structures of modified plants. Modification of DNA may result in such changes, which could potentially prove toxic to humans. It is hoped that manufacturers would test for these changes, but it is also possible the effects of modification may be latent, and thus not easily detected.³⁰

Some modified crops also contain a "marker gene" that better enables scientists to isolate plant cells that have incorporated the desired gene. These "marker genes" have the characteristic of antibiotic resistance, and some scientists fear that the quality could be transferred either to humans who consume the plant, or to naturally occurring pathogenic bacteria, thus reducing the therapeutic effects of antibiotics taken for medical reasons.³¹

Genetic modification may also cause changes to crops that would not pose a direct risk to human health, but could affect humans nonetheless. For example, changes in the levels of nutrients, or in the ability of those nutrients to be absorbed by the body, may occur in modified plants.³² Although such an occurrence would not be life-threatening, long-term changes could have a negative impact on health.

2. *Effects on the Environment*

One of the primary environmental concerns is bioaccumulation, a phenomenon observed in both the field and in the laboratory, which promotes resistance to Bt toxins in insects. The effects of bioaccumulation would render present pesticides ineffectual, and new types would have to be developed continuously.³³

Another concern is that genetically modified crops could pass their modified genes to wild relatives. If the modified crop were developed to be pest-, disease-, and herbicide-resistant, such crossbreeding could result in weeds that would thrive and be difficult to eliminate, potentially throwing ecosystems out of balance. Genetically modified plants may also enter into ecosystems where they were not planted due to pollen drift and seed spillage. Due to

²⁹ *Id.* at 417.

³⁰ *Id.* at 420-22.

³¹ *Id.* at 423.

³² *See id.* (noting that genetically modified soybeans were twelve to fourteen percent lower in phytoestrogens, which are associated with protection against breast cancer).

³³ Buechle, *supra* note 12, at 291.

the large variety of ecosystems that a genetically modified plant could end up in, it would be impossible to predict what effects the plants would have in each.³⁴ The risks associated with the release of new organisms into these ecosystems would be difficult to identify, making successful preparation for such risks unlikely.³⁵ One such potential environmental effect is genetic erosion, which is defined as a decrease in biodiversity.³⁶ Biodiversity may be diminished due to the marginalization of crops not modified to tolerate herbicides and pests.³⁷

Yet another risk to the environment comes in the form of a threat to the genetic integrity of existing species as a result of the release of genetically modified organisms into the environment. Since control over the circumstances of accidental release would be minimal, and the effects of genetic modification are irreversible, such a release would result in the crossbreeding of genetically modified organisms with naturally occurring, non-modified organisms.³⁸ The risk of crossbreeding was made apparent in at least one study which showed that genetically engineered mustard plants were more than twenty times more likely to cross-pollinate than non-modified mustard plants.³⁹ Such an occurrence could have any number of effects on the environment.

First, given the hardiness and pest-resistance of modified organisms, non-modified organisms might be forced out of existing ecosystems through the process of natural selection. Second, the co-mingling of modified and non-modified organisms would mean that eventually, most if not all of the species would acquire genetically modified genes through crossbreeding. The gradual dilution, and possible eradication of organisms that do not contain genetically modified genes could be the end result, thereby resulting in a loss of diversity in the gene pool as the dominant GM plant multiplies. There may also be ripple effects on the ecosystem in general when the natural balance of a species is disturbed.⁴⁰

The threat to genetic integrity was made real in the case of Capulalpan, a small Mexican town containing what amounts to a national treasury of corn. The multitudes of corn varieties found in Capulalpan are used by scientists worldwide to rejuvenate endangered varieties when disease or disaster occurs. Although

³⁴ *Id.* at 291-92.

³⁵ *Id.* at 294.

³⁶ *Id.* at 298.

³⁷ Messer, *supra* note 13, at 85.

³⁸ Kunich, *supra* note 2, at 817-19.

³⁹ Kolehmainen, *supra* note 20, at 276.

⁴⁰ Kunich, *supra* note 2, at 817-19.

Mexico had banned the planting of genetically engineered crops, genetically modified corn was found in the fields of Capulalpan. Ironically, the problem was first discerned when a farmer noticed that the corn in her field did not have the hardiness to which she was accustomed. When sent to laboratories for testing, it was determined that the centuries-old corn varieties had traces of modified corn genes. Moreover, fifteen of twenty-two corn samples from surrounding mountain communities also had traces of the modified genes.⁴¹

The issue of genetic integrity is not only new to law, but also new to public debate in general. New technology allows for the manipulation of genetic material in ways never before possible, and as a result, there are not only questions about the safety of the procedure, but also ethical questions that must be addressed. Do we have a right to tamper with the genetic material of other living organisms, and if so, are there boundaries that we should be aware of? Do plants and animals have a right to be treated as “ends” in themselves, rather than as “means” in a system of production?⁴² How or when should religious concerns be addressed? Who should make the decisions? The issues are simply too new and underdeveloped to provide conclusive answers, but it does appear that there are contradictory opinions, and policymakers must be careful in navigating these uncharted territories.

3. *Effects on Agriculture*

The effects that genetically modified crops will have on agriculture present both economic and social concerns that strike at the heart of our perceptions and policies towards agriculture in general. Much of the history of the United States is rooted in the agrarian tradition, and many of the values coming out of that tradition still inform our relationship with both our food and our land. Presently, we are in a time where much of the farming that takes place in the United States is industrialized, and the small family farm has struggled to compete. There are, however, strong undercurrents keeping traditional farms alive and functional, and it is arguably more than mere sentimentalism that keeps such ideals vital.

Man’s relationship with agriculture is unique in many ways. Without sustenance, we would perish, and it is through the labors

⁴¹ Mark Schapiro, *Sowing Disaster?: How Genetically Engineered American Corn Has Altered the Global Landscape*, NATION, Oct. 28, 2002, at 11-12.

⁴² J.W. Looney, *The Changing Focus of Government Regulation of Agriculture in the United States*, 44 MERCER L. REV. 763, 817 (1993).

of farming that we are able to partake of the world. Traditionally, agriculture has been defined in terms of community, with local growers providing needed crops. Although a shift has occurred whereby we no longer receive the majority of our food products from local farmers, the values of community, land stewardship, and animal husbandry remain strong throughout much of the United States.

With this in mind, it is important to consider the effects that genetically modified crops will have on agriculture. Biotechnology need not be synonymous with the industrialization of agriculture, but in practical terms they exist hand in hand. It is from this perspective that the effects of biotechnology on the agricultural landscape must be examined.

One of the primary concerns about the effect of genetically modified crops on farmers is that of economic costs and controls. One such cost involves the continual updating of modified seed to keep up with the co-evolution of pests and changing ecological conditions.⁴³ Another cost involves the renewing of licenses required to plant many genetically modified crops. The patented plants are often sold only for one growing season, and farmers must purchase new seed or renew their permits to plant in order to continue growing the crops.⁴⁴ Traditionally, seed was simply harvested and used again during the next growing season. Under the terms of most GMO contracts, such a procedure would now constitute patent infringement, and the biotechnology corporations who own the patents have brought a number of lawsuits against farmers. Such agreements thus produce the possibility of litigation costs, as well as monitoring costs to ensure infringement does not occur. The concern is that such a system "leaves farmers at the economic mercy of the companies they support and separates farmers from their natural linkage with consumers and the public."⁴⁵

Genetically modified crops also pose a risk to non-modified growers, and organic farmers in particular. Until recently, organic certification required that crops be unmodified. When modified seed ends up in organic fields, the result is that the organic farmer loses his certification. Since the market price for organic foods is much higher than for non-organic foods, the result is a substantial decrease in the worth of the crop. Furthermore, it would be im-

⁴³ Messer, *supra* note 13, at 86.

⁴⁴ Buechle, *supra* note 12, at 319.

⁴⁵ Neil D. Hamilton, *Agriculture Without Farmers? Is Industrialization Restructuring American Food Production and Threatening the Future of Sustainable Agriculture?*, 14 N. ILL. U. L. REV. 613, 629 (1994).

possible to sort out the plants that contain the modified genes from those that might not, and there is no way to remove the gene. To make matters worse, it is difficult to tell where the contamination occurred. The genes could have come from a local combine operator who failed to clean his machinery, or they could have simply blown in from a neighboring field in the form of pollen. Due to the proliferation of genetically modified crops, zero-contamination may soon be an impossibility.⁴⁶ New organic standards, which were recently adopted, have attempted to remedy this problem and are discussed later in this Note.

Another economic concern comes in the form of international resistance to genetically modified crops. Over the past five years, farmers in the United States have lost more than \$814 million in foreign sales due to international restrictions on genetically modified crops. That figure does not include the amount farmers lose as a result of the oversupply in the domestic market. Presently, the United States, along with the biotechnology industry, is putting pressure on foreign markets to accept genetically modified imports. Such tactics may not be effective, especially in regions where there is concern that the patenting of genetically modified crops "will create a new feudalism in which farmers, especially those in developing countries, will be dependant upon a few multinational companies from the northern hemisphere."⁴⁷ Whatever the result may be, the current market is drastically affected.

While in a technological sense, genetically modified crops may represent a shift in how farming is done, it is not revolutionary in terms of the modern culture of agribusiness.⁴⁸ Critics of biotechnology suggest that the pest and disease problems that genetically modified crops have been designed to counteract are a result of the monoculture farming of industrial agriculture.⁴⁹ Vast fields of identical plants are particularly vulnerable to weeds, pests, and disease, while the usefulness of pesticides is lost to resistance.⁵⁰ Genetic modification allows the system of monoculture to survive without changing its basic structure.⁵¹ Rather than exploring the use of more diverse crops or alternative farming techniques, genetic modification allows for "business as usual," at least for the time being.

⁴⁶ Schapiro, *supra* note 41.

⁴⁷ Franz Xaver Perrez, *Taking Consumers Seriously: The Swiss Regulatory Approach to Genetically Modified Food*, 8 N.Y.U. ENVTL. L.J. 585, 588 (2000).

⁴⁸ MICHAEL POLLAN, *THE BOTANY OF DESIRE* 225-26 (2001).

⁴⁹ *Id.*

⁵⁰ *Id.*

⁵¹ *Id.*

III. HOW THE ISSUE OF RISKS AND BENEFITS HAS BEEN FRAMED

Proponents and critics of genetically modified crops have generally chosen to focus the discussion of the risks of GMOs on the issue of the effects on human health. The effects of GMOs on human health have likewise been the focus of much of the media attention concerning modified crops. Understandably, people tend to focus on the dangers that will affect them most immediately and directly.

This focus on human health risks is deceptive, however. First, many of the documented health risks have been remedied. The presence of genetically modified corn unfit for human consumption found in taco shells and other corn products is a prime example. Such accidents are said to be the exception to the rule that genetically modified crops pose no health risks to humans. Furthermore, the amount of research that points to the safety of modified crops, at least in the short term, is well-documented. Although some research clearly suggests that health risks are present, the research is often speculative, and not based on products currently on the market. A pattern also emerges whereby studies conducted by the GMO industry often point to the safety of their products, while most of the risk-finding studies are conducted by private researchers. At the very least, the cumulative force of the research is indeterminate of the risk posed by GMOs to human health.

The debate is further complicated by how proponents of GMOs portray criticism from the public. In 1993, then-Commissioner of the Food and Drug Administration, Dr. David A. Kessler, speculated that public distrust of GMOs was based on their envisioning a sci-fi landscape, such as from the movie "Attack of the Killer Tomatoes," where mutated tomatoes roll through the streets on a murderous rampage.⁵² Other proponents of GMOs have suggested that the European Community's distrust of genetically modified crops is a remnant of the "mad cow" disease scare, and a generalized over-sensitivity to food safety. These observations tend to dismiss public concern as the product of an over-imaginative and under-informed public. Consumer fear is said to be based not on uncertainty, but on misunderstanding.⁵³ The message is clear: Fear of genetically modified crops is based on irrationality and ignorance, and an informed public would not have

⁵² Judith E. Beach, *No "Killer Tomatoes": Easing Federal Regulation of Genetically Engineered Plants*, 53 *FOOD & DRUG L.J.* 181, 181-82 (1998).

⁵³ Buechle, *supra* note 12, at 300.

any anxiety in embracing genetically modified foods. Ironically, a survey in the United Kingdom showed that the survey group had a greater opposition to biotechnology after receiving a training course on the subject,⁵⁴ hinting that ignorance may not in fact be the source of consumer skepticism.

Although health concerns may be foremost in the public's mind, there are other legitimate concerns that may keep the public from embracing GMOs. Fear for the environment and ecosystems, as well as ethical, religious, and socio-political concerns are all examples of issues that work into the equation of whether or not genetic modification of crops will be accepted.⁵⁵

IV. THE REGULATION OF GENETICALLY MODIFIED CROPS

To some extent, the question of how safe or dangerous genetically modified crops are is still unanswerable, due to a lack of studies on the long-term effects of GMOs on both human health and the environment. In this sense, the introduction of GMO products into the United States food supply serves as an experiment, albeit performed on unwilling subjects and without following scientific method.⁵⁶ Given this degree of uncertainty, GMO critics have called for the United States to adopt the Precautionary Principle when dealing with genetically modified foods and their regulation. Under this approach, "[w]here there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."⁵⁷ This is not the approach that has been adopted thus far, as a brief look at current regulatory structures will indicate.

First, it is important to understand how the GMO industry has grown within the United States. The major players in the genetically modified seed industry were chemical companies (e.g., Monsanto, Dow) who began to acquire agricultural seed companies when the possibilities of genetic modification became apparent. These companies spent billions of dollars investing in genetic modification technology before they sold one plant.⁵⁸

Proponents of GMOs, including the federal government, enthusiastically embraced biotechnology without serious investiga-

⁵⁴ *Id.* at 304.

⁵⁵ Perez, *supra* note 47, at 587-88.

⁵⁶ KATHLEEN HART, EATING IN THE DARK 5-7 (2002).

⁵⁷ Philip Bentley, *A Re-Assessment of Article XX, Paragraphs (b) and (g) of GATT 1994 in the Light of Growing Consumer and Environmental Concern About Biotechnology*, 24 *FORDHAM INT'L L.J.* 107, 111 (2000).

⁵⁸ Schapiro, *supra* note 41, at 17.

tion of the potential problems in what amounted to a “don’t look, don’t see policy.”⁵⁹ One difficulty is that “agricultural policy [may be] influenced more by the interests of the businesses which trade with farmers, than by the concerns of farmers or societal goals.”⁶⁰

Presently, the regulation of genetically modified crops is done through a patchwork of laws spread across the Food and Drug Administration (“FDA”), the Environmental Protection Agency (“EPA”), and the United States Department of Agriculture (“USDA”).⁶¹ For the purposes of this Note, only the major implications of this process will be addressed.

The USDA issues permits for trials of new GM crops, but once they enter into commercial production, the agency has no mandate to oversee them. The EPA has responsibility for any new variety producing its own insecticide, but relies on company-provided data, and is not required to do follow-up inspections or independent monitoring.⁶²

The FDA is responsible for regulating new foods and food additives under the authority of the Federal Food, Drug, and Cosmetic Act.⁶³ In 1992, the FDA decided that genetically modified foods would not require FDA approval, except when food safety questions exist sufficient to warrant pre-market review.⁶⁴ The premise behind this decision is that genetically modified foods are “substantially equivalent” to non-modified foods and do not require special scrutiny.⁶⁵ This rationale is also at the base of the FDA’s decision to not require special labeling for genetically modified foods, and the FDA has stated that there is no material difference in nutrition, composition, or safety between genetically modified food and non-modified food.⁶⁶ The FDA also engages in voluntary safety consultations with biotech companies and reviews data supplied by the companies, but not once in the past ten years has it refused to permit development of new crops.⁶⁷ Critics of genetically modified crops, such as Michael Hanson of the Consumers Union, have expressed concern over this regulatory process because “the lack of legal authority to pursue independent investigations, to do follow-up on producer assertions or to conduct inde-

⁵⁹ *Id.*

⁶⁰ Hamilton, *supra* note 45, at 628.

⁶¹ Kolehmainen, *supra* note 20, at 288.

⁶² Schapiro, *supra* note 41, at 17.

⁶³ Kolehmainen, *supra* note 20, at 289.

⁶⁴ *Id.*

⁶⁵ *Id.* at 290.

⁶⁶ Sarah L. Kirby, Note, *Genetically Modified Foods: More Reasons to Label than Not*, 6 DRAKE J. AGRIC. L. 351, 352 (2001).

⁶⁷ Schapiro, *supra* note 41, at 17.

pendent assessments of safety claims means that in practice, the biotech industry has been given a free ride.”⁶⁸

V. THE LABELING OF GENETICALLY MODIFIED FOODS

As stated above, the decision not to label genetically modified foods is premised on the idea of “substantial equivalence.” The presumption of “substantial equivalence” is based upon the end product, and not the method of production, which is regarded by the FDA as not “material” for labeling purposes.⁶⁹ The FDA does not consider genetically modified foods, as a class, to be inherently less safe than, or to differ in quality from, foods obtained through conventional methods.⁷⁰ While genetically modified crops are different enough to warrant patent protection, they are not considered so different as to require labeling.⁷¹

Although “method of production” is not considered “material” by the FDA so as to require labeling, an exception was made in the case of irradiated foods.⁷² The FDA determined that irradiation could cause changes in flavor or shelf life, and that such changes could be significant and material in light of the consumer’s perception of the foods as unprocessed.⁷³ The labeling decision was limited, however, to foods that were otherwise unprocessed, and did not include the labeling of irradiated ingredients, which were not thought to change the characteristics of a multiple-ingredient food in any significant way.⁷⁴ In other words, the process of irradiation was only labeled to the extent that it changed the normally anticipated qualities of the food.

The FDA’s reasoning in requiring the labeling of irradiated foods could also be applied to at least some genetically modified foods. Through genetic modification, a food’s characteristics may be altered so that shelf life, nutritional value, or flavor may differ from normal consumer expectations.⁷⁵ The difficulty in doing so lies in the distinction between “processing” and “production.” While a consumer has the right to know of processing methods

⁶⁸ *Id.*

⁶⁹ Beach, *supra* note 52, at 186.

⁷⁰ *Id.*

⁷¹ See POLLAN, *supra* note 48, at 189 (“The new plants are novel enough to be patented, yet not so novel as to warrant a label telling us what it is we’re eating. It would seem they are chimeras: ‘revolutionary’ in the patent office and on the farm, ‘nothing new’ in the supermarket and the environment.”).

⁷² Frederick H. Degnan, *The Food Label and the Right-to-Know*, 52 FOOD & DRUG L.J. 49, 52 (1997).

⁷³ *Id.* at 52-53.

⁷⁴ *Id.*

⁷⁵ See McGarity, *supra* note 15, at 414-15.

that change the expected characteristics of a food, that right is not applied when it is the production method itself that changes those characteristics. Arguably, this is a case of distinction without difference. If the concern is consumer expectation, does it matter whether a characteristic change is the result of “processing” or “production”?

Opponents of labeling believe that if consumer concerns were treated as a legitimate reason for requiring the labeling of genetically modified products, there would be no end to the information manufacturers would be required to disclose about their production methods.⁷⁶ What this argument fails to realize is that consumers want information about genetic modification precisely because it is *unlike* other production methods. Furthermore, the bright-line distinction made by the FDA between “process” and “product” may not be so clear in the case of genetically modified goods. DNA sequences inform an organism throughout its existence; moreover, they make the organism what it *is*. The process, in that sense, never ceases being a part of the product.

Ultimately, the FDA’s interpretation of “material” and “substantial equivalence” with regard to genetically modified products is given wide deference.⁷⁷ Since Congress has not spoken directly to the issue, any interpretation that is reasonable is entitled to deference, even if it is not the “best” or “most natural” interpretation.⁷⁸ The regulations used by the FDA were not designed to deal with the issue of genetically modified foods, and thus their application may be understandably unsatisfactory. Until new legislation aimed directly at the regulation of genetically modified products is put into place, the FDA’s choices are determining the government’s approach to the new technology, and may not reflect the concerns of the people as represented by their legislators.

A. *The Consumer’s Right to Know: Labeling Laws and Risk Assessment*

The issue of labeling genetically modified foods is centered on the tension between a consumer’s right to know and the bioengineering industry’s interest in not labeling.⁷⁹ While much discussion has centered upon the FDA’s regulatory practices, there is also the issue of whether or not a state may require the labeling of genetically modified foods. A similar issue was addressed in *In-*

⁷⁶ See *Int’l Dairy Foods Ass’n v. Amestoy*, 92 F.3d 67, 74 (2d Cir. 1996).

⁷⁷ *Alliance for Bio-Integrity v. Shalala*, 116 F. Supp. 2d 166, 178 (D.D.C. 2000).

⁷⁸ *Id.*

⁷⁹ Degnan, *supra* note 72, at 49-50.

ternational Dairy Foods Ass'n v. Amestoy.⁸⁰ The case involves an action brought by dairy manufacturers challenging a Vermont law requiring the labeling of products from cows treated with recombinant Bovine Growth Hormone.⁸¹ Although not specifically dealing with the subject of genetically modified crops, the issues are similar enough to deserve analysis.

In *Amestoy*, the Second Circuit Court of Appeals applied a four-part analysis to determine whether the government restriction (in the form of compelled speech) on commercial speech is permissible.⁸² The court held that the Vermont law failed to meet the second prong of the test, requiring a substantial government interest.⁸³ The interest asserted by Vermont—the consumer interests of its citizenry—was found to be inadequate.⁸⁴ The court stated that “consumer curiosity alone is not a strong enough state interest to sustain the compulsion of even an accurate, factual statement” and that “[b]ecause Vermont has demonstrated no cognizable harms, its statute is likely to be held unconstitutional.”⁸⁵

While the case clearly holds that consumer interest alone is not enough to sustain mandatory labeling laws, the lengthy dissenting opinion of Circuit Judge Leval indicates that there are circumstances under which the outcome might have been different.⁸⁶ The majority opinion is limited to cases in which a labeling law is supported by no interest other than the gratification of consumer curiosity.⁸⁷ Leval speculates that had the state clearly and sufficiently put forth evidence of the interests it sought to advance (concerns about human health, animal health, biotechnology, and the survival of small dairy farms), it would have satisfied the substantial government interest requirement.⁸⁸

Whether or not evidence of such concerns would have resulted in a different decision is debatable, and perhaps hinges on the likelihood of the risks due to the growth hormone. Likewise, it is presumable that the courts will approach the issue of state laws requiring the labeling of genetically modified foods in a similar fashion. Given the number of risks posed by genetically modified

⁸⁰ 92 F.3d 67 (2d Cir. 1996).

⁸¹ *Id.* at 69.

⁸² *Id.* at 72. The factors included “(1) whether the expression concerns lawful activity and is not misleading; (2) whether the government’s interest is substantial; (3) whether the labeling law directly serves the asserted interest; and (4) whether the labeling law is no more extensive than necessary.” *Id.*

⁸³ *Id.* at 73.

⁸⁴ *Id.*

⁸⁵ *Id.* at 74 (citation omitted).

⁸⁶ *Id.* at 74-81 (Leval, J., dissenting).

⁸⁷ *Id.* at 81.

⁸⁸ *Id.* at 76-81.

crops, as discussed in the first part of this Note, it is possible that a substantial state interest in labeling would be found.⁸⁹ The result, however, would revolve around what evidence of the risk is submitted, coupled with the court's willingness to find that the risks rise to the level of a substantial state interest—a point that may be difficult to convince a court of given the FDA's general approval of genetically modified crops as safe.⁹⁰

At what point does public demand substantiate the need for labeling? According to polls, a majority of Americans would like to see genetically modified products labeled.⁹¹ European nations have reacted to similar public concern by requiring labeling.⁹² To ignore mass public concern is irresponsible, and denotes a paternalistic approach to public policy. The studies done on genetically modified crops are at the very least inconclusive in terms of impact upon human health and the environment. Enough doubt remains to substantiate legitimate concern. Moreover, concerns that arise out of ethical, religious, or political beliefs are not easily proved or disproved. The public's "right to know" might better be thought of as a "right to be heard." And listened to. This is the essence of a representative government, a fact not lost to the biotech industry, which has taken full advantage of their lobbying power to ensure technology-friendly regulations.⁹³

B. The Consumer's Interest in Avoidance: Religious and Ethical Considerations

Proponents of the labeling of genetically modified foods have also attempted to support their views on grounds of religious, moral, and ethical concerns.⁹⁴ While these views may have an im-

⁸⁹ Even if a state labeling law passed a First Amendment challenge, there is still the possibility that such a law could be found unconstitutional under the Commerce Clause, an issue the court did not address in *Amestoy*, and which is outside of the scope of this Note. *Id.* at 70.

⁹⁰ See Beach, *supra* note 52, at 186 (noting the FDA's approving attitude).

⁹¹ See Jeffrey K. Francer, Note, *Frankenstein Foods or Flavor Savers?: Regulating Agricultural Biotechnology in the United States and European Union*, 7 VA. J. SOC. POL'Y & L. 257, 299 (2000) (noting a study that showed sixty-eight percent of consumers desire labeling); see also George E.C. York, Note, *Global Foods, Local Tastes and Biotechnology: The New Legal Architecture of International Agriculture Trade*, 7 COLUM. J. EUR. L. 423, 442 (2001) (noting a study finding eighty-five percent of Americans consider labeling of genetically modified foods very important).

⁹² See Francer, *supra* note 91, at 296-97; see also *id.* (noting that seventy percent of Germans and seventy-eight percent of Austrians are unwilling to purchase genetically modified products).

⁹³ See Kirby, *supra* note 66, at 366 (noting that George W. Bush's cabinet, including the secretaries of Defense, Health, and Agriculture, the Attorney General, and the Chairman of the House Agriculture Committee all have connections with Monsanto or the biotech industry).

⁹⁴ See Arthur E. Appleton, *The Labeling of GMO Products Pursuant to International Trade Rules*, 8 N.Y.U. ENVTL. L.J. 566, 568 (2000) (discussing rationales for labeling).

pact by influencing legislature and public opinion, they have not been considered strong arguments by the legal and scientific communities.⁹⁵ In *Alliance for Bio-Integrity v. Shalala*,⁹⁶ the district court rejected a Free Exercise challenge, as well as a challenge under the Religious Freedom Restoration Act (“RFRA”), to the FDA’s decision to not require labeling of genetically modified foods.⁹⁷ The court, following the precedent of *Employment Division v. Smith*,⁹⁸ held that “neutral laws of general applicability do not violate the Free Exercise Clause, even if the laws incidentally burden religion.”⁹⁹ The court also rejected the challenge under RFRA because the FDA’s decision not to label was held not to constitute a substantial burden to religious beliefs.¹⁰⁰ While the court acknowledged that the absence of labeling was a “potential inconvenience” due to the difficulty of determining which foods were genetically modified, the court found that this did not amount to a “substantial burden,” nor cause the abandonment of religious beliefs or practices.¹⁰¹

It is arguable that given the ubiquity of genetically modified foods,¹⁰² the amount of time and money it would take to avoid genetically modified foods amounts to more than a “potential inconvenience.” Although consumers could grow their own produce, and raise their own animals (or purchase from other growers committed to not using genetically modified crops), they would not be able to purchase manufactured or pre-prepared foods. Unlike other religious beliefs concerning food consumption (such as veganism, vegetarianism, and the Kosher tradition), those wishing to avoid genetically modified foods cannot “see” the difference (unlike vegans and vegetarians), nor is the concern limited to the preparation methods of animal products (the Kosher tradition).

Even for those who are not bound by religious practice, the ethical, moral, and political motivations behind a conviction to not consume genetically modified products may be equally strong. In such cases, the issue is not the Free Exercise Clause, but rather a policy decision. Although ethical and moral grounds may be impossible to quantify through scientific studies, they are arguably a

⁹⁵ *Id.* at 569.

⁹⁶ 116 F. Supp. 2d 166 (D.D.C. 2000).

⁹⁷ *Id.* at 179-81.

⁹⁸ 494 U.S. 872 (1990).

⁹⁹ *Shalala*, 116 F. Supp. 2d at 179.

¹⁰⁰ *Id.* at 181.

¹⁰¹ *Id.*

¹⁰² See HART, *supra* note 56, at 5-6 (noting that by 2001, sixty percent of U.S. soybean crops planted in America were genetically modified by Monsanto, and that the 2001 U.S. corn harvest consisted of twenty-five percent modified plants).

component of many policy decisions, and must not be discounted.¹⁰³ Regardless of why they do not wish to consume genetically modified foods, a great number of people would prefer not to eat them. In response to this concern, a number of states and cities have attempted to require labeling, and federal bills are pending in Congress that would mandate labeling.¹⁰⁴

C. *The Cost of Choice*

The opponents of labeling provide a number of arguments to support their views. The first major argument is the expense of labeling—both the cost of labeling itself, and the costs of segregating genetically modified foods from non-modified foods throughout the production process.¹⁰⁵ The end result of these additional expenses could be higher food prices for the consumer.¹⁰⁶ The second major argument is that labeling genetically modified foods would stigmatize them as a result of irrational consumer fears, thus discouraging their purchase, and consequently discouraging the development of the technology.¹⁰⁷ It is for this reason that the food industry has also opposed proposals providing for the voluntary labeling of non-modified foods.¹⁰⁸ To argue that labeling will discourage consumers from purchasing genetically modified products is to argue against consumer choice itself. Many consumers want labeling so that they may avoid these products. Consumer demand, through the choices that are made, will determine which products have a viable market. Without labeling, no choice can be made, and thus no preference can be conveyed to the manufacturers. The fear of the biotech industry may not be that irrational choices will be made by consumers, but that consumers will legitimately reject their products.¹⁰⁹ Some critics argue that this amounts to an intentional consumer deception.¹¹⁰

¹⁰³ Reproductive rights, stem-cell research, and the death penalty would be among the most overt examples.

¹⁰⁴ Amy Martinez Starke, *City Gives Go-Ahead to Biotech Food Petitions*, THE OREGONIAN, Aug. 8, 2000, at FD03.

¹⁰⁵ Appleton, *supra* note 94, at 569.

¹⁰⁶ *Id.* at 569-70.

¹⁰⁷ *Id.* at 569.

¹⁰⁸ See Hamilton, *supra* note 19, at 97 (citing the industry's response to such a proposal by the FDA).

¹⁰⁹ Lara Beth Winn, *Special Labeling Requirements for Genetically Engineered Food: How Sound Are the Analytical Frameworks Used by FDA and Food Producers?*, 54 FOOD & DRUG L.J. 667, 678 (1999).

¹¹⁰ *Id.*; see also *Int'l Dairy Foods Ass'n v. Amestoy*, 92 F.3d 67, 80 (2d Cir. 1996) ("The caselaw that has developed under the doctrine of commercial speech has repeatedly emphasized that the primary function of the First Amendment in its application to commercial speech is to advance truthful disclosure—the very interest [sought to be] undermine[d].").

The question that remains is who should bear the expense of giving those who want the opportunity to make a purchasing choice the ability to make that choice? The biotech food industry has not only spent billions of dollars on research and development, but has also spent millions in fighting labeling initiatives.¹¹¹ It would seem that they have bet the proverbial bank on the success of their products, and thus have more than just a glancing interest in the widespread public acceptance of genetically modified foods. While it may be in the industry's best interest to not label, the alternative is that those who do not want to eat genetically modified foods will bear the cost. Whether or not such an expectation is fair to the concerned consumer remains in doubt.

VI. LIABILITY ISSUES

As fields of genetically modified crops become more common, the likelihood of accidental contamination of non-modified crops through pollen-drift or shared machinery increases. The nature of GMO agriculture presents a number of problems in showing liability. First, the source of the contamination must be proven, a task made more difficult as GM crops become more widespread. Second, there is the question of whether the farmer of GM crops is negligent, or if the manufacturer bears the responsibility, or possibly a combination of both. Third, some form of damage must be shown, a prospect that is made difficult in light of current regulations.

A. *Theories of Liability: Obvious Harm*

There has not yet been extensive litigation on issues of liability due to pollen-drift of genetically modified crops into non-modified fields. The major case discussing liability issues is *In re Starlink Corn Products Liability Litigation*,¹¹² where a group of corn farmers brought actions against Aventis, a biotech company whose genetically modified corn not meant for human consumption contaminated the U.S. corn supply and negatively affected the corn market by causing a drop in prices.¹¹³ In that class action, farmers alleged common law claims for negligence, private nuisance, public nuisance, and conversion, among others.¹¹⁴ Following a motion to dismiss by Aventis, the court held that although

¹¹¹ Elizabeth Weise, *Label Fight Heats Up in Ore.*, USA TODAY, Oct. 10, 2002, at D10 (noting that \$4.6 million was spent opposing an Oregon mandate).

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

¹¹³ *Id.* at 835.

¹¹⁴ *Id.* at 833.

the farmers failed to state a claim for conversion, the allegations supported the negligence and nuisance claims.¹¹⁵

A claim for private nuisance must show a nontrespassory invasion of one's interest in the private use and enjoyment of land.¹¹⁶ The court in *Starlink* found that drifting pollen could constitute an invasion, and that contamination of a neighbor's crops does interfere with the enjoyment of the land.¹¹⁷ The undetermined issue was whether Aventis was responsible for contamination caused by the genetically modified corn beyond the point of sale.¹¹⁸ Jurisdictions are divided as to whether a manufacturer is liable for a nuisance beyond the point of sale.¹¹⁹

To state a private claim for public nuisance, plaintiffs must allege "an unreasonable interference with a right common to the general public," including "the public health, the public safety . . . the public comfort or the public convenience."¹²⁰ Furthermore, plaintiffs must show that they have been harmed differently than the general public.¹²¹ In *Starlink*, the court found that contamination of the food supply interfered with a general public right to safe food, and that the defendants as a group suffered harm to their livelihood.¹²² The court also found that a negligence claim was sufficiently stated due to Aventis' duty to ensure that the modified corn did not enter the food supply, and because their failure to do so caused plaintiffs' corn to become contaminated.¹²³

Starlink is unique in that it involves a class action suit where the genetically modified crop in question was actually unfit for human consumption.¹²⁴ The issues become more complex when there is a less obvious threat to human health.

B. *The New Organic Standards: Elusive Harm*

Until recently, the area where litigation seemed most likely involved organic crops. Under previous standards, the existence of genetically modified proteins in otherwise organic produce would have been enough to deny organic certification.¹²⁵ Under new USDA standards, although genetically modified crops are still an

¹¹⁵ *Id.* at 843-48.

¹¹⁶ RESTATEMENT (SECOND) OF TORTS § 821D (1965).

¹¹⁷ *Starlink*, 212 F. Supp. 2d at 845.

¹¹⁸ *Id.*

¹¹⁹ *Id.* at 847.

¹²⁰ RESTATEMENT (SECOND) OF TORTS § 821B (1965).

¹²¹ *Id.* § 821C.

¹²² *Starlink*, 212 F. Supp. 2d at 848.

¹²³ *Id.* at 843.

¹²⁴ *Id.* at 834.

¹²⁵ See Kirby, *supra* note 66, at 363 (noting strict standards).

excluded method of production, the unintended presence of such products does not affect the status of an organic product or operation.¹²⁶ For organic farmers, this means that the value of their crops will not be severely diminished by the presence of genetically modified proteins introduced through pollen-drift or during processing. While this is good news for organic farm economics, it is not such good news for organic farming and the organic food movement in general.

For many devotees of organic foods, the choice to buy organic is based on a combination of concerns, such as health and the environment, coupled with political and spiritual values.¹²⁷ For some, these values are in direct contention with both biotechnology and monopolistic agribusiness. Under the old organic standards, a customer could reasonably believe that the product did not contain genetically modified proteins. That is no longer the case. The argument that those opposed to GMOs could choose to buy organic¹²⁸ no longer works, and in the absence of a program that would certify products as non-genetically modified, concerned consumers no longer have a choice.

The issue of harm due to contamination and pollen-drift is becoming ever more tenuous. If there is no economic harm to the organic farmer whose crops are contaminated, is there any harm at all? Is a strong belief enough to substantiate liability in any form?

Consider a hypothetical consumer who so strongly wishes to avoid genetically modified foods, that he begins his own farm. Even if he is careful not to use any equipment that may have been used on genetically modified fields, there is still the possibility of contamination through pollen-drift. Does this individual have any recourse?

The first problem would be proving that harm occurred. Even more difficult might be proving how the contamination occurred, and who might be responsible for it. This may be an impossible task. Such an example illustrates the dangerously inequitable territory we are now entering. The message sent is that those wishing to avoid genetically modified foods are helpless because of widespread use and government inaction.

¹²⁶ National Organic Program, 7 C.F.R. pt. 205 (2003).

¹²⁷ See Geoffrey Cowley, *Certified Organic*, NEWSWEEK, Sept. 30, 2002, at 50, 52.

¹²⁸ Kelly A. Leggio, Comment, *Limitations on the Consumer's Right to Know: Settling the Debate over Labeling of Genetically Modified Foods in the United States*, 38 SAN DIEGO L. REV. 893, 930-31 (2001); see also *Int'l Dairy Foods Ass'n v. Amestoy*, 92 F.3d 67, 74 (2d Cir. 1996) (suggesting that consumers interested in such information can make such a choice by buying products from manufacturers who reveal such information).

In order to address this situation, there needs to be a new conception of harm, as well as a system of accountability. It is possible that Monsanto's aggressive protection of its patents might point the way towards accountability.¹²⁹ It is argued that if a biotech company is able to claim ownership of its genes and plants regardless of where they are or how they got there, they should also be responsible for the damage.¹³⁰ Following this line of thought, legislation has been introduced into Congress that would hold biotech companies liable for damage caused by the pollen-drift of genetically modified crops.¹³¹

Even if the question of liability is answered, the issue of harm still remains. In order to remedy the situation, a non-genetically modified food standard must be in place. This could be accomplished by either reincorporating a zero-tolerance policy into the national organic standards, or by creating a separate classification that would allow for products to be certified and labeled as non-genetically modified. Such a system would accommodate those wishing to avoid modified products, and would provide a mechanism to measure damage for those farmers who suffer economic loss from pollen-drift or genetic contamination.

This proposal, however, is only the first step, and merely repositions the players to where they were before the new organic standards were adopted. In order for such a framework to be successful, it must be in connection with legislation that allows biotech companies to be held accountable for pollen-drift. Moreover, the courts must be willing to remedy the harm under one of the proposed theories of liability. To accomplish this, the courts must be inclined to either assess liability for pure economic loss, or expand the concept of physical damage to include cross-pollination and genetic contamination by GM crops.

C. Harm and the Market

Under the presumption that the free market is self-regulating, and will fairly and efficiently take into account both the concerns of consumers and the needs of producers, a result that is both economically efficient and attuned to public concerns should be reached. Even if one accepts that the market could produce a result that effectively takes into account all aspects of the GMO con-

¹²⁹ Bruce Barcott, *Seeds of Discord: Bruce Barcott on the Battle to Stop Genetically Modified Seeds from Overrunning Organic Farms*, LEGAL AFF., Jan.-Feb. 2003, at 59, 62.

¹³⁰ *Id.* at 62.

¹³¹ *Id.* at 61.

trovery, the lack of substantial regulation thus far, coupled with the growth of the GMO industry, may present a distorted outcome.

The possibility of distortion is best understood by tracing some of the effects that the GMO controversy has had on the market. In the midst of growing consumer concerns, major food companies have begun to insist that their suppliers not use genetically modified crops.¹³² Under normal circumstances, such moves indicate the responsiveness of the market to public opinion. The effectiveness of such responsiveness, however, depends upon the ability of suppliers to meet the non-GMO demands of food manufacturers. Without a strict regulatory structure, the proliferation of genetically modified crops, combined with the assortment of ways by which they may become mixed with non-modified crops, makes such demands close to impossible. In other words, despite the market's willingness to accommodate public concern about genetic modification, the present state of regulation may make such a response infeasible.

The question then becomes who bears the burden for the problem and the costs that will presumably arise. Supposing an existing contract between manufacturers and growers specifying the delivery of non-modified crops, a number of questions present themselves. First, is such a contract feasible under the present regulatory system given the possibilities of pollen-drift and contamination during the harvesting and processing of such crops? Second, who bears the burden of proving the crops are not genetically modified, and would any level of genetically modified material qualify as a breach? Third, may a party to such a contract initiate an action for tortious interference against the source of genetic contamination? How these questions are answered will dramatically affect how risk is distributed. If the contract is infeasible, or prohibitive in cost, the food manufacturer will have to either abandon the non-GMO requirements of such a contract, or bear the burden of setting up mechanisms that will insure that non-modified crops are being used. If modified crops are inadvertently supplied to the manufacturer, the burden may be on the grower or distributor who has failed to comply. Alternatively, the grower may have a claim against the source of the genetic contamination

¹³² See *Novartis Bans Crops with Changed Genes from Its Foodstuffs*, WALL ST. J., Aug. 4, 2000, at B8 (observing that large American baby food manufacturers, fast-food chains, and potato chip makers have banned genetically modified ingredients and have requested that their suppliers stop growing genetically modified crops); see also Scott Kilman, *Food Industry Shuns Bioengineered Sugar*, WALL ST. J., Apr. 27, 2001, at B5 (finding that Hershey Foods Corp. and M&M/Mars have asked farmers not to grow genetically modified sugar beets due to public concerns).

for negligent infliction of economic loss. The end result of such an unsuccessful transaction will result in either inefficient contracting or litigation costs.

The prospect of litigation costs may ultimately mean that stricter regulation of genetically modified crops will be more economically efficient than the present regulatory structure. As modified crops continue to proliferate, the possibilities for lawsuits may also increase. An increase in litigation, coupled with the loss of profits from foreign countries refusing to accept genetically modified foods, could result in societal costs that in the long run outweigh the expense of increased regulation. Such an outlook, however, will ultimately depend upon the willingness of the courts to acknowledge the harm done to prospective plaintiffs and their willingness to remedy those harms. Thus far, regulatory agencies have failed to act preemptively in anticipation of the possible harms posed by genetically modified crops. At the same time, the bioengineering industry has spent much time and money promoting its cause, meeting with success among the federal agencies, but fairsing less well with the general public. As the first wave of litigation begins to unfold, it may very well be the courts that determine the eventual outcome of the controversy. If the courts allow for successful claims against the GMO industry, an increase in regulation will likely follow. However, if such claims are unsuccessful, regulation will likely remain at its current level. Although it appears that there may be a number of situations where such lawsuits could succeed, the outcome may depend upon the courts' willingness to acknowledge new notions of harm. Even in a cause of action for negligent infliction of economic loss, the success of a claim often hinges on the presence of physical damage.¹³³

CONCLUSION

On a fundamental level, regulation of genetically modified crops should occur as a response to the growing concerns voiced by both the general public, as well as members of the scientific community. The potential dangers posed by GMOs present enough of a risk that the government must act cautiously, considering not only the effects that regulation will have on the industry, but also the effect that a lack of regulation will have on the public's confidence in present legal and regulatory structures.

¹³³ See Robert L. Rabin, *Tort Recovery for Negligently Inflicted Economic Loss: A Reassessment*, 37 STAN. L. REV. 1513, 1513 (1985) (noting that courts in such cases generally deny recovery on the ground that the injury is "purely economic").

In order to establish that confidence, the national organic standard must either take a zero-tolerance approach to genetic contamination, or set an extremely low tolerance level, so that consumers wishing to avoid genetically modified goods may have a choice. The next step is to support a voluntary labeling program, allowing manufactures to label their product as non-GMO. Ultimately, a mandatory labeling program for GMO products would allow for the greatest consumer freedom. This would encourage biotech companies to “sell” the consumers on their products, rather than slipping the products into the market without notice to consumers. The current legislation being considered in Congress that would allow biotech companies to be held liable for pollen-drift should be passed. This would solve the problem of having to locate the actual source of the contamination, which would likely prove futile. These changes can only take place once GMO technology and its products are recognized as being different from their non-modified counterparts to an extent that entitles the public to make a choice. Because genetically modified crops are necessarily not the same as non-modified crops, unwanted contamination is a harm. These notions of difference and harm are independent from any risks associated with genetically modified goods. They are intrinsic, and carry with them all of the ethical, religious, and socio-political baggage that is associated with the things themselves—the genetically modified plant and the non-modified plant.

The issues surrounding genetically modified organisms are multi-faceted, and there are a variety of questions that must be addressed as policy is developed regarding these new technologies. One such issue is the patenting of living organisms. The United States has never engaged in a thorough debate over the ability to patent genetically engineered life forms.¹³⁴ When such debate does take place, it may have an enormous impact on genetically modified crops, as the patent system allows for the profitability of the biotechnology industry’s push towards an agriculture that embraces genetic modification.

Another issue that is quickly developing is the regulation of transgenic animals. Most of the same concerns over genetically modified crops apply to transgenic animals as well; however, the risks may be even greater because of the independent mobility of animals. Furthermore, genetic modification of animals may provoke even more public concern as the ethical issues become more complicated. While many people may not be troubled over the

¹³⁴ Hamilton, *supra* note 19, at 89.

ethics of plant modification, they may feel quite differently about the genetic modification of animals.

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