

# Genetic Engineering in Agriculture and Corporate Engineering in Public Debate:

## Risk, Public Relations, and Public Debate over Genetically Modified Crops

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Corporations have long influenced environmental and occupational health in agriculture, doing a great deal of damage, making substantial profits, and shaping public debate to make it appear that environmental misfortunes are accidents of an otherwise well-functioning system, rather than systemic. The debate over the genetically modified (GM) crops is an example. The largest producer of commercial GM seeds, Monsanto, exemplifies the industry's strategies: the invocation of poor people as beneficiaries, characterization of opposition as technophobic or anti-progress, and portrayal of their products as environmentally beneficial in the absence of or despite the evidence. This strategy is endemic to contemporary market capitalism, with its incentives to companies to externalize health and environmental costs to increase profits. *Key words:* Monsanto; genetic engineering; genetic modification; discourse.

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Although the selection of different plant varieties for different traits is as old as agriculture itself, agricultural technology has changed radically in the last several decades. In particular, in the mid-1980s plant breeding moved away from Mendelian hybrid production and into genetic engineering.<sup>1</sup> Although this new technology has offered breeders a great many advances, it also comes with risks that are at best understudied and at worst misunderstood. The movement towards genetic engineering and the debate around the safety of these new techniques form the basis of our discussion. We examine the ways in which one large

and important producer of genetically modified (GM) crops—Monsanto—has engineered public opinion to reduce critical scrutiny of the risks of this rapidly evolving technology. By tracing the history of public relations (PR) techniques employed by Monsanto, we show that this strategy follows a tried-and-true set of PR tactics designed to tie GM crops to the question of hunger, to silence debate on the topic, and to challenge critics as technophobic. This PR strategy removes debate that is vital for public and environmental health, particularly when the risks and benefits of GM crops still remain undecided at best. Yet these discursive moves are not idiosyncratic features of one company—they are encouraged and harbored by the contemporary economic system.

We begin by tracing some of the potential problems with GM crops, drawing on both scientific and economic analyses, following this with an examination of emerging conglomerates in the global food system, highlighting Monsanto's role in global food production and distribution. We then turn to an examination of the tactics that Monsanto has used to influence public debate both at present and in the past and how these tactics help to justify the global reach of the corporation. Drawing on this, we analyze the ways in which Monsanto has been able largely to foreclose public debate on GM crops. We discuss the attendant risks of this foreclosure for public and environmental health, and close with a discussion of the consequences of this gradual erosion of critical work on GM technology.

### GM CROPS: PROMISE AND PERIL

Genetically modified (GM) crops represent a radical break with traditional Mendelian hybrids. Traditional plant breeding uses crosses between sexually compatible species to produce hybrid varieties that possess desired genetic traits. Genetic engineering uses a radically different method to create hybrids: instead of crossing sexually compatible plant varieties, genetic engineering allows breeders to insert specific genetic traits into the target hybrid. Though many claim that this is an extension of and improvement upon traditional Mendelian techniques, there remains a radical

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difference between these two methods of obtaining new plant varieties. In traditional breeding, plant breeders cross genetically-similar and sexually compatible plant material with relatively predictable consequences. Genetic engineering, on the other hand, involves the introduction of radically foreign genetic material into an organism. This genetic material can be drawn from many sources, including other plants or even animals. Although this kind of genetic engineering is touted as offering significant advances over traditional breeding (particularly for its ability to speed up breeding cycles), its safety remains an open question. By definition, and by implication of the number of patent rights that are claimed for the creation of novel properties, genetically engineered crops are unlike crops developed through conventional plant breeding techniques. The novel characteristics engineered into crops, both by design and by the inherent uncertainties to which GM technologies are prone, raise a variety of concerns. While it is important to look at each crop on a case-specific basis to assess its specific risk profile, there are clear reasons, a priori, to be concerned about GM crops.

Among these are worries about “gene spills,” or the contamination of landraces by engineered varieties. Because GM crops pass on their modifications to their offspring, it remains unclear what will happen if GM crops cross with wild landraces—crop cultivars that have been improved by traditional agriculturalists, but have not been influenced by modern breeding practices—or other plants. This means that GM crops could potentially threaten biodiversity, destabilize important ecosystems, or limit the future agricultural possibilities in a given region. Gene spills have been reported both in the United States (discussed below) and Mexico. The Mexican case<sup>2</sup> involves genetic contamination from GM maize imported from the United States, which has resulted in lower yields and uncertainty around how to reverse the contamination.<sup>2</sup> This is a concern predicted in advance of the release of the crops, and over which there continues to be a great deal of debate.<sup>3</sup>

In addition, there remain vital questions around the impacts that GM crops may have on human health, particularly when genetic engineering introduces the possibility of unpredictable physiologic or biochemical effects in the target varieties.<sup>1</sup> As we discuss below, this research is contentious, and academic researchers who have raised it have been marginalized or vilified. Nonetheless, respectable news sources carry information from Monsanto’s own evaluations showing “disturbing” abnormalities in animals fed, in two separate studies, on genetically modified corn and potatoes as compared with rats fed on non-genetically-modified food.<sup>4</sup>

The current generation of commercially available crops also raises concerns linked to pesticide and herbicide use. These GM crops are designed either to tolerate herbicide application (e.g., “RoundUp Ready” crops) or to internally create their own pesticide

(known as ‘Bt crops’ because the toxins produced by them derive from DNA spliced from *Bacillus thuringiensis*). While, in the short term, one might expect some decrease in pesticide use, any decrease is usually followed by pest resistance to the chemical. The “pesticide treadmill”—the phenomenon in which increasing amounts of pesticides are needed to control pest populations—is an endogenous feature of pesticide use.<sup>5</sup> Prolonged low-level exposure to pesticide is an ideal environment in which to foster resistance, creating in Bt crops what Nottingham<sup>1</sup> has called a “natural evolutionary arms race” in which the Bt toxin becomes less effective as insects evolve in response to these challenges. Were Bt crops to pollinate and cross with native landraces, Bt itself may, in time, become an ineffective natural pesticide.<sup>1</sup>

In the case of Monsanto’s “RoundUp Ready” crops, plants are genetically modified to resist the broad-spectrum herbicide RoundUp (manufactured by Monsanto), so that weeds can be better controlled by applying herbicide to an entire field. Though this offers the promise of simplifying weed control, there are also potential dangers to RoundUp Ready crops. RoundUp Ready crops may spread and become weeds in non-RoundUp Ready crops stands, making weed control there more challenging. If RoundUp Ready crops cross with existing weed varieties, “superweeds” that are resistant to this particular herbicide may spread. In addition, herbicide-resistant crops also increase the amount of herbicide applied to crops, simply because it can be applied to an entire field, rather than selectively. Even leaving the potential worries of superweeds aside, the increase in herbicide application alone offers problems of its own. Because RoundUp is a broad-spectrum herbicide, runoff from treated farmland can contain herbicide residues that can kill other plants, even far from the original location of application, and may further pollute groundwater sources. What is not noted by Monsanto in much of its literature is the fact that increasing herbicide application is part of the goal of RoundUp Ready crops. With RoundUp Ready crops, as in other cases, GM crops are, first and foremost, innovations in pesticide product development.

In addition to the risks cited above, there are also concerns about the economics of using GM crops for both developed and developing countries. Recent studies have cast doubt on the economic utility of GM crops for farmers in North America, because these crops bring lower yields, and higher input costs attending the use of GM seed.<sup>6,7</sup> Given the preference of many consumers, particularly in Europe, for non-GM crops, certifiably non-GM crops also carry a price premium in both developing and developed countries.

If the scientific and economic case for GM crops is at best debatable, three questions arise. First, why are its developers so keen on it? Second, how have challenges to GM technology been countered in public debate?

Finally, what features of the attempt to shape public debate might be generalizable beyond the domain of genetic engineering in crops? We use the case of Monsanto to shed light on the former two questions, and suggest areas for future study to address the third.

## MONSANTO, CONSOLIDATION, AND THE GLOBAL FOOD SYSTEM

In a report to the U.S. National Farmer's Union in 1999, Heffernan et al. argue that significant portions of the global food chain are under the control of three corporate clusters.

In a food chain cluster, the food product is passed along from stage to stage, but ownership never changes and neither does the location of the decision-making. Starting with the intellectual property rights that governments give to the biotechnology firms, the food product always remains the property of a firm or cluster of firms. The farmer becomes a grower, providing the labor and often some of the capital, but never owning the product as it moves through the food system and never making the major management decisions.<sup>8</sup>

Over the course of the twentieth century, we have moved from a situation in which the largest agro-food firms once controlled a very limited range of commodities—notably sugar, cotton, and tobacco—and perhaps one or two steps in the processing chain, to a state of affairs in which industrial control of agriculture is concentrated at historically unparalleled levels. Recent successes in biotechnology have enabled firms to exercise control over *all parts* of the agriculture and food system, from “gene to supermarket shelf.”<sup>8</sup> Through mergers, acquisitions, joint ventures, partnerships, and other alliances, players in the formerly diverse sectors of the agriculture and food system have pooled human and physical capital with one another, forming formidable power clusters and driving unprecedented consolidation in the industry. Using vertical integration, these clusters synergistically play off of the strengths of one another to leverage control in the global food chain. Heffernan points to three clusters that have emerged in the global agriculture and food system: Cargill/Monsanto, ConAgra, and Novartis/ADM. As a biotech firm, Monsanto has the technological capacity to innovate in seed production. Cargill, on the other hand, lacked the biotechnological capacity of Monsanto, but has plenty of leverage in distribution systems. By forging a joint venture in 1998, these firms were able to complement one another, reaching deeper into the global agricultural system together than they would have individually. Heffernan argues that this merging of giants through collaborative agreements and strategic acquisitions has allowed these corporate powers to create a vertical consolida-

tion of the food system that stretches from the laboratory to the supermarket. By controlling every aspect of the food chain from the production of seed to production contracts to processing and branding, corporate clusters are exercising an unprecedented level of influence over decision making throughout the food system at a global level.

The issue of control and the power that derives from this control to influence science, policy and public perception lies at the heart of the matter. As the prominence of the nation-state wanes in global capitalism, the transnational corporation (TNC) becomes the driving force in the world economic system. TNCs now “decide what food is grown, where, how, and by whom.”<sup>9</sup> TNCs have no particular national alliance, and TNCs depend on their global reach to reap greater profits than their nationalized counterparts. By locating themselves outside the national borders—and the laws—of any one state, TNCs are able to take advantage of the most profitable forms of production and resources.<sup>10</sup> The hypermobility of capital now means that many diverse geographic areas and producers are implicated in the production of any single product. The emergence of TNCs and their role in the global economic order has been linked to “. . . the worsening of environmental conditions; the limiting of food quality and food availability; the worsening of socioeconomic conditions of petty commodity producers, wage laborers, and rural communities in the North, and more important, in the South.”<sup>10</sup> This is because TNCs, unlike even the most undemocratic state, make no claim to represent a populace; as such, they have neither mandate nor motive to guarantee basic rights, and are difficult to influence through traditional political action.

Monsanto's products, particularly its branded seed, have a global reach. According to a 2002 Monsanto annual report, the company's seed occupied 38% of the global corn market and 29% of the global soybean market worldwide. This level of market share also ignores the potential “synergies” in processing and distribution to be had by Monsanto through its relationship with Cargill. For Heffernan et al., this is a key point: as fewer firms come to control the food system, these firms are able to control greater and greater portions of the market because they control more aspects of the production chain.<sup>9</sup> This level of control by a few emerging clusters can severely limit market access for growers who cannot or will not plant the seed dictated by a particular processing firm. The contractual “lock” provided in this manner helps to solidify a firm's position by requiring use of its products, and also creates an economic barrier for producers that will not play by the rules that these firms set.

The question that remains, however, is how this control is articulated and justified, and in whose interests this control is presumed to operate. Control over the food system is not only economic and contractual, but

also discursive and ideological. One cannot understand the environmental health implications of GM organisms and the corporate parents of these organisms without understanding the ideological and discursive dimensions of this control.

## CONTROL OVER PUBLIC DEBATE

To make our case, we now turn to examine the evolution of today's debates around genetically engineered food within the Monsanto/Cargill food cluster. Monsanto has, for at least 30 years, been keenly aware of how to fight a war for 'hearts and minds.' In the 1950s, Monsanto, Dow, and other chemical companies waged a fierce battle against a (then) little-known marine biologist named Rachel Carson. Her book, *Silent Spring*, threatened to mar the image of these companies by linking their products—specifically DDT—with environmental toxicity and a wide range of negative effects.<sup>11</sup> Recognizing the potential impact of this work, these companies (or organizations to which they belonged and that they supported\*) tried to intimidate Carson's publisher into not publishing the work, an effort that ultimately failed. Unable to prevent its publication, the chemical companies jump-started a huge PR machine in response to *Silent Spring*. In public forums sponsored by the companies, supposedly unbiased "third party experts" were called on to attack Carson's credibility while defending the efficacy and safety of DDT and other chemicals. In conjunction with this effort, Monsanto published and distributed 5,000 copies of a pamphlet entitled "The Desolate Year," which depicted a future U.S. landscape ravaged by insects, left to multiply in the absence of pesticides. This is an important discursive moment, for it demonstrates not only the tactics of the pesticide corporation, but the assumptions that underlie its very existence; nature threatens the very existence of humanity, and without the intervention of the pesticide industry, nature will triumph in humanity's destruction through an unchecked and fecund breeding of predators. There is no space here for an appreciation of complex ecosystems, endogenous mechanisms, or for agroecological ideas. It is a recurring theme in debates over GM crops.

Monsanto failed to suppress *Silent Spring*, and it was published in 1962 to great critical acclaim. It has arguably been one of the most important books for drawing attention to the environmental effects of agricultural chemicals. Its success is illustrated by a strategic move that Monsanto made just two years later: Monsanto Chemical Company changed its name to Monsanto Company. This change of name did not, however, result in a substantive change in Monsanto's

operations. Monsanto continued to produce some of the most toxic chemicals known, such as Agent Orange, PCBs, dioxins, and a wide range of pesticides and herbicides.<sup>12</sup> Monsanto's invention and reinvention has continued since then, in response to (and in turn constituting) changing political and popular environmental priorities.

When challenged on their environmental pollution record in the 1970s, Monsanto iterated its control-nature-or-perish theme with a slogan that was rhetorically arresting, analytically trivial, and politically categorical: "Without chemicals, life itself would be impossible." Such modulation of theme is to be expected, since the terrain of public debate is itself in constant flux—a 1960s slogan will not do in the 1970s, after all. The constant moves and counter-moves that corporations make and to which civil society responds are to be expected. Politics is a dynamic process. This dynamism, and the agency that corporations have in being able to respond and reframe the debate, helps us interpret the twists and turns of events in the 1980s, when Monsanto's image was tarnished by its actions in producing PCBs (polychlorinated biphenyls).† Facing challenges over its environmental record in 1988, with yet further allegations of environmental irresponsibility laid at its door, Monsanto pledged to reduce its toxic waste emissions by 90%. This is a laudable effort, but one that obfuscates the root of the problem: Monsanto's products, not its emissions, are the cause of the most environmental damage.<sup>13</sup> Yet by turning the problem into one of "unintended consequences," rather than of the harm created when its products were used in accordance with the manufacturer's own instructions, Monsanto was able to temporarily deflect more serious systemic criticism of its operations. By incorporating certain dissenting views within its rhetoric—in this case, the language over "emissions" and pollution conceived of as "dirty," Monsanto was effectively able to represent itself, and its products, as "clean."

Nonetheless, this pressure grew throughout the 1980s, around the issue of environmental pollution in particular.<sup>14</sup> Above all, Monsanto tried to preempt the threat that this popular discontent might be transformed into government legislation, deciding, like many other corporations, to embrace a more proactive strategy. This involved deploying counter-insurgency tactics against the environmental movement, selectively supporting certain environmental causes that advocated cosmetic and limited change, while at the same

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\*For example, the National Agricultural Chemical Association.

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†PCBs are now found in rainwater at 17 times the legal level in sparsely populated areas of Northern Ontario. Moreover, the amount of PCBs in the fatty tissue of polar bears quadrupled between 1969 and 1984. If it continues to rise at that rate, polar bears will be toxic enough to be considered hazardous toxic waste by the U.S. Environmental Protection Agency. (*Rachel's Environmental and Health Weekly*, #144, August 29, 1989).

time trying to undermine more systemic criticisms. Thus, on the one hand, Monsanto supported Earth Day festivities, while on the other, it contracted with PR firms such as Mongroven, Biscoe, and Duchin (MBD) to monitor the environmental movement and its key players.<sup>13</sup> MBD monitors the environmental movement (and other popular movements) by subscribing to mailing lists for activist organizations, and by keeping an eye on publications that deal with “acid rain, clean air, clean water, hazardous and toxic wastes, nuclear energy, recycling . . . the United Nations, development in Eastern Europe, dioxin, organic farming, pesticides, biotechnology, vegetarianism, consumer groups, product safety, endangered species, [and] oil spills.”<sup>13</sup> This monitoring is key to Monsanto’s ability to continually remake itself in the image of an environmentally responsible, sustainable corporation. It allows Monsanto and its PR consultants to effectively target its campaigns.

The Monsanto PR program that began by attacking Carson has continued. In 1998, the company initiated its “Let the Harvest Begin” campaign in Europe. The company began its campaign literature by referring, glancingly and uncritically, to the historic successes of the chemical industries in the green revolution.‡ Monsanto literature then constructed a trajectory of agricultural disaster; they suggested that with massive increases in third world populations in particular, we face a world of famine.

For the immediate future—the next quarter of a century—some 800 million people will be added each decade. Food production must grow 1.4 percent to 1.6 percent annually, just to maintain the status quo . . . to feed the world in the next century, we need food that is more plentiful and more affordable than it is today. With more productivity needed from less tillable land, we need new ways to yield more from what is left—after development and erosion take their toll. To strengthen our economies, we need to grow our own food as independently as we can. Agricultural biotechnology will play a major role in realizing the hope we all share. Accepting this science can make a dramatic difference in millions of lives.

This is an incredibly sophisticated intervention, drawing on racialized collective fears of ecological apocalypse to justify an argument that doesn’t follow from the premises. Yet it also builds on Monsanto’s past interventions—in the earlier PR material, death by fecundity would be wrought by insects. Here, the

bodies of third-world populations take the place of those rapacious insects. People of color emerge as both the source and the “victims” of food shortage, which in turn is ascribed to natural, not political causes.<sup>15</sup> This discursive trick is a racialized form of the Malthusian ideas that underwrote the arguments of “The Desolate Year,” and are endemic to the debate around agricultural technology.<sup>16</sup> Present since at least the green revolution, the dual threats of the insect world and the “third world” both survive; one or the other may be invoked depending on the context of the debate.

Not only has Monsanto identified the “problem,” but it also provides the “solution.” Increased use of GM seeds will increase productivity, as the accompanying independent scientific study demonstrated. In fact, this line of argument is so powerful that a range of African public figures have endorsed the campaign.§ The African endorsement is packaged thus: “A message from some of the world’s most respected voices, made possible by some of the world’s most respected companies, including Monsanto . . . committed to finding better ways to feed the world’s people.” Popular criticism of corporate agriculture means that Monsanto must attempt to give the sheen of developing-world approval to what are really marketing schemes. In this way, Monsanto has created a foil in the representation of popular sentiment. When necessary, Monsanto created or called upon groups to represent its cause.<sup>17–19</sup> Instead of soliciting the opinions of popular movements, Monsanto relied on the opinions of “experts.” Rather than trusting the voices of the farmers themselves, we are led to trust functionaries in their governments, or other “experts.”

These functionaries are often bounded by their nations’ dire situation, or their own willingness to accept bribes. According to Lorch,<sup>20</sup> Monsanto was fined US\$1.5 million by the U.S. Securities and Exchange Commission in January 2005 for violating the Foreign Corruption Act. The company bribed Indonesian officials to remove the requirement for an environmental risk assessment for their Bt cotton. The bribe apparently included some US\$700,000 worth of payments to 140 Indonesian government officials and their family members in the period from 1997 to 2002. Cited as “financial irregularities” by Monsanto, the payments over five years were used to help Monsanto get a foothold in the production of Bt cotton in Indonesia despite farmers’ protests and stinging bans of its GM Bt cotton in India and Thailand.

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§Babacar N’Diaye (former Director of the African Development Bank), Dr Adebayo Adediji (former Executive Director of the UN Economic Commission for Africa), Dr Esther Ocloo of Ghana, Dr George Benneh (former Vice Chancellor of the University of Ghana and Cabinet Minister), Dr Abdoulaye Conteh (former Minister of Foreign Affairs and of Justice of Sierra Leone) are the figures who have publicly endorsed the campaign to date.

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‡History is an uncomfortable topic for corporations. DuPont, for instance, is interested in celebrating its nearly 200 years of manufacture of gunpowder, explosives, and pesticides through a celebration of its “heritage,” not its history. Heritage, as other commentators have noted, is an explicitly sanitized, feel-good-version of history, history without the politics, details, or truths.

Monsanto also coopts the language of sustainable development to help promote its products. In its 1997 "Report on Sustainable Development," Monsanto states that "Economic development of emerging regions clearly is needed, but it must be development that is profoundly more efficient in its use of resources and its environmental impact." Monsanto then equates "efficient in its use of resources and its environmental impact" with biotechnology, arguing that "The benefits of agricultural biotechnology make it imperative that we continue forward. Our belief is that if society turns its back on biotechnology and other advancements, it will not be able to meet its needs, *even if more rain forests and wildlife habitats are destroyed to create additional farmland*" [emphasis added]. Monsanto both allies itself with rainforest preservationists and forecloses debate over productivity increases by suggesting that there are only two ways to squeeze more out of the land: increase agricultural technology or increase cultivated land area. Monsanto cites no authority for this proposition, likely because presenting the world in such stark, binary terms is perhaps not the best way to approach the question, particularly when small-scale farms are under consideration. Shiva<sup>21</sup> argues that instead of looking at yield, we should think about the total outputs that different kinds of agricultural systems can produce. Monsanto's portrayal of the situation seems to convey that "conventional" agriculture is the only way to feed burgeoning populations. In contrast to this position, Shiva argues that while monocultures of "conventional" agriculture may produce high yields per hectare, mixing crops in a small area may produce small individual yields for each crop, but will likely increase overall output of food per hectare.<sup>21</sup>

Monsanto's use of the rhetoric of agricultural development evidences a shift in PR emphasis, presumably in response to critics who claim that Monsanto has little interest in resource-poor farmers in the developing world. Although Monsanto in the past has used functionaries and "experts" to speak for interests of the farmer, they now also use poor farmers in their PR materials. In a recent report entitled "Growing Partnerships," Monsanto continues to use the image of the poor, small-holder farmer to justify its influence in the global food system. The report—which includes pictures of sombrero-clad smiling *campesinos* and happy African children—argues that Monsanto is doing its part to help the small farmer overcome the challenges of production through key partnerships with these producers:

In countries throughout the world, Monsanto is working with smallholders, non-profit development organizations and other partners to bring a holistic, systems-based approach to agriculture tailored to local needs. Today, more than 300,000 smallholder farmers in Latin America, Asia and Africa are partners in this global effort—an effort that is the

beginning of self-sufficiency in food and a more positive, self-perpetuating economic environment."<sup>22</sup>

This report is so beautifully seductive in imagery and prose that it becomes easy to forget that Monsanto's primary mission is to deliver profit to its shareholders. Of course, this omission is a key element in the success of the strategy. If we stop thinking of Monsanto as a self-interested corporate player and begin thinking of it as a development partner, as a benevolent philanthropist who has technology to "share," we start to feel better about its control and its technology. Monsanto's positioning of itself as development partner does something that Ferguson noticed with respect to the World Bank—it attempts to depoliticize<sup>23</sup>; the public relations machinery, through active co-optation, becomes an "anti-politics machine."

There are moments when the rapture around the possibilities offered by GM crops is interrupted. Independent scientists are constantly engaged in a process of critique and reflection. Those who have turned their attention to GM crops have found much to worry about.<sup>24</sup> The response to this interruption has been swift—researchers who publish work that casts aspersions on GM crops are often subject to extreme sanctions—ones that would be unthinkable had the researchers published findings in favor of powerful corporations. To take one recent example, Arpad Pusztai, and his wife Susan Bardocz, came under considerable personal harassment following Pusztai's discussion of his work on GM potatoes.<sup>25–27</sup> Even more worryingly, there have been direct attempts to influence the publication in peer-reviewed journals of such research—both in Pusztai's case<sup>26,27</sup> and in the case of Chapela and Quist's findings on GM maize.<sup>3</sup> This is an attempt to discredit the science done by these individuals through attacking the individuals themselves, rather than the science. Government-sponsored researchers and research have been somewhat more immune to these personalized attacks. The recent U.K. trials of GM crops, even within a narrow mandate to discover whether GM crops were "better for biodiversity" than their conventional counterparts (disregarding the possibility of a comparison with agroecological techniques<sup>28</sup>) seem to have been widely accepted.<sup>29–37</sup> Unable to discredit the research, Bayer Cropscience withdrew its application for permission to grow GM maize because it feared the regulations that would accompany approval. A Bayer spokesman confirmed the imminent withdrawal of its application to grow in the United Kingdom. The company told *The Financial Times* that the United Kingdom's tough GM regulatory regime could jeopardize the industry. It said: "New regulations should enable GM crops to be grown in the UK—not disable future attempts to grow them."<sup>38</sup>

This is, finally, an admission of the terrain of debate—that public policy needs to be set in public,

with public science, under close public scrutiny. This is not to suggest that the departure of Bayer will herald the advent of broad agroecological practices, but the public debate over GM food has made possible the broaching of alternatives as part of a broad public discourse on agricultural futures, and it was made possible by a targeted critique both of individual crops and the character of the organizations promoting them. This experience of burgeoning democracy may serve as an example to the United States, where debate is lacking.

## ANALYSIS

There are (at least) three elements of the Monsanto strategy that reflect more general techniques corporations use to maintain control over the scientific and political issues that may impact their profits. The first is *historical reconstruction*. It is by no means a widely accepted conclusion that the green revolution increased net human welfare or that the important part of the green revolution was the agro-technical component (as opposed, say, to the changes in land-tenure arrangements that accompanied the revolution). This very selective history is able to correlate area-specific reductions in mortality indicators with the presence of hybrid crops. The connection between technology and increased yields in some places is not a straightforwardly causal one, and there have been many cases where industrial agriculture has been responsible for declines in community welfare.<sup>39</sup> Yet Monsanto's presentation is without significant scientific argument or citation. It omits consideration of alternative theories and gives the appearance that the company's world view is unchallenged and correct.

The description of current agricultural alternatives is also reconstructed in the same manner. Monsanto's account of farming in developing countries portrays it as inefficient in its use of resources and environmentally detrimental, and inaccurately poses GM crops as the solution to hunger in the developing world. Given the profligacy of resources in industrial farming, this is unfair.<sup>40</sup> Many farmers in the global south farm in resource-poor conditions that would not, in any sense, be amenable to the technologically-intensive solutions that Monsanto poses. The assertion that farmers in developing countries cause wanton environmental damage has a long colonial genealogy, but it is not supported by scientific evidence. For example, in an investigation of this theory in areas of Africa, researchers have found that traditional farming practices have been responsible for *increased* forest cover.<sup>41</sup> By contrast, few events in history have left as indelible a scar on the natural world as intensive agriculture in the developed world.<sup>42</sup>

Further, there is no evidence that GM crops, such as RoundUp Ready soybeans, can help to feed the malnourished in the developing world. Peasant farmers in

the developing world are largely unable to afford traditional agricultural technologies, let alone the expensive and new transgenics (which are often created to express traits that have little to do with increased yields or nutrition).<sup>43</sup> Monsanto fails to note that transgenic crops require infrastructure-rich environments which are often lacking, in part, or in whole, in the agricultural production regimes of those in developing countries. By ignoring these facts Monsanto reconstructs the present, remaking it in terms that severely misrepresent the real-world conditions in developing countries. Instead, Monsanto creates a unilinear trajectory of historical change, one in which the only possibility is to capitulate to both the diagnosis and the remedy offered by Monsanto. This "hope-dashing" is not just a central tenet to GM food, but a rhetorical tactic that is associated with the neoliberal worldview that "there is no alternative" to corporate-led globalization.<sup>44</sup> The success of the system is evidenced by its ability to prevent us from even conceiving of alternatives. This is a manifestation of economic power that is all too often ignored.

While power is undoubtedly economic, power also derives from the ability to articulate favorable meaningful frameworks about the ways in which control over resources and various activities are understood.<sup>45</sup> Gramsci viewed this struggle for power as a battle waged over a cultural and ideological common sense, such that economic control was only one part of the formula of social power. In Gramsci's thought, hegemony—or a moment of unique social power—is a blend of consent and coercion such that the ruled are at least partly agreeing to being ruled. The blend of consent and coercion lies behind the second discursive strategy that Monsanto uses, for which *seduction* is a useful metaphor. In choosing this word, we want to emphasize that there is something tremendously compelling about Monsanto's rhetoric, which persists even after rational arguments have shown the motives and maneuvers behind it to be disingenuous. Monsanto's strategies present seemingly straightforward technologic solutions to problems as complex as hunger, deforestation, and development. The seductiveness of these technologic solutions to problems with deep historical, cultural, and social roots is powerful, and many of us want to believe that such fixes really are that simple. Monsanto is able to leverage this desire, an almost pre-rational feeling of the righteousness of a cause. If we are led to believe that Monsanto's technologic innovations are the fix for these problems, opposition to these fixes becomes the same as opposition to feeding the hungry, or opposition to development for the developing world, because these fixes become rhetorically linked to these technologies. This is why it is useful to think of "seduction"—as a metaphor, it puts flesh on the rather dry political economic concepts of coercion and consent, showing one aspect of the constant processes that construct not only social institu-

tions, but our very selves. It is this tension that lies at the heart of what has been termed “greenwashing.” Greenwashing and allied political technologies change the perception of a policy (or institution, or consumer trinket or whatever) not through an alteration of the policy itself, but by “framing” and “articulating” our idea of it with an idea, image, or belief which we already hold dear. Greenwashing works by changing the way we desire and understand, seducing us with our own wants and beliefs. In other words, greenwashing succeeds not by altering the greenwashed thing in any way, but by shifting the signification and the meaning of the thing so that it becomes something new and desirable. Greenwashing is a semantic technology.

In Monsanto’s greenwash, we are appeased by images that offer simple “solutions” to complex historical and social problems. Tracing back to the campaign on sustainable development that we discussed earlier, Monsanto’s greenwash constructs a vision in which we are left to believe that the choice is either the adoption of technology or deforestation and starvation. The problem, however, is that this argument ignores important questions of farmer innovation and the value of local knowledge in generating food security, as well as the political and economic (rather than natural) causes of hunger.<sup>46</sup> In a sense, our readiness to accept technological solutions to these problems makes us willing participants in the PR scheme. The power of this tactic is that even when we are skeptical of this argument, we still may agree with it because disagreement—or not accepting biotechnology as *the answer*—has now come to mean the same thing as condemning the poor to famine. This demonstrates the third tactical dimension: *discursive foreclosure*. By presenting history and alternatives in this foreshortened fashion, Monsanto effectively frames the debate in such a way as to preclude a discussion about the distribution of resources or about injustice. Instead, the discourse is a limited discussion of feeding the fecund masses using agricultural biotechnology. The only alternative Monsanto posits is the destruction of wildlife habitat and rainforests to create more farms, and/or simple famine. By playing on the hegemonic construct of scientific utopianism (technology will cure everything) and our image about ourselves (as caring individuals in a crazy world), Monsanto shifts the terms of the debate, and works to alter our understanding of the world. Because of the way that these elements of the debate are linked together to favor Monsanto’s position, any opposition is construed as opposition to feeding the hungry and/or destruction of environmentally sensitive areas. This is why Monsanto’s methods are particularly insidious; they appeal to those who know little about the technology and its downsides, and can be used to undermine or silence those who do bring a critical approach to the debate. This discursive foreclosure isn’t just a trick of language, though. It involves real

work, and real money being spent. When independent scientists find the research around GM crops missing or absent, they are subject to a degree of criticism and scorn that is not heaped upon their colleagues who make findings in support of GM crops.

## CONCLUSIONS

With its success in influencing the dominant ideas of agriculture and technology, Monsanto has impaired valuable critical reflection on the risks inherent in GM organisms. The cost of discovering the health impacts of products once thought benign is exorbitant—not only in financial terms, but in terms of public health and safety. One need only examine the disease and injuries caused by the negligent conduct of the tobacco, asbestos, or automobile industry to understand the potential for illness, loss of life, and loss of productivity. In the United States, the governmental bodies associated with the protection of the public interest have been under almost continual assault by corporations. In some cases these attacks have succeeded in removing yet another layer of protection against risks to public health and the environment.

In an environment of lax regulation, Monsanto’s discursive maneuvers help to justify their control, to make us feel good about it, and to accept it willingly. The danger here is that we are slowly being seduced into consenting to this form of control over our food supply and to accepting the risks of GM crops without the kind of research, reflection, and debate that is needed when dealing with something as basic to human survival as food. The threats to public health and safety that have come from other industries show us that thoughtful assessments of technology could have forestalled some of the negative consequences that are associated with those technologies. As the second-largest seed company in the world and a huge manufacturer of GM seed, Monsanto has made us all into guinea pigs, showing little real regard for the health of the ecosystem or consumers. Although Monsanto remains a powerhouse in the biotechnology industry, it is far from the only firm producing GM organisms, and its machinations are part of a broader movement in which we are encouraged to surrender a systemic critique of agricultural biotechnology for cosmetic change. Yet, it remains possible to reclaim the space for hard science, and as the British government case shows, science can be independent, publics can be informed, and broad criteria of environmental health can be brought back into the domain of democracy.

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