MONSANTO

A CORPORATE PROFILE

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Executive Summary

You know who Monsanto is. Even if you don't recognize the company name, you've come across some of its products: maybe you've used Roundup weed killer on your lawn or garden, you've heard about the debate over treating cows with the artificial growth hormone rBGH, you're worried about unlabeled genetically engineered organisms in your food, or you've learned about the use of Agent Orange in the Vietnam War, maybe from family members, coworkers or friends who suffered the health consequences. These may not seem related, but they all are a major part of Monsanto's legacy.

The agriculture and life sciences company that's known today as Monsanto is only a recent development. Most of Monsanto's history is steeped in heavy industrial chemical production — a legacy that is extremely at odds with the environmentally friendly, feed-the-world image that the company spends millions trying to convey.

GROUNDS OF THE MONSANTO CHEMICAL COMPANY; NITRO, WEST VIRGINIA, 1973 / PHOTO COURTESY OF U.S. ENVIRONMENTAL PROTECTION AGENCY

Introduction

Monsanto is a global agricultural biotechnology company that specializes in genetically engineered (GE) seeds and herbicides, most notably Roundup herbicide and GE Roundup Ready seed.[1] GE seeds have been altered with inserted genetic material to exhibit traits that repel pests or withstand the application of herbicides. In 2009, in the United States alone, nearly all (93 percent) of soybeans and four-fifths (80 percent) of corn were grown with seeds containing Monsanto-patented genetics.[2] The company's power and influence affects not only the U.S. agricultural industry, but also political campaigns, regulatory processes and the structure of agriculture systems all over the world.

Monsanto was the largest biotechnology seed company in the world in 2011,[9] providing many essential inputs required for farming. Monsanto reported 2011 net sales of $11.8 billion, and profits of $1.6 billion.[10] Monsanto has been at the forefront of the biotechnology industry and is one of the largest agricultural patent-holding companies, with more than 1,676 patents on seeds, plants and other agricultural applications.[11] Because of Monsanto's market dominance, its products are changing the face of farming, from the use of Monsanto's pesticides and herbicides, to the genetic makeup of the food we eat.

Monsanto was not always a purveyor of life sciences, purportedly working to "produce better foods for consumers and better feed for animals."[12] It began as a purveyor of dangerous and controversial chemicals, a history that it has tried desperately to greenwash away.

Monsanto grew from a small chemical startup company to an enormously powerful agricultural and life sciences company, which *Fortune* magazine once labeled "possibly America's most feared corporation."[13] Its market share of seed and patents is overwhelming, and it is notorious for aggressively enforcing intellectual property rights.[14]

Monsanto has a close relationship with the U.S. government, which helps it to find loopholes or simply create regulations that benefit its bottom line. Monsanto and other corporations have increasingly funded academic research from public universities, which they use to justify their latest products. Monsanto's international power has grown at an alarming rate, much to the dismay of developing countries that have inadvertently been exposed to its relentless business strategy. For all of these reasons, Monsanto has become a company that farmers and consumers around the world should fear.

Company History

Monsanto began in 1901 as a small chemical start-up by John Francis Queeney, a man in the wholesale drug industry. Its first product was saccharin, a sugar substitute, and it became the major supplier of inputs for another relatively new company, Coca-Cola.[15]

By the 1920s, Monsanto's product line had expanded to include sedatives, laxatives and aspirin. In the late 1920s, John Queeney's son Edgar took over and drastically expanded operations: Monsanto began producing everything from synthetic fibers, plastics and rubber goods to industrial chemicals, fertilizers, and pesticides and herbicides.[16]

PHOTO © CC-BY DWIGHT BURDETTE / WIKIMEDIA COMMONS

Monsanto: By the Numbers

- **2011 Net Sales:** $11.8 billion[3]
- **Top Products:** Include Roundup and Harness herbicides, DEKALB corn seeds, Asgrow soybean seeds, Deltapine cotton seeds, Seminis vegetable seeds, De Ruiter vegetable seeds, Smartstax insect-repellent corn and Bollgard insect-repellent cotton[4]
- **Global Facilities:** 404 facilities in 66 countries across six continents[5]
- **Global Reach:** In 2009, Monsanto's products were grown on over 282 million acres worldwide, and on 40 percent of the U.S. crop acreage.[6]
- **U.S. Political Campaign Contributions (2000–2012):** $829,662[7]
- **U.S. Lobbying Expenditures (2000–2012):** $62,356,730[8]

After a period focused on agrichemicals — including production of the notorious Agent Orange (see sidebar) and production of PCBs, a class of chemicals so toxic that they were banned in the 1970s but still pollute the environment today — Monsanto transitioned beyond chemicals into seeds. After its creation of an agricultural division in 1960, Monsanto went on a buying spree for the next 40 years, acquiring and merging with dozens of seed and agricultural companies (and shedding its chemical and industrial divisions) to broaden its operations once again and shift itself exclusively into the agricultural market.[17]

See Figure 1 on pages 6–7 for a timeline of Monsanto's history.

Modern-Day Monsanto

Monsanto's Environmental Impact

As a chemical manufacturer, Monsanto's day-to-day operations have wreaked havoc on the environment and public health.

Approximately 99 percent of the polychlorinated biphenyls (PCBs) used by U.S. industry were produced by Monsanto at its Sauget, Illinois, plant until all PCB production was banned nationwide by Congress in 1976.[56] PCBs are a chemical class produced since the 1930s mainly for use as coolants and lubricants in electrical equipment, until startling health effects were discovered. PCBs were found to be carcinogenic, and to cause detrimental effects to the liver, endocrine system, immune system, reproductive system, developmental system, skin, eye and brain.[57]

PCBs continue to be illegally leaked or dumped even after the ban. These persistent chemicals do not break down easily in the environment, and continue to cycle through air, water and soil for long periods of time.[58] PCBs can accumulate in plants and food crops, and also in fish and other aquatic organisms from water that contains PCBs. They can then be taken up by other animals that eat these fish and crops as food, and accumulate to higher levels as they go up the food chain. One of the main sources of human exposure to PCBs is through contaminated food consumption.[59]

Market Share

Monsanto began its research and production of agrochemicals in the 1960s. In 1982, Monsanto's scientists became the first to genetically modify a plant cell.[78] Throughout the 1990s, Monsanto gradually shed its plastics, chemicals and fibers companies and rapidly acquired multiple seed and agricultural companies, shifting its identity from a chemical company to one that produced GE crops and linked agrochemicals — a life sciences company.

Roundup

Monsanto's wildly popular herbicide Roundup guaranteed the company a top spot as it transitioned into the agriculture market. Sales from Roundup and other glyphosate-based herbicides accounted for 27 percent of Monsanto's total 2011 net sales.[79] Monsanto engineers its GE seeds to resist Roundup and Roundup alone, so that the sale of the herbicide is absolutely necessary for those who buy Roundup Ready seeds.

What Is Agent Orange?

Between 1962 and 1971, almost 19 million gallons of defoliants were sprayed in Vietnam to clear vegetation around military bases and to obliterate hiding places and rice paddies used by the Viet Cong.[18] The chemical mixes were labeled by the color of the barrel, and the most toxic of them all displayed a bright orange stripe.

Agent Orange is a defoliant made from two herbicide compounds, 2,4-D and 2,4,5-T. In the manufacturing process, dioxin is released as a byproduct and contained within 2,4,5-T (although several forms of dioxin have also been found in 2,4-D).[19] Dioxin is a highly toxic carcinogen — one of the most dangerous chemicals known. Monsanto was one of the principal companies to supply Agent Orange to the U.S. government during this period.[20]

The Vietnam Veterans of America have catalogued at least 50 illnesses and diseases, and almost 20 separate birth defects, as connected to Agent Orange.[21] The illnesses were so widespread among Vietnam War veterans that a class-action lawsuit was brought against the seven largest manufacturers of Agent Orange. The companies settled for $180 million; however, they continue to deny the connection between Agent Orange and the plaintiffs' health problems, showing Monsanto once again refusing to acknowledge the risks of its toxic products.[22]

The lasting effects as related to herbicide use in the Vietnam War are still in such contention that Congress passed the Agent Orange Act in 1991, mandating a biennial comprehensive report by the Institute of Medicine exploring new biomedical evidence of health effects from exposure to the defoliant.[23] U.S. veterans are not the only ones affected by Agent Orange. The ongoing impacts of Agent Orange on the health of Vietnamese citizens have been the source of much debate but, until recently, of little action by U.S. companies or the U.S. government.[24]

Monsanto's Production Facilities

Multiple Monsanto-owned facilities have been deemed by the U.S. Environmental Protection Agency (EPA) as Superfund sites: those that are so contaminated that they rank among the worst in the United States and are put on the National Priority List for cleanup by a designated EPA fund. Even more have been deemed hazardous by the EPA but have been ordered cleaned up through other means such as litigation.

Here is a sampling of such plants:

- **Monsanto plant in Augusta, Ga.:** Superfund-listed in 1984 for arsenic-laden waste and sludge contributing to groundwater contamination.[60]
- **Monsanto phosphorous plant in Soda Springs, Idaho:** Superfund-listed in 1990 for arsenic, cadmium, radium and other toxins.[61]
- **Monsanto plant in Sauget, Ill.:** Two Superfund sites are still being cleaned up after the initial cleanup in 1982; plant produced 99 percent of all PCBs in the United States.[62]
- **Monsanto PCB plant in Anniston, Ala.:** Listed under Superfund Alternative Approach (for sites not on National Priorities List but treated in the same way) in 2000 for extensive PCB contamination over six decades.[63] The city has been characterized as one of the most polluted places in America.[64]
- **Solutia Plant (formerly Monsanto) in Nitro, W.Va.:** The EPA, Monsanto and Pharmacia entered into a Consent Order in 2004 to perform evaluation, cost analysis and cleanup for release of dioxin from the 2,4,5-T (a component of Agent Orange) manufacturing plant over a 20-year period.[65]
- **Times Beach, Mo.:** See sidebar (below).
- **Solutia plants** ranked #1 in Texas and #4 in Massachusetts for the EPA's top contaminated sites in 2007.[66]

Times Beach, Missouri: A Dioxin Disaster

Times Beach, Missouri, used to be a town of 2,800 people on the Meramec River near St. Louis.[67] After serious mismanagement of chemical waste in the area, the town had to be permanently relocated by the EPA and was effectively wiped off the map.

In the 1960s and 1970s, Russell Bliss's Waste Oil Company took chemical and industrial wastes from plants in northeastern Missouri and mixed them with oil to form sludge to spray on dirt roads and horse arenas.

Bliss Waste Oil Company sprayed the entire town of Times Beach in 1971 to curb the town's dust problems, one of 30 sites sprayed in Missouri.[68] As it turned out, the waste that he had taken from nearby PCB processing plants, including a Monsanto plant, contained dioxin.

Within two days of spraying the waste oil in 1971, 50 horses had fallen ill and 35 died, and there were "bushel baskets full of ... dead wild birds."[69] The U.S. Centers for Disease Control conducted tests of the soil and found dangerously high levels of PCBs, 2,4,5-T herbicide and dioxin.[70]

The EPA had been alerted, but they didn't come to sample the roads until December 1982.[71] Days later, the Meramec River flooded the town, exacerbating the spread of the sludge and bringing the dioxin into residents' homes and over a mile downstream.[72]

In February 1983, the EPA allocated $33 million from Superfund to buy out the entire municipality of Times Beach so that they could relocate residents and begin the cleanup process. The state government contributed $3.6 million.[73] On April 2, 1985, aldermen of Times Beach voted unanimously to disincorporate the town, and it officially ceased to exist.[74]

The Chief Administrator of the EPA at the time, Anne Burford, and her Assistant Administrator, Rita Lavelle, were investigated by Congress for withholding incriminating information that would have found nearby companies, including Monsanto, at fault. As it is, the EPA never officially found the source of the PCBs and dioxin in Russell Bliss's waste oil.[75]

Russell Bliss stated under oath in April 1977 that he had a contract to collect Monsanto's waste products, but Monsanto denies the relationship.[76] Times Beach Action Group uncovered laboratory reports documenting Monsanto's PCBs concentrated in the soil around Times Beach.[77] Despite all of the evidence, Monsanto shirked responsibility for this record-setting contamination disaster and has continued to back the safety of its products since.

Figure 1.

a selected history of

MONSANTO

1901
Monsanto Company is **founded.**[25]

1910s
Manufactures saccharin, as a major supplier to Coca-Cola; manufactures caffeine, vanillin, sedatives and laxatives. Becomes **world's largest maker of aspirin.**[26]

1920s
Manufactures salicylic acid, plastics, resins, industrial and chemical goods.[27] Acquires **chemical and rubber** companies.[28]

1930s
Acquires Swann Chemical Corporation; manufactures polychlorinated biphenyls (**PCBs**) **through 1977.**[29]

1940s
Manufactures **plastics** and synthetic fibers.

1945
Begins manufacturing agricultural chemicals. These include 2,4-D, an herbicide that was mixed with 2,4,5-T to create **Agent Orange**, a defoliant contaminated with dioxin that was produced for the U.S. military during the Vietnam War.

1947
Grandcamp ship explodes in Texas City, Tex., while loading near a Monsanto plant dock. The ship was carrying 2,500 tons of ammonium nitrate, and killed over 500 people. It remains the largest and most deadly U.S. chemical disaster, even six decades later.[30]

1960s
Monsanto's brands of **propachlor and arachlor herbicides** are approved for use, spurring the company's shift into the agricultural market.[31]

1962-1971
Becomes principal company supplying Agent Orange to U.S. military for use in the Vietnam War.[32] The Air Force sprayed nearly 4 million acres of South Vietnam with 18 million gallons of **Agent Orange** and similar defoliants,[33] the effects of which are still being felt today. (See sidebar, page 4.)

1976
Roundup herbicide is approved for use on certain crops.[34]

1982
Dioxin, a byproduct of PCB production, is found at up to 127 parts per billion in the Missouri community of **Times Beach**, and over 2,000 people have to be permanently relocated by the EPA.[35] Monsanto denies any connection, despite its PCB manufacturing plant in the area. (See sidebar, page 5.)

1982
Scientists at Monsanto are the first to **genetically modify a plant cell.**[36]

1985
Monsanto acquires GD Searle, which discovered and manufactured aspartame artificial sweetener. Creates subsidiary **NutraSweet Company.**[37]

1900 1910 1920 1930 1940 1950 1960 1970 1980

1993
rBGH, commercially known as Posilac, is approved for U.S. market.[38] (See sidebar, page 11.)

1995
Divests plastics division to Bayer.[39]

1996
Genetically engineered **Roundup Ready** soybeans, canola and cotton, as well as Bollgard insect-protected (Bt) corn and cotton, are introduced to the U.S. market.[40]

1997
First **stacked-trait combination** in cotton is introduced (multiple GE traits added to one seed).[41]

1997
Spins off chemical division as **Solutia**. Begins an acquisition spree buying multiple seed and agricultural companies.[42]

1998
Roundup Ready corn is commercialized.

1998
Acquires DeKalb Genetics Corporation, a seed company.[43]

2000
Monsanto Chemical Company becomes a **subsidiary of Pharmacia** Corporation (which merged with Upjohn in 1995).[44] Monsanto sells NutraSweet Company to J.W. Childs.[45]

2002
Monsanto Company is spun off as its own new **agricultural sciences** company. The Monsanto as we know it today is born.

2005
Roundup Ready alfalfa and sugar beets are approved, then cancelled in 2007 for further analysis, then approved again in 2011 (alfalfa) and 2012 (beets).[46]

2007
Acquires Delta & Pine Land Company after a decade of antitrust investigation on Monsanto's **monopoly in the cotton industry**. Divests Stoneville cotton brand as ordered by the District Court of Columbia in order to go through with D&PL acquisition.[47]

2008
Sells Posilac to Eli Lilly, amid consumer uproar over company support for attempts to outlaw rBGH-free labeling.[48]

2011
Drought-tolerant GE corn, as well as altered fatty-acid GE soybean, are approved.[49] Roundup Ready alfalfa is reapproved.

2011
Acquires Beeologics, a company dedicated to restoring the health of the **bee population**, amid scientific and media speculation that an overuse of pesticides is to blame for dwindling bee populations.[50] Roundup Ready alfalfa is reapproved.[51]

2012
Roundup Ready sugar beets are reapproved.[52]

2012
Maharashtra state government in India bans sale and distribution of Bt cotton seeds after accusations that Mahyco Monsanto provided inferior quality seeds that aggravated **India's agrarian crisis** and spurred farmer suicides.[53] (See sidebar, page 15.)

2012
"Monsanto Rider" is introduced in U.S. **Farm Bill**, which would allow GE crops to be approved quickly with very little regulation or testing.[54]

2012
Opposes **Proposition 37** in California that would require labeling of foods with GE ingredients. Contributes $8.1 million as top donor in a $45 million campaign that defeats the initiative.[55]

1990 1995 2000 2005 2010

PHOTO © CC-BY DWIGHT BURDETTE / WIKIMEDIA COMMONS

GE Seeds

Most of Monsanto's market strength comes from its genetically engineered seeds. Genetic engineering modifies the genetic material of crops to display specific traits. Most commercial biotech crops are developed to be either herbicide tolerant, allowing herbicides to kill weeds without harming crops, or insect resistant, which protects plants from destructive pests.[80] Monsanto creates many of both types.

Monsanto not only markets its own patented seeds, but it uses licensing agreements with other companies and distributors to spread its traits throughout the seed supply. An *Associated Press* investigation found that these agreements stipulate how competitors can use Monsanto's traits in their products, and negotiate discounts received for keeping a certain amount of Monsanto's products in stock; some contracts even affected ownership of smaller seed companies by requiring them to destroy their Monsanto inventory if ownership changed.[81] By 2010, Monsanto's traits were present in 95 percent of the U.S. GE corn seed market and 89 percent of the U.S. GE cotton seed market.[82]

The acreage on which Monsanto's GE crop traits are grown has increased from a total of 3 million acres in 1996 to 282.3 million acres worldwide and 151.4 million acres in the United States in 2009.[83] Roughly 382 million acres in the United States are used for crop production,[84] so that means that Monsanto's products constitute approximately 40 percent of all crop acres in the country. Monsanto's research and development surpasses other companies, as it holds six times as many permits for field trials of biotech seeds as any other company in the United States.[85]

A lawyer working for DuPont, the next largest competitor in the seed business, said, "a seed company can't stay in business without offering seeds with Roundup Ready in it, so if they want to stay in that business, essentially they have to do what Monsanto tells them to do."[86]

While Monsanto's sheer size and the power of its product lines gives it an obvious edge, there's something more to the story of its unbridled success. It's the way Monsanto does business: how it interacts with and influences governments; its aggressive tactics against its own customers and competition; and its ruthless expansion into foreign markets.

Influence on Government

Monsanto has a long history with former and current employees of the U.S. government, public universities and industry and trade groups. There has been a continuous "revolving door" between these institutions and Monsanto's Board of Directors and senior staff, offering some explanation for Monsanto's powerful influence in policy and public research (see Figures 2 and 3 on pages 9–10).

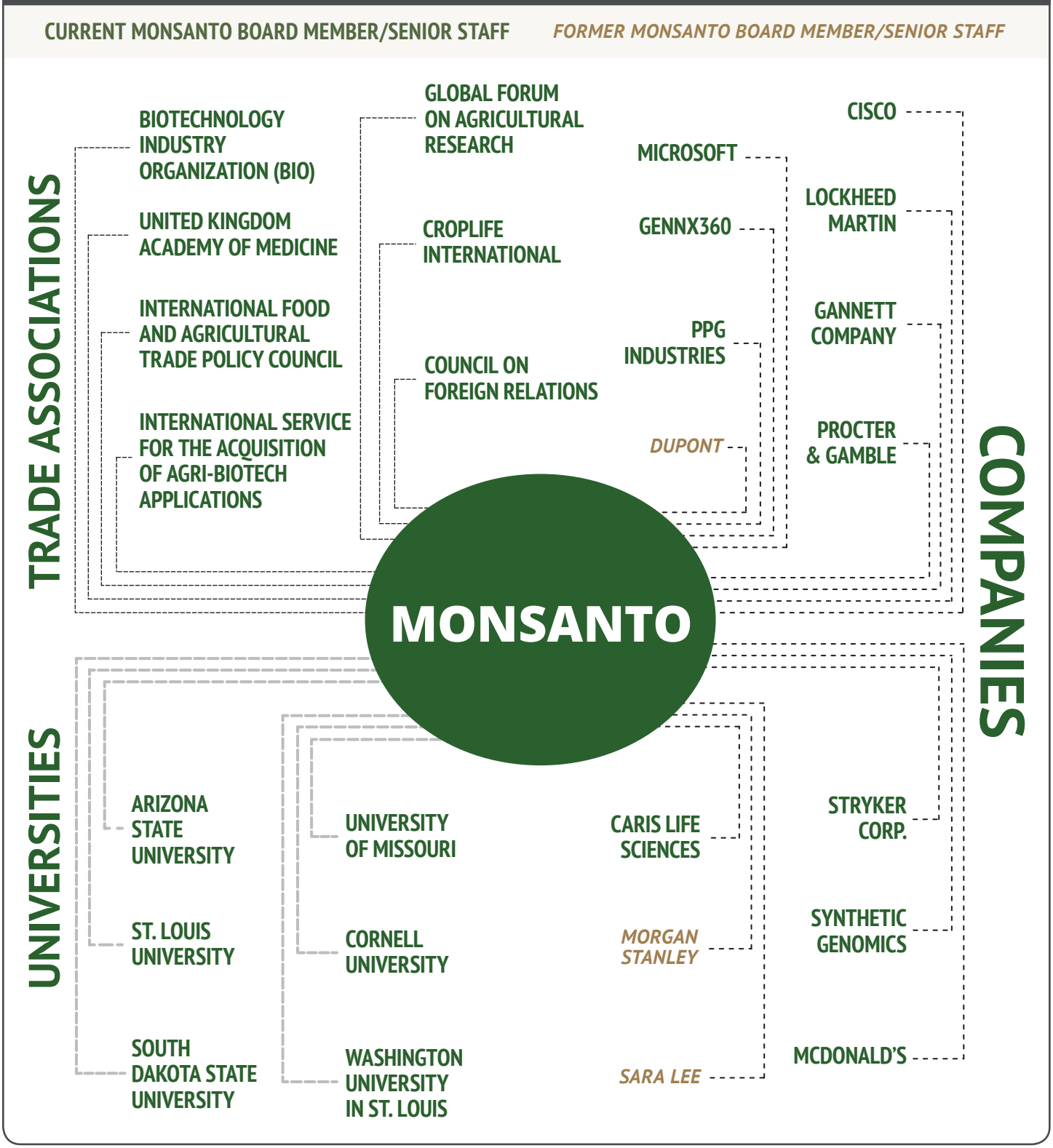
Monsanto's board members have worked for the EPA,[87] advised the U.S. Department of Agriculture (USDA)[88] and served on President Obama's Advisory Committee for Trade Policy and Negotiations.[89] They presided over multiple universities in various senior positions, including South Dakota State University (with whom Monsanto has a significant research agreement),[90] Arizona State's Biodesign Institute[91] and Washington University in St. Louis.[92] Monsanto shares board members with other corporations such as Procter & Gamble,[93] Lockheed Martin[94] and Synthetic Genomics.[95]

The company's board members have been a part of the International Food and Agricultural Trade Policy Council, the Council for Biotechnology Information,[96] the United Kingdom Academy of Medicine, the National Academy of Sciences Biological Weapons working group,[97] CropLife International[98] and the Council on Foreign Relations.[99]

The prevalence of Monsanto's directors in these highly influential positions begs a closer look at how they're able to push the pro-GE agenda within the government and influence public opinion.

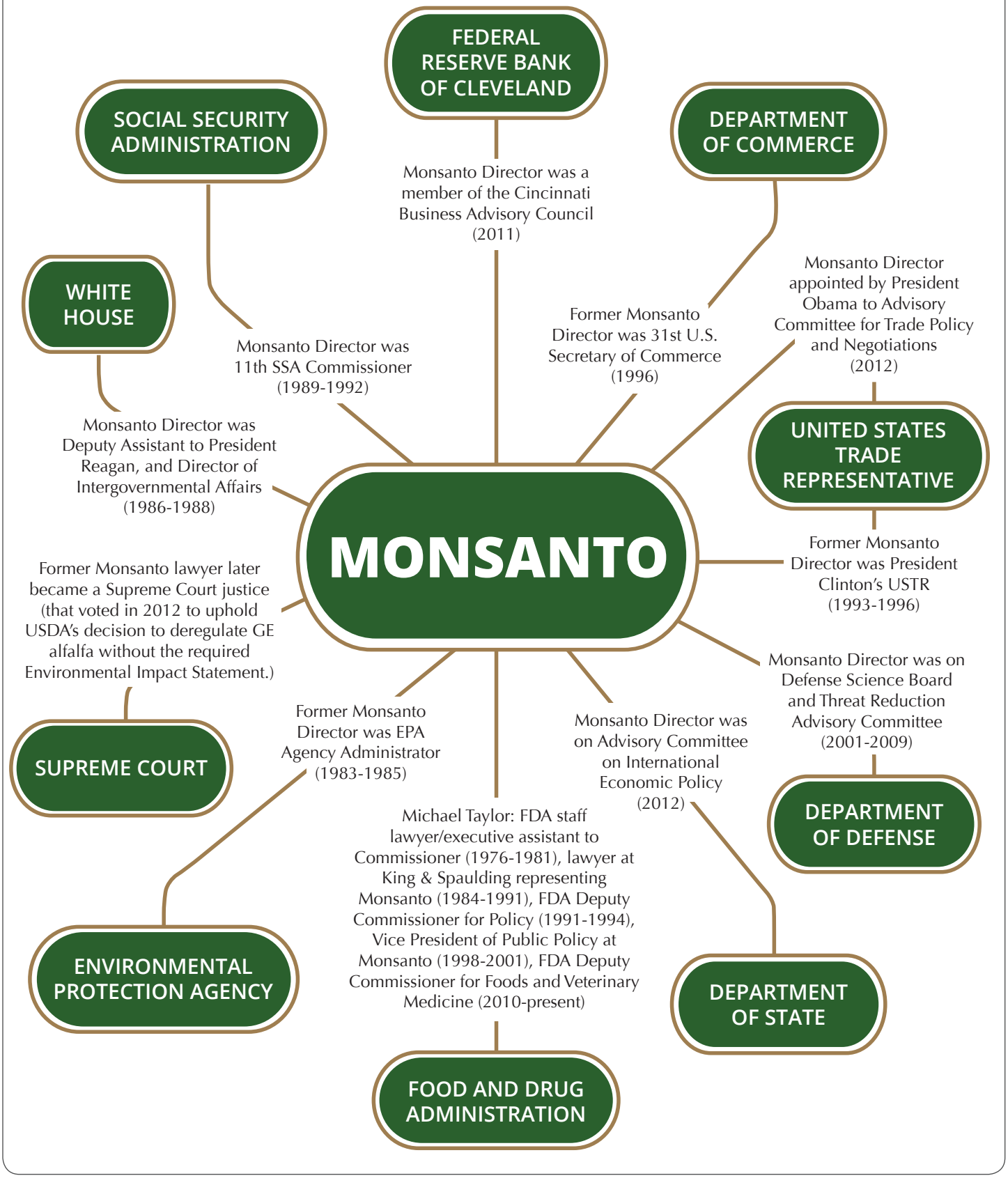
Figure 2. Monsanto's Interlocking Board Members[100]

Each connection is a current or former Monsanto employee who has held a position on the board, or on advisory committees and similar positions, for the following companies and organizations.



AS OF JANUARY 2013. SOURCES: MONSANTO PROXY STATEMENT 2012, COMPANY AND ORGANIZATION WEBSITES, NEWS SOURCES.

Figure 3. Monsanto's Revolving Door[101]



AS OF JANUARY 2013. SOURCES: MONSANTO PROXY STATEMENT 2012, PRESS RELEASES, NEWS SOURCES.

Bovine Growth Hormone

The Food and Drug Administration's (FDA) approval process for recombinant bovine growth hormone (rBGH) has been scrutinized for the connections between Monsanto and the agency that ultimately approved the drug for use. Three FDA employees working on Monsanto's application for approval appeared to have such close ties with Monsanto that — at the request of Representatives George Brown from California, David Obey from Wisconsin and Bernie Sanders from Vermont — the Government Accountability Office investigated them in 1994 for conflicts of interest.[102]

rBGH

Recombinant bovine growth hormone (rBGH), also called recombinant bovine somatotropin (rBST), is a drug that is injected into cows to increase milk production. Developed by Monsanto and approved by the FDA in 1993, by 2000 it had become the largest selling pharmaceutical product in the history of the dairy industry.[108]

As the first genetically engineered product that the FDA had ever approved,[109] the rBGH approval was the subject of much criticism and investigation. It was believed that the FDA ignored both possible health risks as well as potential conflicts of interest with several FDA employees working on the approval.

rBGH has impacts on the physical health of cows. Multiple studies have found it to cause reproductive problems in cows, including lower birth weight, infertility[110] and an increased risk of cystic ovaries.[111] rBGH has also been found to cause mastitis and hoof and leg problems.[112] The FDA required Monsanto to label its product with a disclaimer listing its many possible effects as a way to appease consumer uproar after the nontransparent approval process, and the drug package insert listed a total of 16 negative animal health impacts.[113]

Mastitis, an udder infection, is one of the most common health impacts of rBGH, and must be treated with antibiotics. Antibiotic use in dairy operations exposes bacteria to the antibiotics, contributing to the development of drug-resistant bacteria that can sicken humans.[114]

In 2008, Monsanto announced the sale of its rBGH product to Elanco, the animal health division of pharmaceutical giant Eli Lilly.[115] The sale came after several years of battles at state legislatures and regulatory agencies over attempts to restrict the use of rBGH-free labels on dairy products.[116]

The GAO investigated Michael Taylor, Margaret Miller and Suzanne Sechen. They had all been involved in some way in Monsanto's initial rBGH studies, and then went on to work for the FDA in positions that were later responsible for review of those same studies. The GAO concluded that none of them technically violated any conflict-of-interest rules, and that there was no legal ground for them to take action, despite the multiple ties between Monsanto and the FDA.[103]

It was especially surprising that Michael Taylor got off without a fight, as he had begun his career at the law firm King & Spalding, where one of his clients was Monsanto.[104] There, he drafted a memo for Monsanto on whether it would be constitutional for states to adopt different rules regarding rBGH labeling. He then left King & Spalding to work for the FDA, where he helped draft the FDA's guidance on rBGH labeling,[105] which helped prevent dairies from labeling their products "rBGH free."[106] Taylor was also responsible for the FDA's 1992 guidance stating that there was no need to label genetically modified foods as such.[107]

Aggressive Tactics

PR Masterminds

As Monsanto transitioned from a chemical and industrial processor into an agriculture and life sciences company, it worked to convince the media and consumers that its past would not affect its ability to improve agriculture and "produce more, conserve more and improve farmers' lives."[117]

The company has touted its products and technologies as the most safe and sustainable answers to farming problems — so much so, in fact, that it has been known to blatantly mislead consumers. In 1996, as the patent on Roundup was nearing expiration, Monsanto released a series of advertisements in New York for Roundup herbicide and Accord pesticide, claiming that Roundup "biodegrades into naturally occurring elements," "will not wash or leach in the soil" and "can be used where kids and pets'll play." [118] The company also claimed that glyphosate, the main ingredient in Roundup and Accord, "is less toxic to rats than table salt," and is "practically non-toxic." [119]

These ads were taken to the New York Attorney General, Dennis Vacco, for using misleading information, and he found all of the above claims to be false and misleading.[120] In his statement, Vacco said that Monsanto's claims "contradict the [...] statements required on the EPA-

approved label for Roundup at the time the claims were made."[121] He said that "ads cannot imply that these pesticides, which are used to kill vegetation, are risk free. They should give consumers a full picture of a pesticide's risks."[122] To settle the case, Monsanto had to agree to immediately cease and desist from producing any advertisements in New York with the claims investigated, and to pay the Attorney General $50,000 in costs.[123]

More recently, Monsanto has ramped up a media campaign to portray the company as an agricultural hero, a friend of farmers and a savior of the global south. These claims include reducing chemical use, increasing yield, protecting from drought and feeding the world's growing population.

PHOTO © KAREN PERRY STILLERMAN/UNION OF CONCERNED SCIENTISTS

The company's advertising costs for 2009–2011 totaled $279 million.[124] This budget was used to forward Monsanto's sustainable image, stating goals to "protect our natural resources, fight hunger, improve nutrition and provide economic benefits to everyone involved in an improved system of agriculture."[125]

Instead of following through on these promises, Monsanto is merely creating an image to hide behind as the company continues to promote industrial agriculture and genetically engineered seeds all over the world. Its model of agriculture brings higher costs for farmers in the United States and abroad, while Monsanto and other biotech companies reap the profits.

GE crops have shown little benefit over conventional crops, as the herbicide- and pesticide-laden crops have led to weed and pest resistance,[126] have shown small increase or no yield advantage[127] and have not reduced agrochemical use.[128] Further, the 2009 International Assessment of Agriculture Knowledge, Science and Technology for Development concluded that the high costs for seeds and chemicals, uncertain yields and potential to undermine local food security makes biotechnology a poor choice for the developing world.[129]

Litigation Against Farmers

Monsanto has come under public scrutiny for its role in litigation against individual farmers for patent violation claims on GE seeds. Popular documentaries such as "Food, Inc." and "The Future of Food" highlighted some of these farmers' stories, and it became such a hot topic in the media that Monsanto has developed a special section on its website for explanation of these lawsuits.[130]

Monsanto ensures its right to sue farmers through the company's technology licensing agreement on every bag of GE seed. Any farmer who buys Monsanto's seed is bound to it, either by signing a contract or simply opening the bag, and it stipulates that farmers must not save any seed (a thousands-year-old tradition) and are responsible for following all procedures included in Monsanto's *Technology Use Guide*.[131] This stipulation effectively shut down the seed-saving industry.

The agreement also allows Monsanto to investigate farmers' fields at any time, and to access farmers' records filed with the USDA Farm Service Agency.[132] These records tell Monsanto how many bags a farmer bought and exactly how many acres he planted the seed on, making property investigations and prosecution very easy.[133] To make things even simpler, Monsanto set up a toll-free

"snitch line" where neighbors and community members are encouraged to anonymously tattle on farmers that may be using Monsanto's seeds without a license.[134]

The company fiercely defends its patent rights and stands behind the claim that it should be able to collect damages from anyone who violates them.[135] To achieve these ends, Monsanto has hired private investigators to videotape farmers, sneak into community meetings and interview informants about local farming activities.[136] The cases that result from the information Monsanto collects have seen the company demanding thousands of dollars in damages and legal fees from farmers who never chose to plant the company's seeds in the first place.[137]

GE seed contamination is a legitimate concern for which Monsanto has refused to take responsibility. The very nature of plant reproduction means that pollen from crops is carried by the wind or insects to reproduce elsewhere. Any crops grown near GE crops are at risk of GE contamination through cross-pollination. Contamination can also occur when GE seeds are inadvertently mixed with non-GE seeds during storage or distribution.[138]

However, Monsanto states in its Technology Use Guide (which is required reading only for those planting Monsanto seeds) that responsibility for any specific "marketing standards or certification lies with that grower," that the grower "inherently agree[s] to employ those practices appropriate to ensure the integrity and marketability of his or her crop" and that "each grower needs to be aware of the planting intentions of his or her neighbor in order to gauge the need for appropriate best management practices."[139]

In other words, even farmers who do not grow Monsanto's products must be held accountable for their neighbors' GE crops, and Monsanto effectively eliminates the company's responsibility for its own products. This is especially frightening for farmers when they see Monsanto going after those who inadvertently end up with Monsanto's traits on their fields.

Percy Schmeiser is one of the few lucky ones who won his case against Monsanto — or as much of a win as is possible in such an unfair fight. Schmeiser is a Canadian farmer who was found to be growing Monsanto's GE canola plants in 1999, but he never intentionally planted Monsanto's seed — it had blown on to his field either from passing trucks, or from five neighboring farms that all grew Monsanto's canola.[140] Monsanto sued, and the case went all the way to the Canadian Supreme Court in 2004.

While the court upheld Monsanto's patent, it also decided that Schmeiser did not have to pay any fees to Monsanto for the presence of the GE canola.[141] He was still, however, burdened by years of expensive legal fees.

Most farmers aren't as fortunate. According to a study conducted by The Center for Food Safety, Monsanto had filed 136 lawsuits against American farmers as of 2010. These lawsuits involved 400 farmers and 53 small businesses.[142] Another finding is that Monsanto keeps staff on hand solely for the purpose of investigating and prosecuting farmers.[143] Even for the farmers who win their cases, like Mr. Schmeiser, the process takes years of legal battle, stress and significant financial burden. Many farmers settle out of court rather than try to defend themselves — outside of recorded lawsuits, the company investigates roughly 500 farmers each year.[144]

Corporate Lawsuits

Monsanto doesn't just sue farmers; it sues (and gets sued by) its own competitors in the seed market. Monsanto and the next largest competitor DuPont have been in a years-long battle trying to prove that the other has too much market power.

Monsanto sued DuPont in 2009 for patent infringement when DuPont stacked Monsanto's Roundup Ready trait with one of DuPont's own traits in soybeans, which was not allowed in Monsanto's licensing agreement. DuPont countersued on antitrust issues, claiming that Monsanto gained illegal monopoly power through a "multifaceted, anti-competitive scheme to unlawfully restrict competition."[145]

DuPont lost against Monsanto and was ordered to pay $1 billion, the fourth largest patent verdict ever in the United States.[146] Legal experts noted that it was odd that such a large damage was awarded when DuPont never even sold the product guilty of patent infringement.[147] As of September 2012, DuPont was appealing the decision.[148]

The problem here is not who copied whom; it's the fact that our biggest biotech companies are spending their time on lengthy and costly lawsuits amongst themselves, while the prices of seeds continue to rise because of anticompetitive behavior. The endless finger-pointing obscures efforts to squeeze out competition and allows the use of patents to further consolidate the seed supply, driving up costs for farmers and limiting the choices of seed available to them.

Buying Research

Land-grant universities have been important agricultural knowledge centers since their creation in 1862. For over 100 years, these public institutions provided invaluable research to farmers and the agricultural community through public investments from state and federal governments.

Starting in the 1980s, however, federal policies including the Bayh-Dole Act of 1982 began encouraging land-grant schools to partner with the private sector on agricultural research, and to patent the results of the research. A key goal was to develop agricultural products such as seeds, which were sold to farmers under an increasingly aggressive patent regime.[149] Private sector businesses have flooded public universities with donations and funding for research, skewing the goals of research toward the goals of industry and discouraging independent research.

It is not surprising that Monsanto has taken an interest in influencing the research priorities of several of these institutions.

As mentioned earlier, Monsanto has shared board members with several universities. The company also has donated enough for naming rights at some schools. Iowa State University now has a Monsanto Student Services wing in the main agriculture building, thanks to a million-dollar pledge.[150] The University of Missouri houses a Monsanto Auditorium.[151] Monsanto gave $200,000 to the University of Illinois's college of agriculture to fund the Monsanto Multi-Media Executive Studio, where industry seminars are held.[152] These donations (or more appropriately, investments) increase both the company's influence and brand power at the university level.

With this connection to land-grant research, Monsanto is not only gaining access to research that is publicly accepted as legitimate and independent, but it is profiting highly from it. The company's signature products, the artificial growth hormone for cows rBGH and Roundup Ready seed technology, were only possible through research provided by public universities.[153] The use of these technologies is further advanced because the official agricultural research establishment pursues them rather than alternatives such as organic or agro-ecological solutions. Extension services then spread this as official advice for best farming practices, giving it even more legitimacy.

Global Reach

As Monsanto's share of the U.S. market grows, so does its share of the global market. Monsanto has recently bought multiple companies in South America and Eastern Europe[154] and licenses and sells its products to every region in the world.[155] Monsanto's hybrid corn crops hold the number one position in the share of seeds in all Latin American "key countries" (Argentina, Brazil and Mexico, according to a corporate presentation).[156] Approximately 46 percent of Monsanto's 2011 sales originated outside the United States.[157]

Amid discussions of a global food crisis, technological advancements in biotechnology are widely touted as a quick, easy and sustainable fix for agricultural development. Corporations are stepping in as key players in the fight against hunger and poverty, and they are convincing governments to let them promote their industrialized business models in developing countries.

WikiLeaks cables from around the world in recent years reveal Monsanto's representatives and U.S. government officials striving to promote and sell biotechnology worldwide.[158] The Department of State has hosted meetings to discuss the merits of GE technology in target countries in recent years.[159] Cables from embassies in China, Hungary, Ukraine, France and even the Vatican show a relentless drive to convince those countries of the benefits of GE crops, whether or not the countries themselves want or need it.[160]

Not surprisingly, not all countries are benefiting from Monsanto's invasive global business strategy. Once Monsanto's products are introduced, it is virtually impossible to revert back to traditionally grown crops. Farmers must invest in the matching herbicide and pesticides, sign licensing agreements and become liable for any natural spreading of the germplasm. A few stories from around the globe illustrate Monsanto's impact.

Why Are Farmers Committing Suicide in India?

In 2009, 17,638 Indian farmers committed suicide. The farmer suicide rate in India is four times higher than the general suicide rate.[161] What's happening in India to cause so many farmers to take their own lives?

India has been subjected to massive economic reforms instituted by the World Bank and the International Monetary Fund since the 1990s, opening the country up to global competition, trade liberalization and privatization. The World Bank's structural adjustment policies forced India to allow global corporations to access the country's seed and agriculture sectors.[162] The Indian rupee's subsequent devaluation dropped crop prices and increased demand for Indian crops abroad, making India's agriculture industry focus on export-oriented cash crops like cotton.

Monsanto capitalized on this opportunity, introducing its insect-repellent *Bt* cotton seeds (the first approved GE crop in India) to India's farmers in 2002.[163] Through its partnership with Mahyco Monsanto Biotech, Monsanto licensed its insect-repelling *Bt* cotton trait to Indian farmers and sub-licensed it to 28 other seed companies, promising reduced pesticide use.[164] After the first eight years of *Bt* cotton cultivation, 87 percent of all Indian cotton produced was *Bt*.[165]

Despite the claims of higher returns and better crops, farmers have yet to see *Bt* cotton's benefits. Not only do *Bt* cottonseeds cost at least twice as much as regular seeds,[166] but they also require much more water and more money for added inputs.[167] The prolific use of *Bt* cotton has caused bollworms — the very pest it was engineered to repel[168] — to develop resistance to it, meaning that pesticide use must be increased exponentially to keep pace with the bollworms.

Bt cottonseeds are sold as hybrids, which are unable to reproduce exact traits year to year — meaning that farmers must buy entirely new seeds each year.[169] Although these reasons might be enough to put a farmer off from investing in *Bt* cottonseeds, investigative journalist Trevor Aaronson reported that "although boxes of *Bt* cotton have a warning label that instructs farmers to use the seed only in irrigated fields, the warning is in English, which few farmers can read."[170]

The increased price forces farmers to borrow more money from banks and local moneylenders, which they do to keep a competitive edge by planting the latest technology.[171] The pressures of global competition, indebtedness and soaring seed prices have caused a surprising number of farmers to take their own lives. According to a study by Sijrit Mishra, of the farmers who committed suicide in 2004 in the state of Maharashtra, 87 percent did so due to indebtedness, and 74 percent did so due to economic decline.[172]

India's National Crime Records Bureau has been recording national and state suicide numbers since 1997, which have been steadily climbing. The biggest spike came in 2004, after the first and second harvests from the first *Bt* cottonseeds.[173] The five states with the highest farmer suicide rates account for 62 percent of the national total; two of these states rank in the top three states of cotton production in the country.[174]

The state of Maharashtra has remained in the top spot consistently for 10 years.[175] Maharashtra's agrarian crisis has become such a massive problem that in August 2012, the state banned Monsanto's *Bt* cottonseeds entirely.[176] Mahyco Monsanto Biotech has been effectively banned from doing any business in Maharashtra, one of the first governmental statements on the connection between India's agrarian crisis and *Bt* cotton. Maharashtra Agriculture Minister Radhakrishna Vikhe-Patil has also ordered an independent study of the socio-economic effects of *Bt* cotton.[177]

Haiti

After the disastrous earthquake in Haiti in 2010, funding and aid came from individuals, governments, foundations and corporations worldwide. Monsanto donated $4 million worth of hybrid fruit and vegetable seeds to Haiti's struggling farmers.[178] While this may seem like a charitable move, it locks the growers into buying the same costly seeds again and again because hybrid seeds are more expensive than conventional seeds, cannot retain the exact same traits in the next generation (so they can't be saved from year to year) and require more chemicals to work with Monsanto's genetic engineering.[179]

The leader of the Peasant Movement of Papay, Chavannes Jean-Baptiste, saw the donation as a plan to get peasant farmers to continue buying more expensive hybrid seeds and institute large-scale agribusiness in Haiti.[180] He said:

> *"...In the agricultural industry, it's always a package. You have to use the seeds, the fertilizer and pesticide together ... the United States agribusiness wants to use our land to produce agro-fuel and produce fruit to send to the United States. It doesn't want a peasant production culture.... The peasant agriculture doesn't use chemical pesticide or fertilizer – it's our agriculture. It's against the agricultural industry of the United States."*

Jean-Baptiste and his organization want to end the promotion of these new seeds, and to stand up against Monsanto's promotion of more chemical-intensive agriculture. For them, regardless of intentions, "any seed from Monsanto is bad," because "agriculture is to produce food for life. Now, the agribusiness enterprise combines agriculture and business to get money, without any apprehension about the health" of the products.[181]

China

According to a cable from the U.S. Embassy in Beijing, at the 8th U.S.–China High Level Joint Biotechnology Working Group Meeting in Beijing in 2009, China's Vice Minister of Agriculture "noted complaints received from Chinese soybean farmers about the large volumes of biotech soybean imports from the United States. He commented that U.S. companies, including Monsanto, were earning 'fat profits' from this trade and were only interested in expanding their market share."[182]

PHOTO BY KENDRA HELMER / U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID)

Nepal

In Nepal, a growing resistance movement to Monsanto's presence escalated in late 2011 after the Nepalese Ministry of Agriculture made agreements with the U.S. Agency for International Development and Monsanto to introduce a pilot program that would import more of Monsanto's hybrid corn and train farmers to efficiently grow it.[183] Nepalese activists protested extensively and sparked a hearing within the Ministry of Agriculture to reassess the proposed Monsanto venture.[184] The ministry spokesman, Hari Dahal, had this to say about the situation:

> *"Because we are food insecure to some extent we do feel that we should use hybrids. Second thing is, there is tremendous pressure from the companies too. If there is a provision to file an application then companies will and have been filing applications. So we can't pick and choose. There is no denying the companies are quite influential.... If a company like Monsanto comes it will eat us whole."*[185]

Hungary

Although the European Commission regulates GE crops at the European Union (EU) level, there is a 'safeguard clause' allowing temporary restrictions or bans of the use or sale of GE products in individual countries.[186] Hungary was the first Eastern European country to have used this safeguard clause, banning Monsanto's GE corn in 2005 for human health and biodiversity reasons.[187]

Since then, Monsanto, Pioneer and the U.S. Department of State Senior Advisor for Biotechnology, Jack Bobo, have relentlessly worked to change Hungary's position. The U.S. government, along with Monsanto and Pioneer, is, according to a cable from the U.S. Embassy in Hungary, "continuing a sustained, modulated outreach plan in hopes of changing the policy over the long term," and they are hopeful that a "steady stream of carefully orchestrated outreach of this type will eventually wear down Hungary's resistance to lifting the biotech ban."[188]

By 2009, Hungary's unwavering position (even with multiple pressures by the European Commission to overturn the ban[189]) prompted the EU to allow the country to permanently maintain its ban on the cultivation of GE crops.[190]

France

France is one of Europe's leading agricultural producers, and has been against GE cultivation since its introduction.

In 2006, the top French court revoked some of Monsanto's authorizations to field test its GE corn — and Monsanto said this would not stop it from further testing. Monsanto insisted that it had the permits necessary and refused to disclose its test-site locations, in fear that GE opposition groups would destroy its fields. Roughly half of all of Monsanto's test sites in France are destroyed each year.[191]

Currently, only one seed, Monsanto's pest-resistant GE corn, has been allowed for cultivation in the EU. Beyond that, the only GE products allowed in the EU are imported food and feed.[192] France banned the GE strain of corn in 2008 following public protests and concerns about public safety.[193] The French are fiercely protective of their environment and food, and the public outcry against GE crops has been undeniable. Even so, the French court overturned the ban in November 2011.[194]

French Agricultural Minister Bruno Le Maire imposed another temporary ban on Monsanto's corn in March 2012 after the company was found guilty of chemical poisoning related to its Lasso herbicide in February 2012.[195] It was

the first time a decision was made that found a pesticide maker guilty of such a poisoning — there is usually too much difficulty in establishing definitive causal links between a specific product and health effects experienced by those who use it.[196]

In order for a country's individual ban to stand up to the EU's regulations, the country must have valid scientific justification as determined by the EU for the decision. The European Food Safety Authority ruled in May 2012 that there was not enough evidence of risk to human, animal or environmental health to justify France's ban on the GE corn, and rejected it.[197] Regardless, Prime Minister Jean-Marc Ayrault has promised to maintain the ban as part of President François Hollande's broader plan to reduce the use of chemicals in farming and improve overall environmental health.[198]

The back-and-forth politicization of this issue threatens to take attention away from the real problem here: the French public does not want GE crops cultivated in their country.[199] Yet the trade pressures from the biotechnology industry, the United States and the European Union still force their way into French food and agriculture policy.

Recommendations

Monsanto bullies its way onto farmers' fields, university research labs, government policies and consumers' dinner plates through its massive size and aggressive tactics. It's time for governments around the world, starting with the United States, to take on this agribusiness giant's stranglehold on the food system. While consumers need to avoid Monsanto's products, we also need to demand that our government take the following actions:

Market Power

- The U.S. Department of Justice should investigate seed patent contracts with farmers and strengthen the guidelines used to evaluate seed company mergers to determine what effect the mergers had on the marketplace, farmers and consumers and take enforcement action, including divestitures, to address anticompetitive conditions.

Research

- Congress should use the Farm Bill to prioritize and fund research to further the public interest, rather than allowing companies like Monsanto to hijack the agricultural research agenda.
- The federal government should shift public research away from projects that culminate in private patents, giving money instead toward developing non-genetically engineered seeds that are distributed to farmers without patents and licensing fees.
- Congress should repeal the Bayh-Dole Act, which created an intellectual property regime that allows companies like Monsanto to dominate the agricultural research system.

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Genetically Engineered Crops

- The federal government should enact a moratorium on new approvals of genetically engineered plants and animals.
- Regulatory agencies including the USDA and the FDA should institute the precautionary principle for GE foods, and enact policy that would more rigorously evaluate the potentially harmful effects of GE crops before their commercialization.
- Congress should fund independent research into the health and environmental impacts of genetically engineered crops and mandate that public institutions are permitted to research patented biotech seeds to analyze yields, assess food safety and investigate potential environmental impacts by prohibiting companies like Monsanto from restricting research in their licensing agreements.
- The federal government should require mandatory labeling of GE foods, ingredients and animal products.
- The federal government should establish policy that shifts liability for GE contamination to seed patent holders such as Monsanto, rather than farmers who are economically harmed.

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