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GM(Oh No!)

When I was nine, I took my first trip to Los Angeles with my aunt. One particularly warm night, we were on the hunt for a restaurant in downtown, when we walked through a graffitied alleyway. Out of the sea of street art, one image stood out: The likeness of the Evil Queen from Snow White, holding out a poisoned apple. My aunt, upon sight of this, began laughing hysterically, and, out of curiosity, my cousin and I went in for a closer look. The image was certainly familiar, but one word was not--over the eyes of the witch, "MONSANTO" was harshly sprayed in red paint. Aunt Sarah then explained that Monsanto was a corporation that sold GMOs. I knew not what a GMO was, nor did I a corporation, but I nodded that I understood, assuming that I would never think of the witch, or the corporation, ever again.

However, as time goes on, genetic modification is becoming more and more a part of global culture. And not just in agriculture: the ideas of GMOs have even been picked up by pop culture. Crime television today is full of unbelievable, close-to-comedic plots, and even those are beginning to examine the global GMO crisis. For example: an evil, possibly psychotic man destroying over 90% of the world's food supply nearly instantly. NBC's popular thriller show, *The Blacklist*, explores this plot in an episode titled "Eli Matchett." In summary, Matchett, the villain, develops a super virus that destroys a specific type of genetically modified corn. As it turns out, that corn is responsible for the feeding of a good majority of the world's population,

and without it, a great number of people would die, sending the world into an apocalyptic chaos. Thankfully, the show's heroes are able to stop him before the virus is released, saving the globe from famine (Bokenkamp).

However, the most notable part of the episode is not the thrilling chase, the hidden subplots, or even the villain himself. It is, in fact, the investigation of the monoculture genetically modified organisms produce. Realistic society may not have the conspiracies and excitement of primetime TV, but it does share the prominence of GMOs. Despite the gratitude we may have towards TV's protagonists for saving us from starvation, they did not solve for any of the real-life negative impacts of GMOs. Genetically modified food, now more commonplace than natural organisms, creates a global agricultural system that is unsustainable and harmful to both health and livelihoods. Specifically, main impacts are decreased agricultural biodiversity, monoculture, the overuse of dangerous chemicals, and corporate threat to personal livelihood.

The use of genetically modified organisms as crops decreases the agricultural biodiversity of affected regions. They limit the number of crops that are grown, and the genetic variation within those crops. The Permaculture Research Institute states that, over the course of human history, we have eaten thousands of crops, but today, we eat mostly variations of genetically modified soy and corn (PRI). Furthermore, these crops are more genetically uniform. Jorge Cornejo of the USDA reports that in the U.S., 89% of corn and 94% of soy is genetically modified (Cornejo). Miguel Altieri of UC Berkeley adds that genetically modified foods will contaminate all other sources of food through cross-pollination (Altieri 365). In this way, naturally grown organisms cannot reproduce without being contaminated by modified plants. Thus, even well-meaning farmers cannot always choose to avoid the detriment of GMOs. This

monocultural approach to farming also causes harms to the soil. The International Journal of Environmental Studies states that, when only one crop is planted in soil repeatedly, it depletes the natural nutrients in the soil (Nicholls 24). In turn, this makes food less healthy in two ways. First, it decreases the nutrients in the crops. Second, the bad soil causes farmers to put more unnatural, synthesized fertilizers and pesticides into plants. The impact of these fertilizers is two-fold: in addition to adding chemicals to food, runoff from these chemicals gets into water supply as well as the atmosphere, contributing to pollution and climate change.

Greg Holder, former owner of a family farm and current wine man, has even larger worries about the chemicals now inclusive with GMOs. As I was interviewing him about his experiences with genetic modification, his healthy, beautiful daughters, ages four and six, played around us. Sadly, he explained that these amazing kids were the root of his stress: how will GMOs affect the world we are leaving our children? Holder is afraid that the pesticides used with GMOs will negatively affect their health, as well as that of their generation:

As GMOs began being used, one incentive to increase their planting was the idea that they wouldn't need pesticides. However, the decreased diversity of the plants didn't make it so that no pesticides were used, rather, it made it so that they were less susceptible to pesticides, and now, farmers use even more pesticides on their crops. They just spray them, and then they spray them again, and again... (Holder).

The negative impacts on humans of increased pesticide use can be detrimental: "ranging from short-term impacts such as headaches and nausea to chronic impacts like cancer, reproductive harm, and endocrine disruption," according to the Toxics Action Organization. In addition, Holder is right to specify his worries towards his daughter's generation: The organization

further that “Children are particularly susceptible to the hazards associated with pesticide use...The combination of likely increased exposure to pesticides and lack of bodily development to combat the toxic effects of pesticides means that children are suffering disproportionately from their impacts” (Toxic Action Center 2). Similarly, children living near pesticide-using farms are twice as likely to develop brain cancer than their peers, cited by a study done by the Agency for Toxic Substances and Disease Registry (Shim et. al 3). Greg reminds that in many foreign countries, companies are forced to test their pesticides and other chemicals before they are put into use, but here in the United States, the public must prove a health detriment before they are taken out of use. This means that the people are the test subjects: if we are able to prove something dangerous about a chemical, some of the population must have already seen that negative affect.

In addition to chemicals related to genetic modification, the lack of agricultural biodiversity in itself is extremely unhealthy. Prior to industrialization, humanity ate around 80,000 unique crops, rather than the mainly soy and corn that we now consume. The body is forced to live only off of the nutrients within these mono developed crops, in an unnatural way that does not successfully sustain a healthy lifestyle. When less food becomes available, as is currently occurring with monoculture, people have little to no choice in the crops they consume. The population is forced to eat modified, chemically altered crops, with the impact of getting less nutrition.

GMOs cause detriment to citizen’s livelihoods. Because GMO seeds are created in labs, they allow monopolies to be placed on them by the corporations that own those labs. Thus, corporations are in control of the jobs and income of many citizens. Farmers do not often have

the option of avoiding these seeds: The Center for Food Safety finds that Monsanto, DuPont, and Syngenta, major corporations, control over 53% of the global seed market (Barker 2). In addition, an attempt to avoid that 53% can be futile, as those farmers that do not grow genetically modified foods are targeted by corporations. Columbia University states that Monsanto alone has sued 410 farmers for patent infringement on genetically modified crops and won every single case (Lo 3). Not only are farmers forced to give their money to the corporations, but they are also mandated to disrupt healthy farming. The UN explains that the licensing of genetically modified foods forces farmers to grow them in monocultures (UNEP 1). Aforementioned negative effects of monoculture are thus mutually inclusive in the majority of modern farming.

Holder's experience with the agricultural industry spurred similar worries. He discussed his concerns for small-town farmers, like himself: "When these plants are put into use, it's so hard to tell what is and what isn't influenced by GMs." He furthered that this was bad for local farmers because, one, less people are inclined to buy their crops because they were more expensive, and two, when people do purchase their goods, it is becoming increasingly difficult for one to completely guarantee that seeds have not been modified.

A more specific farming fear of Holder's lies with the wine industry. Currently, Holder works in the design sector of Marilyn Wines, and he states that he has many woes for the interaction of GMOs and wine business. He says that in the status quo, wine grapes are not genetically modified, but it looks like the path towards that is inevitable. "Wines," Holder informed me, "are defined by the type of grape that they are made up of. If I sell you a Cabernet Sauvignon, I am guaranteeing that that wine is made of those grapes. Not only would people not get the same product if grapes were genetically modified, but it would become a legal issue." He

explains that wine producers are mandated to label the types of grapes that go into their wines, and that “with genetic modification, this would be nearly impossible to do.” Many people’s livelihoods reside on wine agriculture, and the increased use of GM crops has the potential to very nearly destroy this industry as it exists.

In addition to changing local livelihoods, poverty is increased by GM crops. As well as forcing farmers to purchase from corporations, including purchasing payments and the payment of royalties, GMO corporations harm foreign farmers. The International Fund of Agricultural Development finds that 1.4 billion people in poverty depend on agriculture for their livelihoods. This large group, one seventh of the world population, is greatly impacted by GMOs. For one, Emily Sellers of Cornell University writes that small farmers cannot compete with the enormous production of farms in the west, depriving them of their livelihoods (Sellers). Additionally, those that can sustain suffer economically, as Monsanto seeds are twice as expensive as conventional seeds (Food and Water Watch 14). Not only does the monocultural GMO industry harm livelihood, it also affects the culture and environment of many impoverished communities. FIAN International finds that monoculture forces the eviction of rural and indigenous people due to an increasing demand for land to grow food (Suarez et al 9). Millions of people have been violently expelled from their land by corporations in hope of producing more food. For example, the Rainforest Action Network reports that the genetically modified soy industry has evicted 100,000 small farmers from their land in Paraguay, abused farmers in Papua New-Guinea, and disrupted the culture and land of indigenous peoples in Brazil (Howard et al).

One can easily see that GMOs have amazingly large negative impacts: Monoculture, lack of diversity, pesticides, and livelihood are just a short summary. But when compared to other

issues of similar merit, it gets little attention from the general public. Though agroecologists have been studying the issues with modification since it began, it is now becoming so inclusive in food that those of us without a specialty in agriculture need to take a stand. In order to prevent the health issues and economic harms caused by GMOs, citizens as a whole need to oppose the huge corporations that hope to completely monopolize life through the ownership of food. A stance large enough to make an impact is one that would take a lot of effort, and education, which is why it is necessary that everyone, not just high school researchers, be well-versed on these issues and how they affect the entire globe.

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