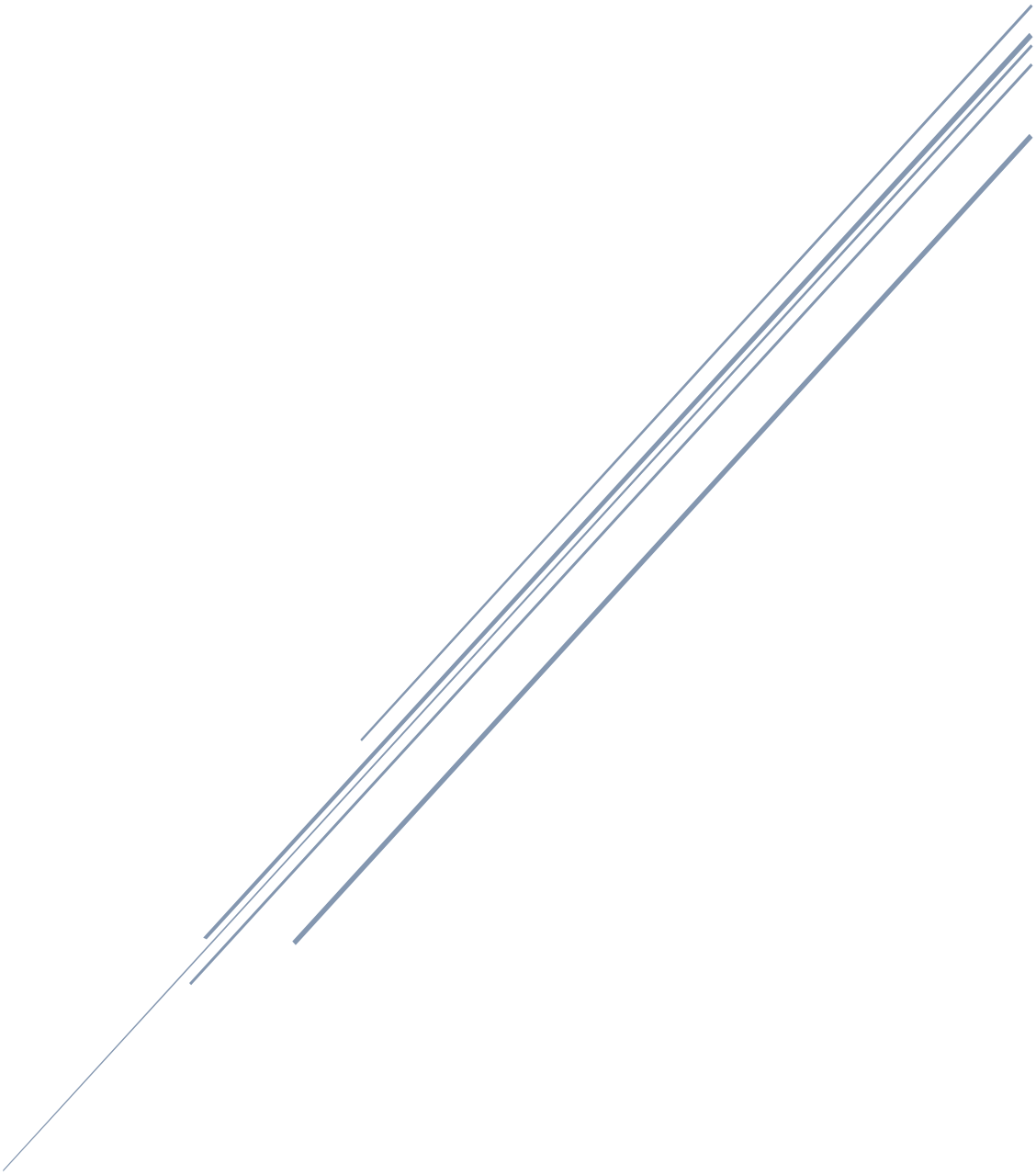
GLOBALIZATION IMPACTS

GMO's in Developing Countries



Nicole Kluck Dorset College
Academic Writing

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Introduction

Globalization is defined as extending to other or all parts of the world, the development of worldwide integration. Developing countries are considered as having a standard of living or level of industrial production below what's possible with financial or technical aid; a country that is not yet highly industrialized. (Dictionary, 2019) This essays purpose is to identify and describe the effects of when these two worlds are forced to come together through technological expanses in food and agriculture. Genetically Modified Organisms (GMO's) are scientifically altered organisms that do not occur naturally in nature. This has created a new range of diversity amongst the food industry that is seen as having positive and negative effects on a global scale, bringing up controversies as to whether this technology is safe to use. Contained there are discussions from GMO producers, and advocates, as well as scientists, activists, and studies to promote and demote the use of this technology. First described are the definitions, history and beginnings of genetic modification, along with some of the concerns to chemical use with this technology. Then evaluated, are summaries of interviews with several scientists promoting the use of GMO's in developing countries, while limited to several of them being GMO company employees. After, the oppositional stance opinions are given, along with the outcomes of public concerns and the impacts it is having on some communities, before finally exploring some of the newest GM technology hitting the market.

Background:

When it comes to genetically modified foods (GMO), some see it as the latest evil in biotechnology with potentially long-term detrimental effects. Others argue that for developing countries with high rates of hunger and poverty, GMO's are the best way to feed people where food is scarce, and growing conditions are harsh. But with no real evidence of increased crop production rate or plant quality/value some say that the extra costs of raising these crops can be futile. (Luis Herrera-Estrella, 2001)

GMO: Bio-technology defined:

GMO's began when science started altering the genetic patterns of plants, animals and microorganisms that didn't occur in nature through natural selection or pollination, bringing the terminology of genetically modified organisms, also referred to as Bio-technology, amongst other names. This process of scientific genetic combining allows selected traits to be

transferred from one species to another non-related species. These types of products are created with some types of gain in mind for the consumer nutritionally, and the producer monetarily. This is also intended to directly impact the farmer as a means of a subsidiary form of crop protection. Through genetic adaptation these crops can gain resistance from plant diseases caused from insects or viruses, or tolerance towards herbicides, used to moderate influx of unwanted plants or previous crops. (Organization, 2014)

GMO History:

Since the beginning of time nature has been selecting genetic traits, from wild animals choosing a mate, to our modern day, human influenced dog breeds. Bio-technology takes on a different stance. Nature selects its genetics from the same gene pool, scientific genetic engineering does not. This allows insect traits to become part of the genetic code in corn kernel. Beginning in the 70's, Monsanto scientist Mary Dell Chilton (following research from Belgian scientist Marc Van Montagu) first discovered that a bacterial strain could insert a piece of its own DNA into a plant cells genes. (News, 2013) This brought on precise plant breeding techniques by reducing the random assortment of genetic codes natural breeding caused, and also allowed scientists to insert a piece of information that killed or deterred a pest, into the code of a susceptible plant. In turn, insecticide (bug killer) use is reduced, creating higher yields at reduced expenses. Technology such as this, creates a shift in the natural forms of reproduction, to precise and controlled outcomes, not capable in nature.

Chemical Use:

However, critics have noticed that genetic modification for herbicide (weed/plant killer) has increased the pounds of chemical use. (News, 2013) The continuous use of herbicide made the very plants that farmers are trying to kill, immune to the chemicals themselves. Currently the agricultural profession is facing a crisis in which crops must be modified to withstand several different herbicides along with several applications due to plant immunity, leaving few known chemical compounds left for future treatments. (Kaskey, 2011) In turn, seeds spilled in the fields during harvest are able to sprout and produce seeds of their own the next year. Since monoculture crops deplete the soil quality, crop variety must be rotated every couple of years, resulting in seed contamination from two different crops, of which producers are docked payment immensely. These cases of multiple plant immunities lead to several

different applications from different types of herbicides, increasing overall exposure and expenses.

This high rate of chemical use is a growing concern to the health field as well. Recent studies have shown that traces of these chemicals are showing up in the food system, from cookies to breast milk, and could be linked to cancer, birth defects, and other diseases. (Samet, 2019) This has caused some to question the long-term effects this could have on public health.

Positive Effects on Developing Countries:

With the potential to positively influence a countries infrastructure, many believe that GMO crops are an important resource for under developed communities. According to Jeffrey Sachs (2006), director of the Earth Institute at Colombia University in 2006, investing in improved agriculture will improve the quality of life, thus beginning the process of economic development and unlocking the poverty trap. With bio-technologies, he claims GM crops could fortify nutrients in places where nutrient deficiencies are common. Furthermore, GM traits can be customized to protect against local pest infestations, and by using drought resistant varieties in arid climates, ultimately bring economic gain to the surrounding community. "Getting these technologies to the countries that need them should be seen as an investment and will create lively hood, income, and commercial agriculture where it didn't exist before."

Brazilian scientist, Elibio Rech, (2008) from the company Embrapa, also praises the infrastructure of GMO development. Not only are they interested in market commodities of corn, cotton and soy, but they are also working on the development of more local and lesser globally demanded products. He believes that in his country they need genetic engineering to solve problems that are not possible to solve through traditional methods. In addition, he stated that GMO's are "incredibly safe" due to strict regulations, ensuring environmental, animal, and human safety. "It's a way to develop products and give a free licence to countries that don't have as many resources…This will certainly help raise the standard for life quality on our planet."

Ademola Adenle, (2018) author and scientist, says that by 2050 the world population is expected to reach 9.8 billion, much of this population remaining in developing countries. He claims food production will have to increase by 70% in order to meet these population needs, and that bio-technology would have a key impact to making that happen. He additionally states

there is excessive opposition in Europe because GMO's are highly politicized, and that regulation is not based on scientific evidence and expertise, therefore undermining the application of GMO's in Africa. He additionally promoted local training of scientists to conduct regional research in order to help alleviate the local concerns of GMO safety. "Scientific evidence forms part of the decision-making process... Allowing the scientist to provide the kind of evidence to be used… is key to developing GMO policy. Developing countries have to invest in Research and Development."

GMO Concerns:

Not everyone believes that Bio-technology is safe. Hans Herren (2013) won the World Food prize in 1995 for using natural means to control pest outbreaks in Africa. He does not agree that GMO's are the best way to fight hunger because the root cause of food shortages has nothing to do with production. Likewise, GMO's are just a support system to the intensive forms of agriculture, and more research is needed on the health and environmental impacts.

"We need to change the paradigm. We're running out of fertilizer, which produces a lot of CO2, water is limited and will become more limited in the future. We have to find better solutions." (News, 2013)

Nnimmo Bassey (2011) from Friends of the Earth International, claims that food technologies have been a complete failure in developing countries. "GM farms are not spreading to new territories but staying in the same areas that are already growing them." Negative impacts are becoming more visible in some local areas, causing farmers to abandon crops before harvest. Nnimmo also states that GM production is not suitable for mixed cropping, small scale farming, as well as being highly dependent on chemical use, and doesn't provide any higher yield benefits than non-GM crops.

"The future of agriculture in the world… will not depend on industrial farming. It certainly will not depend on bio-technology. Small scale farming is what is going to feed the world, because of the diversity of seeds…[and] cultural appropriate[ness]… suited to the environment." (GM crops a failure in developing countries, says Friends of the Earth, 2011)

Furthermore, some add that there is already enough food produced in the world to feed underdeveloped areas, and the vast majority of GM crops are used for feeding livestock,

processed food, and bio-fuel, resources of which are not easily accessible in underdeveloped countries. (Council, 2014)

Opposition to GMO's among the producers and consumers is also spreading globally. In the Philippines, protesters uprooted a test plot of GM rice. (News, 2013) Poor farmers in India were committing suicide due to their debt and lack of turnover in their GMO investments. (Council, 2014) Consumers are protesting with their wallets as well with growing concerns of safety, and the perception that modern biotechnology is leading to the creation of new species. (Organization, 2014). A study in France showed that as many as 35% of shoppers were not willing to purchase products with GM ingredients. (Noussair, 2004) In the United States, consumers were demanding mandatory labelling of GMO ingredients in all products. (Hemphill, 2015) Farmers are concerned as well, since these crops are patented and give all intellectual property rights to the bio-technology seed owner. (Organization, 2014) Trade regulations also bring concerns. Some countries have little to no regulation, while others have high restrictions on GMO imports, bringing focus to consumer health, environmental risk, as well as labelling and testing. This opposition debate varies across regions but is specific to each country's needs and concerns.

New GMO Advances:

Recently in the Biotechnology world, there is growing development in the creation of laboratory cultured animal-based products for the market. Vladimir Mironov, (Pooley, 2006) a professor at the Medical University of South Carolina, has been working on a meat making device.

Let's say tomorrow you want to have a hamburger with 30% lamb, 10% pork and 20% turkey, but you only want 3% fat. You would select all of these cells from the freezer, attach the cells to the steroids in the bioreactor and go to bed. In the morning, you'll have a fresh, juicy hamburger.

JUST, an American based company in California, has been selling non-animal products since 2013, and has been pushing to put lab grown animal tissue on the market at retail prices. CEO, Joshua Tetrick, says "The food system needs to start over," and that he wants to focus on "…Feed[ing] as many people as I can, every day, a little bit better." (2018) While economic feasibility is the current biggest hurdle for this type of production, the potential to feed a growing, hungry population without the animal infrastructure, is appealing to some.

Conclusion:

From the information given, we can see that there is confliction in how this globalizing technology is impacting developing countries. The future outcomes on humans and the environment from this type of unnatural genetic development has yet to be fully understood. With some arguments from bio technology company employees stating that this type of technology is essential for creating economic growth in poverty susceptible areas, it is a sense of humanitarianism that seems to encourage GMO access to be made available to the people and places that potentially need it most. But with the growing number of concerns being expressed through examples of dangerous long-term health and economic studies, it's understandable as to why so many countries are opposed to the introduction of such things.

With my knowledge of the growing influx of research on natural methods of crop protection, I believe, that the future of agriculture will change over time. Challenging conventional farming practices with small scale, holistic and regenerative means would create little to no need for genetically altered plants as well as reduce, or eliminate, the need for chemicals.

The development of laboratory cultured meats I believe could go down the same path as GM crops and turn into a mine field of health and economic concerns. I also would be concerned of the potential regeneration of animals and their by-products no longer of today's existence, along with the unforeseen diseases and consequences that may develop with them.

Bibliography

Ademola Adenle: GMOs in Developing Countries. 2018. [Film] s.l.: ROCKYMEDIA.

Council, W. F., 2014. *CHOICE OF MONSANTO BETRAYS WORLD FOOD PRIZE PURPOSE, SAY GLOBAL LEADERS.* [Online]
Available at:
http://www.geneconserve.pro.br/excerpts2014/TheWorldFutureCouncil_WorldFoodPrize2013.pdf
[Accessed 16 August 2019].

Dictionary, 2019. *Dictionary.* [Online]
Available at: https://www.dictionary.com/browse/globalization
[Accessed 16 August 2019].

GM crops a failure in developing countries, says Friends of the Earth. 2011. [Film] s.l.: The Guardian.

GM Crops Deliver Benefits for Farmers, Especially in Developing Countries. 2008. [Film] Brazil: Monsanto.

Hemphill, T. A. a. B. S., 2015. 'Genetically Modified Organisms and the U. S. Retail Food Labeling Controversy: Consumer Perceptions, Regulation, and Public Policy'. *Business & Society Review,* 120(3), p. 435–464.

Jeffrey Sachs Discusses Pros of Genetically Modified Foods. 2006. [Film] s.l.: BiotechGMO.

Kaskey, J. a. E. J. E., 2011. 'The Superweed Strikes Back'. *Bloomberg Businessweek,* Issue 4245, p. 21–22.

Lab-Grown Meat Is Coming to Your Supermarket. Ranchers Are Fighting Back.. 2018. [Film] s.l.: ReasonTV.

Luis Herrera-Estrella, A. A.-M., 2001. Genetically modified crops: hope for developing countries?. *NCBI,* 2(4), pp. 256-258.

News, V., 2013. *GMO Pioneers Win World Food Prize,* Washington: VOA News.

Noussair, C. R. S. a. R. B., 2004. Do Consumers Really Refuse To Buy Genetically Modified Food?. *Economic Journal,,* 114(492), pp. 102-120.

Organization, W. H., 2014. *FAQ on GMO.* [Online]
Available at: https://www.who.int/foodsafety/areas_work/food-technology/faq-genetically-modified-food/en/
[Accessed August 2019].

Pooley, E., 2006. How to Grow a Steak. *Canadian Business,* 79(13), p. 44.

Samet, J. M., 2019. Expert Review Under Attack: Glyphosate, Talc, and Cancer. *American Journal of Public Health,* 109(7), pp. 976-978.

Webster, 2019. *Merriam-webster.com.* [Online]
Available at: https://www.merriam-webster.com/dictionary/noise
[Accessed june 2019].