

Forum: The Environment Commission

Issue: The role and permissibility of genetically modified crops as a means of combating poverty and starvation

Student Officer: Arian Hosseini

Position: Deputy President



Introduction

The issue regarding genetically modified crops is of immense importance and utmost relevance. Due to a growing population, humanity collectively moves towards a critical point where our consumerist culture intersects with our ability to produce enough edible food items. Our choices are clear: either we have to increase crop cultivation or reduce the amount of food wasted. It appears we've chosen to do neither, prompting us to explore the potential of genetically modified crops.

GM (Genetically modified) products are highly controversial in the current market. Numerous people distrust and refuse to consume GM products due to the uncertainty surrounding the products and the widespread theories connecting genetic modification with possible cancerous growths and potential mutagenic side-effects. These dangerous health effects have been documented throughout history, in numerous studies. For instance, GM crops have shown substantial health benefits, such as exceptionally increasing nutrient supply and lowering the mortality rate from vitamin deficiency-related illnesses by up to 49%¹. The consistent consumption of GM foods has been linked with many damaging health effects, simultaneously with the heightened risk of various cancers including but not limited to: liver, thyroid, kidney and bladder cancers.²

Genetically modified crops have had their potential benefits recognized by developing countries since they account for 38%³ of the global GM cultivation land, despite the continual controversy surrounding them. The percentage of people who are below the boundary for famine sit at around 9.3%⁴ as of 2020. The aforementioned number can easily be decreased with the future cultivation of GM crops. Currently, about 18% of the planet's population lives beneath the international poverty line.⁵ If that number were to

¹ ScienceDirect <https://www.sciencedirect.com/science/article/pii/S1871678410005364>, Accessed 27.11.2023

² Journal of Organic Systems

https://www.farmlandbirds.net/sites/default/files/JOS_Volume-9_Number-2_Nov_2014-Swanson-et-al.pdf, Accessed 27.11.2023

³ Science direct <https://www.sciencedirect.com/science/article/abs/pii/S0958166906000346>, Accessed 4.12.2023

⁴ Our World In Data <https://ourworldindata.org/hunger-and-undernourishment>, Accessed 4.12.2023

⁵ Relief Web (OCHA)

<https://reliefweb.int/report/world/global-multidimensional-poverty-index-2023-unstacking-global-poverty-data-high-impact-action#:~:text=According%20to%20the%202023%20release.of%20every%20six%20poor%20people>, Accessed 4.12.2023

be put into perspective, 18% is around 1.1 billion people. The cultivation of GM plants could prove to be of life-or-death importance to hundreds of millions of people.

The ability of GM crops to have one or more beneficial traits such as herbicidal tolerance, insect resistance, and nutritional improvement is what makes them useful. Since expensive fertilizer, insecticides, and various agricultural machinery are all necessary to vastly increase crop output and growth⁶, it is difficult for LEDCs (less economically developed countries) to produce enough crops to feed their populations. The main cause of this is the lower quality of their yields when compared to other more industrialized nations. The absence of useful instruments used to increase crop yields stunts not only the economic growth of said countries, but also creates a void in food production which large multinational corporations will inevitably fill.

Definition of Key Terms

Genetically modified organism

GMOs (Genetically modified organisms) are those whose genetic material has been altered using genetic engineering techniques. GMOs refer to crops that have had their DNA modified to improve their shelf life, pest resistance, herbicidal tolerance and so on. Said modifications can be achieved via various ways of gene manipulation e.g. electroporation, gene gun and CRISPR-Cas enzyme usage. These organisms are often modified to create new varieties of plants that exhibit characteristics not common in nature.⁷

Biodiversity

Biodiversity is the variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. The term includes diversity within species, between species and ecosystems.⁸

Gene pool

A gene pool refers to the combination of all the genes, including alleles, present in a reproducing population or species. A large gene pool has extensive genomic diversity and is better able to withstand environmental challenges.⁹

⁶ Board works

<https://cpb-eu-w2.wpmucdn.com/edublog.mgfl.net/dist/a/14/files/2015/05/Farming-in-LEDCs-zalvzh.pdf>, Accessed 28.11.2023

⁷ National Human Genome Research Institute

<https://www.genome.gov/genetics-glossary/Genetically-Modified-Organism>, Accessed 30.11.2023

⁸ Institute of Terrestrial Ecology

<https://www.eea.europa.eu/publications/92-9167-077-4/download#:~:text=The%20Convention%20on%20Biological%20Diversity,between%20species%20and%20of%20ecosystems>, Accessed 30.11.2023

⁹ National Human Genome Research Institute

<https://www.genome.gov/genetics-glossary/Gene-Pool#:~:text=Definition,able%20to%20withstand%20environmental%20challenges>, Accessed 30.11.2023

Mutagen

A mutagen is a chemical or physical agent capable of inducing changes in DNA called mutations. Examples of mutagens include tobacco products, radioactive substances, x-rays, ultraviolet radiation and a wide variety of chemicals.¹⁰

Sustainable agriculture

Sustainable agriculture is a way to approach farming. Sustainable agriculture tries to meet the demand for food without compromising the ability of future generations to meet their own needs. Sustainable agriculture seeks to keep or improve soil fertility, conserve water resources, minimize the use of synthetic pesticides and fertilizers, promote local biodiversity, and ensure the fair treatment of farm workers while further promoting irreplaceable and productive farming systems.¹¹

Subsistence Farming

Subsistence farming is the cultivation of crops and livestock in order to provide for the basic needs of the farmer and his/her family, without producing surpluses that can be sold at markets for a profit.¹²

Cultivation

“Cultivation, in agriculture and horticulture, the loosening and tilling up of the soil or, more generally, the raising of crops. The soil around existing plants is cultivated by hand using a hoe or by machine using a cultivator to destroy weeds and promote growth by increasing soil aeration and water infiltration.”¹³

Background Information

Poverty and famine is a real problem that many face even in the current technologically diverse and hastily globalizing society we live in. Even with more advanced countries producing millions of tons of food waste each year¹⁴, we have many countries that struggle with achieving the bare minimum of being able to feed their own population. In 1983, humanity started becoming more familiarized with the ability to genetically modify¹⁵ certain foods to better suit mankind. Ever since the usage of genetic modification became more mainstream, more and more companies have begun finding advantages in

¹⁰ National Human Genome Research Institute
<https://www.genome.gov/genetics-glossary/Mutagen#:~:text=A%20mutagen%20is%20a%20chemical.a%20wide%20variety%20of%20chemicals>, Accessed 30.11.2023

¹¹ Wikipedia https://en.wikipedia.org/wiki/Sustainable_agriculture, Accessed 30.11.2023

¹² Oxford Reference
<https://www.oxfordreference.com/display/10.1093/oi/authority.20120106120454326#:~:text=Cultivation%20of%20crops%20and%20livestock.can%20be%20sold%20at%20market>, Accessed 30.11.2023

¹³ Britannica <https://www.britannica.com/topic/cultivation>, Accessed 7.12.2023

¹⁴ Feeding America
<https://www.feedingamerica.org/our-work/reduce-food-waste#:~:text=How%20much%20food%20goes%20to.is%20thrown%20away%20each%20year>, Accessed 7.12.2023

¹⁵ National Library of Medicine
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5790416/#:~:text=In%20agriculture%2C%20the%20first%20GM.GM%20tobacco%20for%20virus%20resistance>, Accessed 7.12.2023

genetically modifying their products to achieve greater profits.

In 1994, the first consumable genetically modified product was released for public consumption after being cleared for usage by regulators. The product was named the “FLAVR SAVR”, a tomato created by the Californian company Calgene¹⁶. The tomato resolved a common problem among fresh tomatoes at the time, with its extended freshness and shelf life. The tomato produced enzymes internally which tremendously extended the amount of time it took for the fruit to rot. FLAVR SAVR’s production, however, did not last for long. The fruit had problems with its cell walls: They would break down faster, making the fruit softer and more susceptible to fungal infections. This is when widespread misinformation about GMOs began spreading.

After the creation of many labeling mandates, stricter laws to abide by when cultivating and inflexible rules regarding the production and purchasability of GMO seeds.¹⁷ While larger corporations fight to make genetic engineering within plants easier to do and pass onto the markets, smaller scale farmers struggle with the cultivation of basic plant seeds. While the amount of people suffering from hunger became less and less, the amount of land used for agricultural purposes jumped from 39% to 44%.¹⁸ The question of today lies within the reason of how can a country with almost half of its land dedicated to agriculture barely be able to provide enough food to be able to sustain itself?

Ensuring the safe implementation of genetic modification across diverse crop varieties

The problem with the implementation of genetic modification is the strict rules private companies must abide by to ensure consumer safety. The safety of GM products also stems from the specificity of crops modified on and which genes were affected. With our limited knowledge we can accidentally create totally new potentially harmful proteins that could prove to be detrimental to the genetic makeup of the plant, just by editing one even one codon in the DNA sequence of a plant. To ensure the safety of genetic engineering member states themselves are tasked with keeping the products within safe standards. Countries in the EU (European Union) are tasked with double checking their results with the EFSA (European Food and Safety Authority).¹⁹ This is the reason why when talking about GMOs and their implementation, the EU is used as an example. While many see the various restrictions of the EU as “disgraceful”²⁰, while many other countries see them as a future

¹⁶ Wikipedia https://en.wikipedia.org/wiki/Flavr_Savr, Accessed 7.12.2023

¹⁷ Euractive

<https://www.euractiv.com/section/agriculture-food/news/new-legal-basis-may-lead-to-stricter-rules-for-gmos-in-seeds/>, Accessed 7.12.2023

¹⁸ The World Bank <https://data.worldbank.org/indicator/AG.LND.AGRI.ZS?locations=ZG>, Accessed 7.12.2023

¹⁹ European Food and Safety Authority <https://www.efsa.europa.eu/en/topics/topic/gmo>, Accessed 7.12.2023

²⁰ European Commission

https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13119-Legislation-for-plants-produced-by-certain-new-genomic-techniques/feedback_en?p_id=26519622, Accessed 7.12.2023

blueprint for the rest of the civilized world.

The effects of genetically modified crops on human health

Although there have been limited findings on actual health risks, the existence of them mustn't be crossed out.²¹ The largest concerns that have been brought up regarding GMOs has been the possibility of the crops to induce allergic reactions, raising the ability of bacteria to fight against antibiotics more efficiently and questions whether the toxins created within the fruits to combat rotting for example, will harm human health or not.²² Thankfully the regulatory oversight that the WHO, EFSA, FAO and other organizations provide minimize the risks attached to GMO cultivation. These organizations conduct risk assessments²³ which include the evaluation of allergenicity, toxicity, and nutritional composition. While many studies support the cause and idea of GMO cultivation the skepticism of man has created conflictive ideas and differing opinions in the public eye.

The potential of economic impact due to the production of genetically modified crops

The economic impact of GM crops can stem from their hefty starting price. However, the modified affinities reduce the production cost of said plants which also lowers the price of food products internationally, providing a positive impact for consumers. This lowers the price of food products internationally.²⁴ The development of the current food product market would be hefty in size, GM crops open new doors to better exportation abilities and availability to newer markets. The potentially improved qualities of the foods adds to their ability to reach markets previously left untapped. Effects of GMO products on local farmers should not be left unseen though. While farmers may benefit from the adoption of GM crops due to their ability to grow more efficiently, reducing the production costs. Questions get raised about the potential dependency of farmers on seed companies and their ability to hike up the prices.²⁵ In turn, making the production more expensive yet again. Moreover, the growth of the biotechnological side of the industry will inevitably grow due to the growing interest in GM products.

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²¹ Harvard University <https://sitn.hms.harvard.edu/flash/2015/will-gmos-hurt-my-body/>, Accessed 7.12.2023

²² Government of Netherlands <https://www.government.nl/topics/biotechnology/antibiotic-resistant-gene>, Accessed 7.12.2023

²³ Food and Agriculture Organization of the United Nations <https://www.fao.org/documents/card/en?details=CB8375EN>, Accessed 7.12.2023

²⁴ Alliance for Science <https://allianceforscience.org/blog/2021/12/developing-countries-pay-hefty-price-by-restricting-gmo-crops-new-research-shows/#:~:text=%E2%80%99CGMOs%20have%20contributed%20to%20reducing.benefit%20from%20overall%20lower%20prices>, Accessed 7.12.2023

²⁵ National Sustainable Agriculture Coalition <https://sustainableagriculture.net/blog/farmers-trapped-in-unsustainable-cycle-by-biotechnology-seed-consolidation/>, Accessed 7.12.2023

²⁶ European Parliament <https://www.ecologic.eu/7979>, Accessed 7.12.2023

Major Countries and Organizations Involved

World Health Organization

The WHO (World Health Organization) is the sole group that can internationally accept or deny the usage of GM products. As per status quo, the WHO supports the usage of GM products and sees their value in the foods of the future. The WHO has stated previously that GM crops can contribute positively to food production, sustainability, nutritional content, and food availability, especially in regions facing food insecurity and malnutrition. However, the WHO has also emphasized the need for each crop to be assessed individually for the safety of potential consumers before its introduction into the market.²⁷ The WHO does actively promote the need to evaluate potential risks and benefits associated with GM crops, encouraging testing to ensure their safety for human health and the surrounding environment.

Greenpeace

Greenpeace has mentioned that they feel that GMOs have had a negative effect on modern agriculture, human health, and the environment. Greenpeace opposes both the use of pesticides simultaneously with GMOs and GMOs themselves. Greenpeace claims that growth in usage of pesticides is the result of genetically engineered crops, which also promotes an unsustainable, chemical-intensive farming system. Greenpeace also promotes openness about the use of GMOs in food products. Greenpeace opposes large agricultural businesses' control of seeds and advocates for obligatory labeling on all GM products. They argue that the current style of management poses a danger to farmers' independence and the diversity of food supplies.²⁸

Friends of the Earth International (FOEI)

The FOEI generally opposes the usage of genetic modification in agriculture.²⁹ The FOEI has brought concerns about the environmental, social and economical impact of GMOs into the limelight. Their mentioned worries include biodiversity loss, potential risks to human health, concentration of seed control by large international companies and genepool variety constriction. The FOEI advocates for sustainable agriculture and supports traditional farming methods to GMOs. The FOEI believes that the current GMO market is extremely exclusive by mentioning that non-GM stakeholders in the food industry will pay for all measures to secure their GM-free status creating an unfair field for them.³⁰

European Union (EU)

The EU allows GMO cultivation by respecting the sovereignty of each member state³¹. However,

²⁷ World Health Organization <https://www.who.int/news-room/questions-and-answers/item/food-genetically-modified>, Accessed 30.11.2023

²⁸ Greenpeace <https://www.greenpeace.org/usa/sustainable-agriculture/issues/gmos/>, Accessed 4.12.2023

²⁹ Friends of the Earth International https://www.foei.org/wp-content/uploads/2020/12/gm_decade1.pdf, Accessed. 4.12.2023

³⁰ Friends of the Earth International https://www.foeeurope.org/sites/default/files/publications/foee_socio_economic_effects_gmos_0311.pdf, Accessed 11.12.2023

³¹ European Food Safety Authority <https://www.efsa.europa.eu/en/topics/topic/gmo>, Accessed 4.12.2023

the EU has made it mandatory for each member state to label GM products visibly, acknowledging the consumer.³² The EU itself has been somewhat neutral towards laws regarding GMOs, keeping in mind that as of 2018, non GM crop cultivation was reduced to a minority within the EU.³³ All GMO producers in Europe must follow a procedure which includes thorough risk assessment by the EFSA (European Food and Safety Agency).³⁴ Europe has made their rules around the production of GMOs stricter due to the widespread negativity of the public regarding GMOs in Europe.

Timeline of Events

Date (start - end)	Name	Description
1972-1974	The possibility of producing recombinant DNA was found	In a series of experiments between 1972 and 1974 Stanley Cohen and Herbert Boyer developed techniques that formed the basis of recombinant DNA technology. ³⁵
1982	The commercial usage of the first GMO was approved	The FDA approves the first consumer GMO product developed through genetic engineering, human insulin to treat diabetes. ³⁶
May 21 st , 1994	The first consumable GM food was introduced onto the market	The FDA approved the sale of the first genetically modified food, the FLAVR SAVR tomato, deeming it as safe as conventionally-bred tomatoes. ³⁷
1990s	A wave of GM products hit worldwide shelves	The first wave of GMO produce created through genetic engineering becomes available to consumers: summer squash, soybeans, cotton, corn, papayas, tomatoes, potatoes, and canola. ³⁸

³² European Commission

https://food.ec.europa.eu/plants/genetically-modified-organisms/traceability-and-labelling_en, Accessed 4.12.2023

³³ National Library of Medicine <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7553740/>, Accessed 4.12.2023

³⁴ European Commission

https://joint-research-centre.ec.europa.eu/scientific-activities-z/gmos_en#:~:text=Food%20and%20feed%20made%20from.provided%20by%20the%20applicant%2C%20i.e., Accessed 13.12.2023

³⁵ National Museum of American History

[https://americanhistory.si.edu/collections/object-groups/birth-of-biotech/recombinant-dna-in-the-lab#:~:text=Description%20\(Brief\)-.In%20a%20series%20of%20experiments%20between%201972%20and%201974%20Stanley.birth%20of%20the%20biotechnology%20industry](https://americanhistory.si.edu/collections/object-groups/birth-of-biotech/recombinant-dna-in-the-lab#:~:text=Description%20(Brief)-.In%20a%20series%20of%20experiments%20between%201972%20and%201974%20Stanley.birth%20of%20the%20biotechnology%20industry), Accessed 4.12.2023

³⁶ The Food & Drug Administration

<https://www.fda.gov/food/agricultural-biotechnology/science-and-history-gmos-and-other-food-modification-processes#:~:text=1973%3A%20Biochemists%20Herbert%20Boyer%20and.human%20insulin%20to%20treat%20diabete>, Accessed 4.12.2023

³⁷ National Human Genome Research Institute

<https://www.genome.gov/25520336/online-education-kit-1994-flavr-savr-tomato#:~:text=The%20FDA%20approved%20the%20sale.%2D%20marketed%20by%20Calgene%2C%20Inc.>, Accessed 4.12.2023

³⁸ The Food & Drug Administration

<https://www.fda.gov/food/agricultural-biotechnology/science-and-history-gmos-and-other-food-modification-processes#:~:text=1973%3A%20Biochemists%20Herbert%20Boyer%20and.human%20insulin%20to%20treat%20diabete>, Accessed 4.12.2023

Oct 18 th , 2003	The UN creates the first resolution on GMOs, creating guidelines for their usage.	The World Health Organization (WHO) and the Food and Agriculture Organization (FAO) of the United Nations develop international guidelines and standards to determine the safety of GMO foods. ³⁹
Aug 2013	CRISPR-Cas used to engineer plant genomes.	The usage of more advanced gene editing using the CRISPR-Cas9 enzyme gains increased attention for the potential in precision breeding, allowing for more targeted genetic modifications.

Relevant UN Treaties and Events

- The Convention on Biological Diversity, 22 May 1992, **(A/RES/64/203)**⁴⁰
- The Cartagena Protocol on Biosafety, 29 January 2000⁴¹
- The International Plant Protection Convention, 6 December 1951⁴²
- International Treaty on Plant Genetic Resources for Food and Agriculture, 29 June 2004⁴³
- World Food Summit, first summit in 1974, 5-16 November⁴⁴
- International Symposium on Agricultural Biotechnology for Sustainable Productivity and Food Security, 15-17 February 2016⁴⁵

Previous Attempts to solve the Issue

There have been very few attempts to bring up the issues regarding hunger and starvation in countries with struggling populations. However, as time has passed, genetically modified products have become a larger point for countries to speak about. Non-governmental organizations such as the Alliance for Science have tried to develop a plan for peace in lower-income countries that strive for the chance at utilizing genetic modification in their agricultural practices.⁴⁶ The initial objective was the removal of fear-mongering misinformation and

³⁹Food and Agriculture Organization of the United Nations

<https://www.fao.org/faolex/results/details/en/c/LEX-FAOC041254/>, Accessed 4.12.2023

⁴⁰ United Nations <https://www.un.org/en/observances/biological-diversity-day/convention>, Accessed 7.12.2023

⁴¹ EUR-Lex

<https://eur-lex.europa.eu/EN/legal-content/summary/convention-on-biological-diversity-cartagena-protocol-on-biosafety.html#:~:text=The%20Cartagena%20protocol%20to%20the.%2F2003%20%E2%80%94%20see%20summary>, Accessed 7.12.2023

⁴²The International Plant Protection Convention <https://www.ippc.int/en/>, Accessed 7.12.2023

⁴³ Food and Agriculture Organization of the United Nations <https://www.fao.org/plant-treaty/en/>, Accessed 7.12.2023

⁴⁴ World Food Summit <https://wfs.dk/>, Accessed 7.12.2023

⁴⁵ Food and Agriculture Organization of the United Nations

<https://www.fao.org/publications/card/en/c/59ee08cf-c007-4818-8b91-016670d79bfc/>, Accessed 7.12.2023

⁴⁶ The Alliance for Science

<https://agbiotech.ces.ncsu.edu/what-are-some-solutions-to-the-problems-regarding-gmos-presented-by-the-public-s>

the dissemination of factual information from reliable sources. This effort aimed to counteract the false claims surrounding the process and outcomes of genetic modification.

The process of counteracting misinformation is one long-lasting uphill battle. Adopting a slow and ineffective approach to solving the issue could hinder feeding millions. Instead, targeting other more effective parts of the issue such as assuring the safety of the product, raising producer reliability and making GM products more available would work better in favor of the end goal.

Countries such as India have banned the usage of GMOs despite 16.6% of India's population being beneath the starvation line.⁴⁷ Many countries in the east and in the African peninsula have either banned or heavily restricted the usage of genetic modification on their food products.⁴⁸ Even though these same countries are mass exporters of GM cotton and other such crops.⁴⁹ Many potential ways to solve hunger have all been shot down by the general public and by extent, the governing bodies themselves.

In 2001, the Codex Alimentarius Commission⁵⁰ agreed that all GMO products should have testing done on them and governments must give their approval before the product can enter the local markets.⁵¹ This additional step in allowing GM products has proven itself to be highly beneficial. Not only has the decision raised societal acceptance of GM products, it has also created the possibility of broader market access.

Possible Solutions

Sub Topic 1: Ensuring the safe implementation of genetic modification across diverse crop varieties

More comprehensive safety assessments of products

The most practical way to ensure the safe implementation of genetic modification would be to either create a governing body or to assign the responsibility of overseeing the international use

[uch-as-labeling-packaging-on-foods-contamination-allergies-and-disease-from-consuming-gmos/](#), Accessed 7.12.2023

⁴⁷ Global Hunger Index <https://www.globalhungerindex.org/india.html>, Accessed 13.12.2023

⁴⁸ Centre For Science and Environment

<https://www.cseindia.org/unlawful-entry-illegal-gm-in-our-food-8909#:~:text=Foods%20produced%20from%20genetically%20modified,foods%20in%20India%20so%20far>, Accessed 13.12.2023

⁴⁹ Research Outreach

<https://researchoutreach.org/articles/genetically-modified-cotton-how-changed-india/#:~:text=The%20effects%20of%20Bt%20cotton.-The%20effects%20of&text=One%20study%20suggests%20that%20genetically.increased%20farmer%20profits%20by%2068%25>, Accessed 13.12.2023

⁵⁰ Codex Alimentarius <https://www.fao.org/fao-who-codexalimentarius/en/>, Accessed 7.12.2023

⁵¹ United Nations <https://news.un.org/en/story/2001/07/7512>, Accessed 7.12.2023

of genetic modification in crops to an already existing agency. The fact of the matter is that private companies and individual member states cannot be fully trusted to act in an unbiased manner due to the underlying benefits stemming from their ability to govern their own actions regarding and achieve certain advantages and benefits. Companies will always strive to minimize their losses and maximize their profits, which is exactly why giving the power to govern over the GM of crops should be added to bodies such as the FAO (Food & Agriculture Organization) or the WHO (World Health Organization).

Better education and training

Providing better education to new farmers who think about using GM seeds will with utmost certainty lessen the improper usage and distribution of cultivated plants or fruits. The largest problem with GM use is the potential introgression of the transgenes slowly seeping into the natural landscape, impacting the genepool and gene flow causing large losses of biodiversity.⁵² The best solution to combat such a haphazard occurrence would be to either promote better education regarding GM agriculture or creating certain thresholds for the genetic acclimation of the local environment which producers would have to meet. Having less-educated farmers become better educated on their potential future endeavors in the GMO field would definitely lower the percentage of misuse within the industry in the future and lessen the overall fear of GMO products.

Sub Topic 2: The effects of genetically modified crops on human health

Promoting further research and overall monitoring

While the effects of GM crops on human health are variable, the constant research and monitoring of transgenic progression within the genes of said plants must be well documented. The current problem many face is the lack of history that has come with GMOs. Further research will allow us to thoroughly understand the genetic activity, genetic change and possible effects such plants might have on human health. Constant monitoring allows us to take more precise actions in locating the problematic areas in certain GMOs if some kind of outbreak does happen. Promoting these procedures facilitates deeper understanding of genetic modification, possible outcomes of use and practicality of genetic modification on organisms.

Clear labeling of genetically modified products

The most widespread problem regarding GM products is the labeling. While many private companies try to claim that GMO labeling will feed into the misinformation many customers might

⁵² National Library of Medicine

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6343535/#:~:text=Concerns%20about%20environmental%20risks%20of.resistance%20and%20loss%20of%20biodiversity>, Accessed 7.12.2023

have. They further claim this would lessen their potential income putting them in unfair disadvantages in the international market.⁵³ This However, goes against the consumers international right to know what they might be consuming. Clear labeling of GM foods allows consumers to evaluate their purchases based off of the organicness of said products. The right to know what is being consumed is something that mustn't be infringed upon as so is pledged in the right to be informed on products being bought. Many producers enter so called "gray areas" of labeling due to the alleged cost of said labeling and packaging production.⁵⁴ In any potential solutions, the clear labeling of GM products should be heavily discussed and the rights of the consumer mustn't be forgotten.

Sub Topic 3: The potential of economic impact due to the production of genetically modified crops

Providing support to small-scale/local farmers

The reality of the situation is that large international companies have the funds and technology for advanced genetic modification usage on their pre-existing infrastructure of products. On the other hand, small-scale farmers have more difficulties to face if they wish to cultivate GMOs. By offering better education, proper training and the right resources to local farmers we create the possibility of them effectively utilizing GM seeds. By doing this, it will be ensured that the smaller-scale farmers will be able to benefit from increased yield, reduced production costs and larger market availability. Providing support also promotes a stable way for smaller scale farmers to start the cultivation of GM crops. This will also benefit lower income countries due to their restricted amount of funds at use when compared to other more capable countries and companies.

Incentivizing innovation in the field

Many smaller farms stray away from utilizing the possibilities offered by the GMO market because of the high starting cost.⁵⁵ However, if the cultivation of GM crops were incentivized by e.g. tax breaks, subsidies and other possible incentives, there would most likely be scale up the current market by enormous margins. Not only would local farmers be further incentivized into growing GMOs, but the cultivation of said GM products would also break into multiple smaller markets as well. This then would prevent the possible monopolization of the current production of GM foods.

⁵³ Canadian Biotechnology Action Network

<https://cban.ca/gmos/issues/labelling/labelling-arguments/#:~:text=Arguments%20against%20labelling%2C%20and%20responses&text=Many%20consumers%20are%20misinformed%20about.inform%20consumers%20about%20GM%20foods>, Accessed 7.12.2023

⁵⁴ Harvard Political Review <https://harvardpolitics.com/food-fight-the-debate-over-gmos-and-food-labeling/>, Accessed 14.12.2023

⁵⁵ US Department of Agriculture

<https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=106785#:~:text=Despite%20their%20higher%20cost%2C%20GM.the%20need%20for%20insecticide%20applications>, Accessed 7.12.2023

Further enriching the international economy by allowing competitiveness within the future financial state of the GMO cultivation field.

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