

# Vancouver Youth Model United Nations 2021



UNEP

Background Guide





## VANCOUVER YOUTH MODEL UNITED NATIONS 2021

### **United Nations Environment Programme**

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Dear delegates,

My name is Jessica Zhang and I am beyond honoured to serve as your director of the United Nations Environmental Programme for VYMUN 2021. Throughout the conference, I will make it my utmost priority to ensure a positive, engaging, and inclusive environment for delegates with all levels of experience. The topics we will be debating are: The Environmental Impact of the Fast Fashion Industry and Sustainable Agriculture in the Face of a Growing Population.

The rise of fast fashion in the 21st century has had significant impacts on our environment. Fast fashion is the production of cheap, often low quality, clothing garments at a rapid pace to meet microtrends, and is leading to a global overconsumption crisis. This widespread business model has been detrimental to the environment in both the production and post-production aspects. The former is a leading cause of water pollution, air pollution, deforestation, and increased microplastic content in bodies of water. For post-production, there are a multitude of complications with landfills including greenhouse gas emissions, incineration, and the time it takes to biodegrade. Due to the environmental implications in every aspect of the lifespan of clothing, delegates should be ready to propose a solution that will create a systemic change in the fast fashion industry.

The second topic, sustainable agriculture in face of a growing population, is about the environmental concerns of the rapidly adapting global agriculture industry. Due to factors such as climate change, population growth, and world hunger, farming around the world is being forced to stray further and further from natural methods, and the market is instead dominated with artificial inventions. Due to these changes, agriculture has become extremely damaging to the environment. Soil degradation, greenhouse gas emissions, genetic pollution, and eutrophication are just a few of the terms that will be brought up as you read through this backgrounder. To increase chances of success, delegates should aim to craft a solution that acknowledges the social, economic, and the environmental aspects of agriculture.

If you have questions about either topic or concerns regarding any facet of VYMUN conference, you are more than welcome to contact me at [unep@vymun.com](mailto:unep@vymun.com). I cannot wait to meet all of you in October!

Sincerely,

Jessica Zhang

Director of UNEP | VYMUN 2021

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# Environmental Impact of the Fashion Industry

## Questions to Consider

1. What are some successful initiatives and projects related to fast fashion and why are they successful?
2. How can we ensure a system-wide change in the fashion industry?
3. How can we help support the economies of countries reliant on the fashion industry?
4. What are ways to ensure we can address both the production and post-production impacts in a resolution?
5. How do we address the needs of both clothing consumer and clothing producer countries in a solution?

## Overview

Fast fashion is everywhere. Every billboard, social media post, and store window is constantly boasting the latest fashion trend. Owning just one outfit per season is a thing of the past, and it is the new normal to wear clothing only a few times before discarding it.

Defined as the movement of shortening the period of time between design to a physical item, fast fashion focuses on creating the highest quantity of clothing while disregarding quality in order to make the most profit. Due to this, consumers rapidly throw away clothing after just a few uses in favour of new styles and trends. Fast fashion has quickly taken over markets and outgrown competitors despite only being first popularized in the 60s because of its high-profit margin. Now, consumers are becoming more and more accustomed to the rapid trend and disposal cycles of clothing, feeding into narratives that clothing should have a short lifespan.

While this is ideal for companies like Zara and H&M dominate the world fashion market, the fast fashion industry is greatly impacting the environment. Water deprivation and soil degradation occur when growing the materials for the fabric. When clothes are being made, water is polluted and greenhouse gases are produced. Even after the garments are purchased, they can still harm the environment by sitting in landfills for roughly 200 years before biodegrading. Due to this, increased and unnecessary demand for new clothing results in significant environmental degradation.

Despite past initiatives, the environmental impacts of the fashion industry due to fast fashion are still dire and need to be addressed immediately. In order to fully solve the issue, a solution must address every part of the life of a piece of clothing, from farm to factory to consumer to landfill. Furthermore, delegates

should keep in mind that the solution must also be long-term, widely implemented, and supportive of the socioeconomic standing of all countries, to create the most effective resolution that will fully resolve this issue.

## Timeline

### **1856:** First Synthetic Dye Commercialized

Although not the first synthetic dye invented, this coal-tar-derived dye revolutionized the dyeing industry and was one of the most important inventions in the history of the textile industry. British Chemist William Henry Perkin invented the dye accidentally when he was just a student.<sup>1</sup>

### **1864:** Sewing Machine receives a patent

This greatly increases the efficiency rate of production, which thereby decreases the individual cost of clothing.<sup>2</sup> Localization of clothing producers occurs, as prior to this, people spun wool into cloth to make clothes.

### **1935:** Nylon is invented

Arguably one of the most environmentally devastating fabrics, nylon is invented and receives a patent in 1935<sup>3</sup>, but only hit the markets 4 years later in 1939.<sup>4</sup>

### **1939-1945:** Standardization of clothing production

During the second world war, the standardization of women's clothing changed consumer thinking, and mass-produced clothing started gaining traction.

### **1947:** H&M opens their first location

The retail giant opens its first-ever store in Sweden. The company started small but eventually began opening stores in locations outside of Europe in 2000.<sup>5</sup>

### **1966:** First Fast Fashion Trend is created

Scott Paper Company released dresses made from a combination of paper napkins and rayon. These clothes were made with the intention of being thrown away after one wear, and they sky-rocketed in popularity soon after release.<sup>6</sup> By the end of the year, clothes made from "paper" earned the company around \$3.5 million.

### **1991:** The internet becomes commercialized

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<sup>1</sup><https://blog.scienceandindustrymuseum.org.uk/worlds-first-synthetic-dye/>

<sup>2</sup><https://www.theurbangardeninitiative.org/blog/the-history-of-fast-fashion>

<sup>3</sup><https://www.mentalfloss.com/article/61845/brief-history-nylon>

<sup>4</sup><https://www.sciencehistory.org/distillations/nylon-a-revolution-in-textiles>

<sup>5</sup><https://about.hm.com/content/dam/hmgroup/groupsite/documents/en/Digital%20Annual%20Report/2017/Annual%20Report%202017%20Our%20history.pdf>

<sup>6</sup><https://timeline.com/paper-fashion-1960s-43dd00590bce>

The internet is now free to anyone who wants to make a website. Online retail started picking up steam following the launch of Amazon in 1994 and eBay in 1995.<sup>7</sup>

**1990s-2000s:** Fast Fashion is created and popularized

Wearing cheap clothing is now portrayed as “chic” by the media. More and more consumers choose to spend less on low-quality clothing instead of buying high-end clothes.

**2009:** Ethical Fashion Initiative (EFI) is created

UN officer Simone Cipriani starts the project in Nairobi, Kenya. The EFI links local fashion craftsmen with high profile international companies with the goal of strengthening the fashion industries of developing countries. This sustainable fashion initiative would later spread to eight other countries and set a leading example for the global community.<sup>8</sup>

**April 24th, 2013:** Rana Plaza Collapses

The 5 textile production factories located in Dhaka, Bangladesh collapsed, killing 1,132 and injuring 2,500.<sup>9</sup> This tragedy sparks outrage in the international community and increases investigations into the working conditions of textile factory workers.

**December 10th, 2018:** Fashion Industry Charter for Climate Action launches

This Charter is created in hopes of achieving the goal of reducing greenhouse emissions of the fashion industry to net-zero by 2050. 43 brands and companies decide to sign this, including industry giants like H&M.<sup>10</sup>

**March 2019:** UN Alliance for Sustainable Fashion is created

One of the most prominent leaders in sustainability in the fashion industry debate, the alliance was created during the 4th meeting of the United Nations Environmental Assembly (UNEA). The members consist of several powerful UN and UN-affiliated organizations, including the UNEP, the International Labour Organization (ILO), and the International Trade Centre (ITC).<sup>11</sup>

**February 22nd, 2021:** Global Alliance on Circular Economy and Resource Efficiency (GACERE) launches

Organized by the UNEP, the EU, and the United Nations Industrial Development Organization (UNIDO), GACERE’s goal is to promote sustainable usage of the earth’s resources, including the sustainable consumption of the fashion industry.

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<sup>7</sup> <https://www.bbc.com/worklife/article/20200722-the-curious-origins-of-online-shopping>

<sup>8</sup> <https://unfashionalliance.org/members/itc-efi/>

<sup>9</sup> [https://www.ilo.org/global/topics/geip/WCMS\\_614394/lang--en/index.htm](https://www.ilo.org/global/topics/geip/WCMS_614394/lang--en/index.htm)

<sup>10</sup> <http://sdg.iisd.org/news/fashion-industry-launches-charter-for-climate-action-at-cop-24/>

<sup>11</sup> [unfashionalliance.org/members/itc-efi/](https://unfashionalliance.org/members/itc-efi/)

## Historical Analysis

The fashion industry as we know it today began when the sewing machine was first patented in 1864.<sup>12</sup> Prior to this invention, most clothing was made in shops based in homes called “cottage industries.” Materials such as wool and cotton were spun into yarn with spinning wheels, and which were subsequently made into clothing garments. During this time, people of most social classes would wear a piece of clothing for a long time, only making new ones when absolutely necessary.

During the industrial revolution, clothing started to be mass produced in factories and sweatshops. This shift, along with the invention of the sewing machine, significantly increased the efficiency of production. The cost of purchasing clothes decreased as a result, which led to an increase in consumption. To meet this demand, garment workers were required to meet high quotas of clothing made each day; furthermore, employees worked 14-16 hours a day with a meagre wage, with many dying from prolonged exposure to toxic textile dye and sickness that ran rampant in these factories.<sup>13</sup>

Along with human rights violations, the industrial revolution also did a great deal of damage to the environment. Factories often dumped wastewater into nearby streams and lakes.<sup>14</sup> The wastewater contained remnants of synthetic dyes, which were commonly used during this time period. The lack of water filtration caused the dye-contaminated water to be directly ingested by people living in nearby slums. Not only that, it often damages aquatic ecosystems by killing plants and inhibiting the growth of other organisms. These harmful effects along with more, such as air pollution released from the machinery, deforestation from using wood as fuel, and the creation of a large number of textile factories still have lasting impacts on the environment today.<sup>15</sup>

During World War 2, clothing was standardized. In the UK, clothing for civilians was rationed due to the shortage of materials. The Austerity Restrictions, which placed guidelines on the production of all clothing, were set in 1942 and lifted in 1949. These guidelines saved an estimated 5 million square meters of fabric every year.<sup>16</sup> For the U.S., silk was unavailable due to Japan being the world’s biggest export of silk at the time, and as a result, the 11 million soldiers in the army wore wool uniforms, causing a shortage of the material for civilian wear. Instead, Rayon and cotton were commonly used fabrics of government-approved consumer clothing.

Around the same time, a wave of synthetic fabrics was being invented. The first was Nylon, which was patented in 1935 and later brought to the market in 1939<sup>17</sup>. The following year brought the creation of polyester, one of the most commonly used fabrics today, and soon after came spandex. These synthetic fibres exploded in popularity as they were cheaper and more stain-resistant, and by 1965, synthetic fabrics made up 63% of the world's global textile market.<sup>18</sup>

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<sup>12</sup>Ibid

<sup>13</sup><https://www.britannica.com/story/the-rise-of-the-machines-pros-and-cons-of-the-industrial-revolution>

<sup>14</sup> Ibid

<sup>15</sup>Ibid

<sup>16</sup><https://www.iwm.org.uk/history/how-clothes-rationing-affected-fashion-in-the-second-world-war>

<sup>17</sup>Ibid

<sup>18</sup> Ibid

The production process of synthetic fabric commonly involves a treatment with a variety of chemicals, which can pollute nearby waterways and harm wildlife. Because the fibres are a lot more processed than natural ones, more greenhouse gases and particulate matter are released. Additionally, synthetic fibres almost always have petroleum in them, so they take a longer period of time to break down in landfills.<sup>19</sup>

After World War II, people fully embraced and welcomed a new wave of creative fashion. Due to the influence of counterculture in the 60s, clothing was made with vibrant and unique patterns and worn with the intention of expressing individuality. Another fashion breakthrough during this time was in 1966. The line between haute couture—high-end clothing made exclusively for the wearer—and high street—pre-made clothing made for the general public— blurred when YSL opened its first ready-to-wear store, which was shocking because no haute couture brand had ever carried pre-made clothing before. This completely shattered the standard at the time that only lower class people shopped at ready-to-wear stores. The 60s brought forth the concept that fashion is for everyone.

Some of the biggest chain clothing stores today opened during the mid to late 20th century. The industry's two biggest companies, Zara and H&M, opened in 1947 and 1975 respectively. Both continued to expand rapidly internationally, and by the 21st century, they had become industry giants.

Part of these companies' success can be attributed to the commercialization of the internet in 1991 when online retail started to become mainstream. Another reason is the development of the "Quick Response" strategy, which is the concept of having direct contact between factories and stores, and releasing new clothing in short intervals to incentivize more frequent trips by customers. The production process of Zara clothing was described as "if you don't buy it (Zara clothing), right then and there, within 11 days the entire stock will change" by Masoud Golsorkh, editor of fashion magazine Tank.<sup>20</sup>

Not all clothing chains with a low price, low quality, and quick customer turnaround business model were successful. Forever 21, who opened its first store in 1984, filed for bankruptcy in September of 2019. Popular high street brand Topshop closed all of their U.S. locations and 23 of their U.K. locations in the same year, and Charlotte Russe closed all stores, due to not being able to keep up with the extremely competitive and fast-paced fast fashion market.

On April 24th, 2013, the collapse of the Rana Plaza brought to light the inhumane conditions of sweatshops.<sup>21</sup> The Plaza, located in Dhaka, Bangladesh, housed 5 separate textile factories which were all affected by the devastation. 1,132 lives were lost and 2,500 more were injured. The incident sparked outrage in the international community, which was reflected in the increased media attention and widespread debate regarding the rights of garment workers. The Accord on Fire and Building Safety in Bangladesh and the Alliance for Bangladesh Worker Safety were created, and prominent fashion companies around the world including Nike and H&M signed transparency pledges in order to prevent the

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<sup>19</sup><https://www.masterclass.com/articles/natural-vs-synthetic-fibers#advantages-of-using-synthetic-fibers>

<sup>20</sup><https://www.nytimes.com/2012/11/11/magazine/how-zara-grew-into-the-worlds-largest-fashion-retailer.html>

<sup>21</sup>Ibid



tragedy from repeating itself.<sup>22</sup> Meanwhile, the environmental devastations that also stem from textile factories remain overlooked.

## Past Action

The UN Alliance for Sustainable Fashion, which launched in March of 2019, is one of the leading UN forces in reducing the environmental impact of the fast fashion industry. The alliance is made up of World Bank Group's Connect4Climate, the UN Economic Commission for Europe (UNECE), the International Labour Organization (ILO), the United Nations Framework Convention on Climate Change (UNFCCC), and the UN Global Compact, with the UN Environment Programme (UNEP) and the International Trade Centre (ITC) working as the co-secretariat.<sup>23</sup> In order to meet the eight Sustainable Development Goals (SDGs), the alliance works on facilitating cooperation between different UN and UN-affiliated organizations by addressing the issues of the clothing production industry. Since its launch, members of the alliance have imposed international guidelines on textile production, raised awareness for sustainable fashion, and helped manage and improve clothing supply chains around the world.<sup>24</sup>

The UNFCCC, which is part of the alliance, launched the Fashion Industry Charter for Climate Action in 2018.<sup>25</sup> The charter was created in order to address the significant impact of the fashion industry on greenhouse gas emissions and the importance of reducing it in order to meet five SDGs and the Paris Agreement on Climate Change.<sup>26</sup> The Paris Agreement is the goal of achieving zero net emissions across all industries by 2050, and to control the average global temperature increase to be within 2 degrees of pre-industrial temperature. 43 companies involved in the fashion industry, including clothing giant H&M, agreed to follow the charter, which plans to decrease greenhouse gas emissions by 30% by 2030 and to decrease the use of coal starting 2025. Other commitments of the charter include tracking emissions of individual companies and reporting them publicly, prioritizing the use of natural fibres over synthetic, working towards using more sustainable energy sources, and increasing consumer awareness regarding the climate impact of the textile industry.

The ITC Ethical Fashion Initiative (EFI) is another member of the UN Alliance for Sustainable Fashion. Founded as a joint organization between the UN and the World Trade Organization (WTO), the EFI works with local brands in developing countries and helps them expand and connect with the international clothing industry. The Initiative works in Burkina Faso, Kenya, Mali, Uzbekistan, Afghanistan, Côte d'Ivoire, Haiti, Tajikistan, and Uganda, where they connect local artisans and traditional fashion making practices with large fashion corporations such as Adidas.<sup>27</sup> Workers employed are protected by the EFI code of conduct, which regulates working conditions and environmental impact. Clothing is traditionally

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<sup>22</sup><https://www.npr.org/sections/parallels/2017/04/30/525858799/4-years-after-rana-plaza-tragedy-whats-changed-for-bangladeshi-garment-workers>

<sup>23</sup><https://sdg.iisd.org/news/unep-international-trade-centre-lead-un-alliance-for-sustainable-fashion/>

<sup>24</sup><https://unfashionalliance.org/wp-content/uploads/2021/07/UN-Alliance-for-Sustainable-Fashion-Synthesis-Mapping-Report.pdf>

<sup>25</sup>Ibid

<sup>26</sup>Ibid

<sup>27</sup>Ibid

made in these countries with natural fabrics, which is significantly better for the environment than the synthetic-dominated global market. Deploying social workers to monitor factories and assessing working conditions annually are examples of other things the initiative does to support the artisan community in these countries. Furthermore, a living wage calculator is used to pay the workers fairly on a country-by-country basis which often exceeds the minimum wage significantly.<sup>28</sup>

## Current Situation

There are currently 3 major issues that result from the fast fashion industry: pollution released during production, pollution released after production, and overconsumption.

### Production Pollution

The process of making clothes in our current fashion market causes a great deal of damage to the earth's natural resources. Most garment factories don't filter nor treat wastewater before draining them into nearby bodies of water. Further, the dye process with synthetic dyes requires high temperatures that reach up to 100 degrees celsius.<sup>29</sup> The resulting wastewater can cause thermal pollution which can kill all sorts of aquatic life.

Clothing is also often treated with chemicals that contain mercury, lead, and arsenic, all three of which are endocrine disruptors and the latter two are also carcinogens.<sup>30</sup> These toxins can bioaccumulate in animal life, and they will further biomagnify up the food chain, which means the toxins will build up as predators will accumulate all the toxins from their prey. Humans are also at risk because if we consume any meat that contains those metals, it can also accumulate in us. Extremely acidic and basic chemicals are also used when treating textiles, and they can harm entire ecosystems if they are not neutralized before being discarded. Due to the lack of enforced international law governing garment factories, 1/5th of all global industrial water pollution comes from the textile production process.<sup>31</sup>

Not only is water being contaminated, but it is also being depleted by the industry. Over 1.5 trillion litres of water is used by the fashion industry per year.<sup>32</sup> One of the reasons for this staggering number is that fibres require a lot of water to grow: one single kilogram of cotton requires 20,000L of water to produce.<sup>33</sup> To put this in perspective, that amount of cotton can merely make one t-shirt and one pair of jeans. The immense demand for cotton has historically caused major ecological disasters, such as the devastation of the Aral Sea Basin. The over-exploitation of the former fourth-largest lake in the world caused the body of water to deteriorate into arid land.<sup>34</sup>

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<sup>28</sup>Ibid

<sup>29</sup><https://www.bbc.com/future/article/20200710-why-clothes-are-so-hard-to-recycle>

<sup>30</sup> Ibid

<sup>31</sup> Ibid

<sup>32</sup> <https://www.ecofriendlyhabits.com/fashion-industry-facts/>

<sup>33</sup> <https://edgexpo.com/fashion-industry-waste-statistics/>

<sup>34</sup> <https://www.theguardian.com/sustainable-business/sustainable-fashion-blog/2014/oct/01/cotton-production-linked-to-images-of-the-dried-up-aral-sea-basin>

Other forms of production pollution are gas emissions and air pollution. 1.2 billion tons of greenhouse gases are emitted from the textile industry each year, and it is estimated that 8-10% of global carbon dioxide (CO<sub>2</sub>) emissions result from this industry.<sup>35</sup> As such, regulation of the fashion industry is crucial to meeting global emissions targets.

Powering the machines in factories releases sulphur dioxide (SO<sub>2</sub>) and nitrous oxide (N<sub>2</sub>O). The first compound causes acid rain and the second brings a rise to ground-level ozone. Volatile Organic Compounds (VOCs) are also emitted in several steps of production, which can negatively affect the health of workers after prolonged exposure. Likewise, synthetic fibres, which is a common material used in clothing due to the cheaper price, also release CO<sub>2</sub> during their creation, as they are made from fossil fuels.

### **Post-Production Pollution**

Not only is the fashion industry destructive to the environment during the production process, clothing can even have a negative impact after being taken home by consumers. Due to the increased consumption and the declining wear time of clothing that result from fast fashion, an alarming amount of unwanted garments ends up in landfills. In fact, around 50% of all clothing is discarded within a year of purchase. Due to this, more than 92 million tonnes of landfill come from the fashion industry each year. The waste either gets incinerated or piled up and stored there; both methods of disposal have dire consequences to the environment. When clothing is incinerated, methane (CH<sub>4</sub>), CO<sub>2</sub>, other greenhouse gases, and particulate matter are released.<sup>36</sup> The first 3 contribute to the impending climate change crisis, and the buildup of the latter in the air can cause severe health issues for humans and animals. Synthetic dyes and chemicals used in the production process are often carcinogenic and toxic, and are often also released when clothing is burned; while some incineration facilities have machines made for filtering this out, most do not.<sup>37</sup>

On the other hand, if clothing is left to sit in landfills, they occupy a wasteful amount of space. Synthetic fibres break down significantly slower than natural materials, with some even lasting up to 200 years before fully decomposing. The decomposing process releases significant amounts of methane, which has a Global Warming Potential (GWP) of 25. To put this in perspective, the GWP of carbon dioxide is only 1, which means that if we were to compare the same amount of methane to the same amount of carbon dioxide, the methane would do 25 times the damage of CO<sub>2</sub> to the environment.<sup>38</sup> Additionally, the chemicals and dye the clothing were treated with can be carried by the rain into the soil, which can affect

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<sup>35</sup>[https://www.nature.com/articles/s43017-020-0039-9.epdf?sharing\\_token=IekpsirErfOb016lJDQCPdRgN0jAjWel9jnR3ZoTv0NrTOAvTiqFxn1nfvyRGyHkE4yF\\_jq14qyqvZZR\\_flNycp0dHRa9mDfKB4m8mVn197Sd5hcOjiIJ0eAk6yitgphX3nBz9HOBiQrZPDHxznRpUcWYg-CTaD-9u22qnukr93lCn638PDNSU0QuTOSRyyVORieRn\\_Y6oRaQXNP4hFt\\_Hbsx0139RODHpEYITBeD08QMNInCyQ4IP3mlj510a5xYBK0gzNaOdoCfDsf3dQ-QJy25sl\\_Ta5gsbWHn7vQWD3gdPxuSSBhVk5\\_b5vrI3LMFrexO8aFIxaJy1yVRQWP0A%3D%3D&tracking\\_referrer=www.theguardian.com](https://www.nature.com/articles/s43017-020-0039-9.epdf?sharing_token=IekpsirErfOb016lJDQCPdRgN0jAjWel9jnR3ZoTv0NrTOAvTiqFxn1nfvyRGyHkE4yF_jq14qyqvZZR_flNycp0dHRa9mDfKB4m8mVn197Sd5hcOjiIJ0eAk6yitgphX3nBz9HOBiQrZPDHxznRpUcWYg-CTaD-9u22qnukr93lCn638PDNSU0QuTOSRyyVORieRn_Y6oRaQXNP4hFt_Hbsx0139RODHpEYITBeD08QMNInCyQ4IP3mlj510a5xYBK0gzNaOdoCfDsf3dQ-QJy25sl_Ta5gsbWHn7vQWD3gdPxuSSBhVk5_b5vrI3LMFrexO8aFIxaJy1yVRQWP0A%3D%3D&tracking_referrer=www.theguardian.com)

<sup>36</sup> <https://www.wildelectric.co/articles/health-effects-of-fast-fashion>

<sup>37</sup> Ibid

<sup>38</sup> Ibid

soil quality and poison groundwater supplies.<sup>39</sup> The harmful substances can also run off into nearby waterways, potentially damaging aquatic ecosystems.

Recycling clothing into other items such as wall insulation or other clothing is one way of increasing wear time; however, this is extremely tedious. Garments need to be sorted by their fabrics, which is intensive labour and can be very time-consuming. Furthermore, only some regions, such as Europe, which recycles 50% of textiles, have the funding to run costly recycling facilities.<sup>40</sup> Donating to charity or thrift stores is another way to increase the lifespan of a clothing item, but only 0.1% of unwanted clothing ends up there. Of the measly amount donated, only 30% is purchased.<sup>41</sup>

Finally, pollutants are released directly from consumers' homes. Every time you wash clothing made from synthetic fibres such as nylon and polyester, an average of 1,900 individual microfibres come off.<sup>42</sup> Microfibres that come off when washing clothes made of synthetic fabrics are considered microplastics, and they are released into the ocean regardless of whether there are wastewater filtration systems. Microplastics are very absorbent of Persistent Bioaccumulative and Toxic Substances (PBTs).<sup>43</sup> These toxins can accumulate in smaller organisms that eat microplastics, which can, in turn, biomagnify these effects onto predator species. These can also have trickle-down effects on human health.

### **Overconsumption**

A significant amount of pollution can be reduced if less clothing can be produced. Fashion retailers today depend on consumers frequently buying more than they need. They achieve this through business models which manipulate the consumer mindset. Brands today average around 52 micro-releases a year instead of the traditional semiannual seasonal cycles. This targets the psychology of consumers and induces them to buy greater quantities of clothing by creating both a sense of novelty and urgency. Due to the highly competitive nature of the fashion market, fast fashion retail stores often drive other clothing stores out of business due to their profitability and rapid growth. Furthermore, due to the low prices resulting from high competitions, there is a narrative that clothing should be bought often and easily discarded.

The international community is experiencing a boom in clothing consumption. 62 million tonnes of clothing are purchased each year, and it is estimated that this number will increase to 93 million in 2030 and 160 million in 2050 according to the current trend.<sup>44</sup> However, the statistics differ greatly between developing and developed countries. For example, the average lifespan of an article of clothing in the U.S. is 75% shorter than the global average lifespan. Nonetheless, the global trend of clothing lifespan is decreasing, with clothing having a 36% shorter wear time than 15 years ago.<sup>45</sup>

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<sup>39</sup> Ibid

<sup>40</sup> <https://www.thebalancesmb.com/the-basics-of-recycling-clothing-and-other-textiles-2877780>

<sup>41</sup> Ibid

<sup>42</sup> <https://www.sustainablefashion.earth/type/water/synthetic-fibres-used-in-72-clothing-items-can-sit-in-landfills-for-200-years/>

<sup>43</sup> [https://nsuworks.nova.edu/cnso\\_stucap/62/#:~:text=Microplastics%20also%20act%20as%20a,tissue%20once%20within%20an%20organism.](https://nsuworks.nova.edu/cnso_stucap/62/#:~:text=Microplastics%20also%20act%20as%20a,tissue%20once%20within%20an%20organism.)

<sup>44</sup> Ibid

<sup>45</sup> [https://www.ellenmacarthurfoundation.org/assets/downloads/publications/A-New-Textiles-Economy\\_Full-Report.pdf](https://www.ellenmacarthurfoundation.org/assets/downloads/publications/A-New-Textiles-Economy_Full-Report.pdf)

## Possible Solutions

### Decrease Consumption and Change Consumer Habits

Consumers create market demand, which directly affects the amount of clothing produced in factories, causing production and post-production pollution. Therefore, changing consumer habits would be tackling the “root” of the problem. Increased education and transparency surrounding the issues of fast fashion can greatly aid in changing consumer mindset if done correctly. Education can be done through digital media; for example, the UN can fund GMOs to do research on fast fashion factories without government intervention and accurately report on information to the public. Furthermore, shifting the narrative away from microtrends and towards timeless fashion in the media can be another effective method of decreasing consumption. A way of increasing transparency can be Traffic Light Labeling (TLL). This method is labelling items with a red, yellow, or green sticker based on their environmental impact. This is currently being used in the food industry to represent how healthy something is, and it has been proven effective due to its straightforward concept.<sup>46</sup> Issuing an international quality standard for all clothing made in factories can also decrease consumption. As such, there is more incentive for companies to make better quality clothing. Prices will likely go up as well as a result of higher production costs, which will also discourage customers from buying clothing that they do not need.

### Increased Regulation

The environmental impacts of factories, especially ones in developing countries, are often unmonitored and overlooked.<sup>47</sup> Creating new legislation and enforcing it can be an extremely beneficial and efficient solution to production pollution. Water pollution, for example, can be solved with the filtration and treatment of wastewater. Mandating all factories to install such machines and doing routine checkups to ensure the health of nearby water supply can be methods of resolving the issue. Aquatic pollution can also be mitigated if fewer chemicals were used in the production process. Clothing made from natural materials such as cotton requires significantly fewer chemicals to produce.<sup>48</sup> Therefore, one possible solution would be to create weight limits on the amount of synthetic fabric each factory is allowed to use. Similar policies would also significantly reduce the amount of gas and air pollution.. Scrubbers are machines that use water and electricity to filter out particulate matter and other pollutants.<sup>49</sup> If all smoke expended from factories had to pass through scrubbers, the issue of pollution in these areas would be much smaller.

### Maximizing the Lifespan of Textiles

On average, a piece of clothing is only worn seven times before being thrown out.<sup>50</sup> Ways to lengthen this period from factory to landfill include promoting clothing recycle and reuse. Clothes can be reused by

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<sup>46</sup> Ibid

<sup>47</sup> Ibid

<sup>48</sup> Ibid

<sup>49</sup> [www.wermac.org/equipment/scrubbers\\_part1.html](http://www.wermac.org/equipment/scrubbers_part1.html)

<sup>50</sup> Ibid



reselling them online or by donating them to thrift stores and donation centres. If there were a way to incentivize consumers to do this, garments would see a lot more use before being thrown out and there would be less buildup in landfills. Recycling can turn textiles into other functional things like mops, insulation for walls, mattress stuffing, or they can even be recycled back into clothing. However, since this process is done by hand in factories, the task of sorting clothing by its fabric can be extremely tedious and difficult. Technological developments seek to make this easier, though: European researchers are currently developing cameras that can differentiate between types of fibres easier.<sup>51</sup> If the UN or other governmental bodies decide to fund research into this type of technology, recycling clothing can become increasingly common.

Patagonia does an excellent job of both the “reuse” and “recycle” areas of this solution. They launched the Common Threads recycling program offering cheap hemming and repairs of all Patagonia items, which encouraged customers to get their old clothing fixed instead of buying new ones.<sup>52</sup> Additionally, they launched an online marketplace in 2017 called Worn Wear, an online marketplace for used Patagonia items.<sup>53</sup> In terms of recycling, Patagonia also accepts used Patagonia clothing and recycles them into new clothes. Governments subsidizing sustainable business models like Patagonia’s can potentially encourage companies to be more environmentally friendly.

## Bloc Positions

### Consumer Countries

The countries that have the most purchasing power currently are Japan, Germany, UK, Russia, France, Italy, Brazil, and the United States of America. Including China and India, they contribute to 75% of all clothes and 66% of all shoes purchased. Of these consumer countries, Germany, Italy, and the U.S. are also big exporting countries.<sup>54</sup> Waste management solutions are likely to be supported by these countries, as they are the ones most affected by the effects of post-production pollution. The U.S. alone accumulated 17 million tonnes of textiles in landfills in one year.<sup>55</sup> These countries, along with other developed consumer countries, will also likely support the solution of lengthening the lifespan of clothing pieces, as they have sufficient resources and research to build textile recycling facilities. Furthermore, these countries are in a position to provide aid as they have prosperous economies and high GDPs.

### Countries with Struggling Fashion Industries

Burundi, Rwanda, Tanzania, Kenya, and Uganda are examples of countries that would fall under this bloc. They rely on the donations of second-hand clothing by developed countries to uphold their markets.

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<sup>51</sup> Ibid

<sup>52</sup><https://www.imd.org/research-knowledge/case-studies/case-studies/patagonia-s-sustainability-strategy-dont-buy-or-products/>

<sup>53</sup><https://www.roadrunnerwm.com/blog/textile-waste-environmental-crisis>

<sup>54</sup> Ibid

<sup>55</sup> Ibid

In Uganda, over 81% of all garments bought are second-hand.<sup>56</sup> To promote the creation of new jobs and to boost their economy, Burundi, Rwanda, Tanzania, Kenya, and Uganda imposed a ban on all imports of used clothing in 2019.<sup>57</sup> For Uganda, that meant no longer having 1,500 tons of second-hand clothing from the U.S. each year. These countries will likely support a resolution that will help them develop their own sustainable and local fashion market; however, they will be looking for aid to achieve it, as some of these countries have struggling economies, with Burundi even holding the title of lowest GDP in the world in 2020.<sup>58</sup>

### **Biggest Textile Exporters**

Vietnam, Indonesia, Bangladesh, Pakistan, Cambodia, Sri Lanka, and Turkey are where a significant amount of the world's clothing is produced. Companies choose them to make their goods as their labour costs are some of the lowest in the world. Bangladesh in particular has extreme laws; the minimum wage is a mere 65 USD per month.<sup>59</sup> Furthermore, these countries produce the greatest amount of production pollution due to simple infrastructure, lack of regulation, and lack of funding. These countries along with India and China face the brunt of production pollution. Therefore, in a resolution, these countries and other producer countries would be looking for guidelines regulating factories' environmental impacts, and financial support to help reverse the damage already done. However, delegates should keep in mind that these countries' economies are reliant on the fashion industry and would likely require foreign aid to pass a resolution.

### **China and India**

These two countries are unique because not only are they both part of the top 10 exporters of textiles, they are also on the list of top 10 consumers. Currently, China is dominating the manufacturing field; in 2019, textile exports were valued at 120 billion USD.<sup>60</sup> To put this in perspective, in second place was the entirety of the EU, and even they had a value of only 66 billion USD.<sup>61</sup> China has control over 40% of all global exports, but this number is likely to decrease slowly in the coming years.<sup>62</sup> While never surpassing China, India's textile industry has been growing steadily. Their export value was estimated at 37.1 billion, placing them 5th in the world.<sup>63</sup> In fact, big companies currently with factories in China may turn to India, as the labour cost of the former is increasing, removing the original appeal of cheap manufacturing. As stated before, China and India are also top consumer countries. China is ranked first in most garments purchased, at 40 billion a year, and India is in third, at 6 billion a year. The impact China and India has over both the consumer and the producer market puts both countries in a powerful position over the future of the fashion industry; their compliance to resolutions could be crucial to its success. These two countries

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<sup>56</sup><https://sustainablebrands.com/read/waste-not/not-so-fast-fashion-african-countries-to-ban-secondhand-clothing-imports>

<sup>57</sup>Ibid

<sup>58</sup>[www.statista.com/statistics/256547/the-20-countries-with-the-lowest-gdp-per-capita/](https://www.statista.com/statistics/256547/the-20-countries-with-the-lowest-gdp-per-capita/)

<sup>59</sup><https://techpacker.com/blog/manufacturing/top-4-asian-countries-for-garment-manufacturing/>

<sup>60</sup><https://www.statista.com/statistics/236397/value-of-the-leading-global-textile-exporters-by-country/#:~:text=In%202019%2C%20China%20was%20the,well%20as%20the%20finished%20garments.>

<sup>61</sup>Ibid

<sup>62</sup>Ibid

<sup>63</sup><https://www.texfilesbd.com/news/top-10-garments-exporting-countries-of-the-world-in-2020-top-textiles-exporting-countries/>

would be looking for a solution that protects jobs and maintains trade. Increasing regulation is a resolution that matches these criteria, but they are also likely to support a solution that protects the environment during the production process due to disasters such as the Yamuna situation in India.<sup>64</sup> The Yamuna river is currently covered in toxic foam caused by wastewater from clothing factories, and it is devastating local farmers by cutting off a water source for their livestock. However, delegates should be aware that these two countries will likely prioritize capital over everything else.

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<sup>64</sup><https://www.aljazeera.com/opinions/2021/4/19/the-high-cost-of-indias-cheap-garment-exports>

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# Sustainable Agriculture in the Face of a Growing Population

## Questions to Consider

1. What are your country's views on GMO regulation? Are they strict on importation of genetically modified crops?
2. Is your country actively participating in international treaties and agreements on sustainable agriculture?
3. How important is agriculture to your country's economy?
4. Does your country have any laws regulating the use of synthetic pesticides or herbicides? Have they banned any chemicals for agricultural use?
5. What is your country's projected population growth rate? What is the current hunger situation in the region?

## Overview

Agriculture is the backbone of civilization. One of the key reasons humans developed from a nomadic species to residing in cities today is the adoption of farming practices. Throughout history, farming has evolved to adapt to the needs of the human race and has become increasingly efficient. Inventions of tools such as biotechnology and synthetic fertilizers were major leaps in not only the agricultural field, but also in humankind's understanding of the limits of the natural world around us.

However, the rapid growth of the human race has caused many problems. People were forced to choose between environmentally friendly farming, which provided them comparatively less yields in the short term, and low cost farming which would provide the most abundant results in a short span of time. When humanity chose the latter, we were not initially aware of the severe ramifications that came with it. Synthetic pesticides that were once praised for efficiency are damaging aquatic ecosystems in addition to causing birth defects in fetuses still in their mothers' wombs. Genetically modified crops that provide resistance to harsh chemicals and produce more yields are now perpetuating the pesticide treadmill effect. Synthetic fertilizers that were created to be easier to transport than natural fertilizers is degrading soil to the point where plants are losing their nutritional value.

These impacts must be addressed as soon as possible by the international community to reverse the near-permanent damage the agriculture industry has caused. Delegates should analyze past initiatives, learn from their mistakes, and implement ideas that can be successful in the long term. Furthermore, a resolution should consider all three aspects of agriculture: the people, the environment, and the economics.

## Timeline

### **1892:** Gas-powered traction machine is invented

Prior to this, there were only steam powered machines that had low efficiency and were extremely dangerous to use. This invention by John Froelich led to the development of modern day tractors, which run on fossil fuels and release greenhouse gas emissions.<sup>65</sup>

### **1896:** First organic chemical herbicide is developed

Under the name “Sinox,” the first organic chemical herbicide entered the market and pioneered the development of the herbicides widely used today.<sup>66</sup>

### **1945:** The first official pesticide dichlorodiphenyltrichloroethane (DDT) is made available for commercial use

Prior to this, organic and inorganic chemicals and substances were applied in different ways in an effort to control pests.<sup>67</sup> DDT quickly became widely used because of its cheap cost, durability, and alleged low risk to humans.<sup>68</sup>

### **October 16th, 1945:** UN creates Food and Agriculture Organization (FAO)<sup>69</sup>

42 participating countries met in Quebec, Canada to found this organization; one of the organization’s central goals is to “[promote] scientific, technological, social and economic research relating to nutrition, food and agriculture.”<sup>70</sup>

### **1951:** Start of the green revolution

“World Food Problem,” published by the Mexican Agricultural Program, is a paper that highlights the factor global hunger plays in political insecurity. This sparked the beginning of an agricultural revolution with the aim of maximizing yields per area.<sup>71</sup>

### **June 30th, 1962:** *Silent Spring* is published

Written by environmental activist Rachel Carson, the book started a widespread pesticide safety movement.<sup>72</sup> *Silent Spring* discusses issues such as the pesticide resistance crisis and the dangers of DDT.

<sup>73</sup>

### **1974:** Most commonly used herbicide glyphosate is brought to market

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<sup>65</sup><https://www.bayviewtrucks.com/blog/history-of-the-tractor--6575>

<sup>66</sup><https://www.britannica.com/science/herbicide>

<sup>67</sup>[https://agrochemicals.iupac.org/index.php?option=com\\_sobi2&sobi2Task=sobi2Details&catid=3&sobi2Id=31](https://agrochemicals.iupac.org/index.php?option=com_sobi2&sobi2Task=sobi2Details&catid=3&sobi2Id=31)

<sup>68</sup><https://www.fishersci.ca/ca/en/publications/lab-reporter/2016/issue-4/the-evolution-chemical-pesticides.html>

<sup>69</sup><http://www.fao.org/3/p4228e/P4228E01.htm#:~:text=On%2016%20October%201945%2C%2042,struggle%20aga inst%20hunger%20and%20malnutrition.>

<sup>70</sup><http://www.fao.org/3/p4228e/P4228E03.htm>

<sup>71</sup><https://origins.osu.edu/article/feast-and-famine-global-food-crisis>

<sup>72</sup><https://www.panna.org/resources/ddt-story>

<sup>73</sup>[https://www.beyondpesticides.org/assets/media/documents/stateipm/resources/ipm\\_history.pdf](https://www.beyondpesticides.org/assets/media/documents/stateipm/resources/ipm_history.pdf)



Widely known as “Roundup,” this herbicide was originally used as a water system cleaner in 1961, but its weed killing properties were only discovered in 1970.<sup>74</sup>

**1989:** FAO creates Farmer Field School (FFS)<sup>75</sup>

In response to the pesticide crisis in Indonesia at the time, this UN organization created an education program for farmers to learn Integrated Pest Management (IPM) strategies.<sup>76</sup>

**1994:** First genetically modified (GM) crop is made commercially available to the public

Tomatoes that were resistant to rotting were created by U.S. based company Calgene and brought to market this year, and the crop was trademarked as “Flavr Savr.” This is the start of the takeover of GM crops in agriculture industries around the world.<sup>77</sup>

**2001:** UN Stockholm Convention on Persistent Organic Pollutants bans DDT along with other chemical pesticides

In this international treaty, DDT, a pesticide previously praised for its low risk to human health, was recognized as “causing adverse effects on humans and the ecosystem,”<sup>78</sup> 184 countries signed to ban DDT for agricultural uses and other pesticides such as toxaphene. This was adopted on May 17th, 2004.<sup>79</sup>

**November 3rd, 2001:** The International Treaty on Plant Genetic Resources for Food and Agriculture is adopted by the FAO<sup>80</sup>

All nations who ratified this agreement will be part of a multilateral system that provides easy access to a comprehensive pool of plant genetic material.

**September 11th, 2003:** Cartagena Protocol on Biosafety is put into effect

Created during the convention on Biological Diversity on January 29th, 2000, the treaty calls for the protection of biodiversity in the natural world.<sup>81</sup> The protocol aims to regulate the imports and exports of living modified organisms (LMOs).<sup>82</sup>

## Historical Analysis

Throughout history, humans have always been driven by the need for food, and as a result the production of food determined the very survival of the human race. Around 10,000 years ago, the first traces of agriculture were shown when the human race was still a hunter-gatherer species.<sup>83</sup> From this advancement came the development of civilization, as communities of people could settle down with a stationary and

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<sup>74</sup><https://thenaturalfarmer.org/article/a-short-history-of-glyphosate/>

<sup>75</sup><http://www.fao.org/3/ad487e/ad487e02.htm>

<sup>76</sup><https://www.econstor.eu/bitstream/10419/19855/1/Witt.pdf>

<sup>77</sup><https://www.thecanadianencyclopedia.ca/en/article/genetically-modified-foods>

<sup>78</sup><http://chm.pops.int/TheConvention/ThePOPs/The12InitialPOPs/tabid/296/Default.aspx>

<sup>79</sup><http://www.pops.int/Countries/StatusofRatifications/PartiesandSignatoires/tabid/4500/Default.aspx>

<sup>80</sup><http://www.fao.org/plant-treaty/overview/en/>

<sup>81</sup><https://bch.cbd.int/protocol/background/>

<sup>82</sup><https://bch.cbd.int/protocol/text/article.shtml?a=cpb-03>

<sup>83</sup>Ibid

permanent food source. At around 5000 BCE, in a series of isolated events, the majority of occupied territory developed farming systems.

Pest control methods such as crop rotation were speculated to have begun as early as the Roman Empire.<sup>84</sup> Crop rotation is a method of planting crops that involves rotation every couple of years of which type of plant on which type of soil. This approach increases yields, maintains soil quality, and decreases pest numbers; crop rotation ensures pests have natural predators and that they will not threaten to wipe out an entire breed of crop. The system taught by Roman literature and adopted by European farmers in the middle ages and throughout the 18th century was called “food, feed, fallow.”<sup>85</sup> In three different sections of land, farmers planted an edible crop (food), a grain that feeds livestock (feed), and the third section remained bare in order for the soil to recover nutrients (fallow). The crops rotated every three years following this strategy.

Ever since the beginning of agriculture, artificial selection and selective breeding of crops have existed, though the designation was only created in the 1800s.<sup>86</sup> The earliest evidence of these processes being applied was in 7800 BCE in southwest Asia. Defined as The process of mating organisms with desired traits to pass them on to their offspring, artificial selection and selective breeding are the forerunners of the concept of biotechnology.

GMOs, defined as organisms whose DNA has been directly artificially modified, were first experimented in crops in 1987.<sup>87</sup> 5 years later, GM tomatoes trademarked as “Flavr Savr” hit the markets and since 1996, over 2.7 billion hectares of biotech crops have been planted.<sup>88</sup>

The first pesticide invented is widely considered to be DDT. Before the invention of DDT, various organic and inorganic substances were used as a means of pest control. These chemicals were generally ineffective as they needed to be reapplied frequently, and they often only killed 1-2 insect species. The invention of DDT covered these issues and was seen as a perfect invention, as its persistence countered the need for reapplication, and was especially effective at exterminating disease vector insects, such as mosquitos. Furthermore, DDT was seen as ideal due to its perceived low harm to humans and animals, but this was later proven untrue.

Later research on the effects of DDT on human health showed that it can cause damage to the nervous system, internal organs, the fertility rate in men, and it can even induce miscarriages as well as birth complications. What made these results even more alarming was that these side effects were all seen in cases with minimal exposure to the pesticide.

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<sup>84</sup><https://www.allotment-garden.org/crop-rotation/history-principles-crop-rotation/>

<sup>85</sup><https://science.jrank.org/pages/1870/Crop-Rotation-History.html>

<sup>86</sup><https://sitn.hms.harvard.edu/flash/2015/from-corgis-to-corn-a-brief-look-at-the-long-history-of-gmo-technology/>

<sup>87</sup><https://geneticliteracyproject.org/2017/06/28/biotechnology-confusion-differences-among-gmos-gene-editing-gene-tic-engineering/>

<sup>88</sup><https://gmoanswers.com/gmos-around-the-world>

The publication of “Silent Spring” by scientist Rachel Carson led to renewed investigation of the effects of DDT. The book detailed the bioaccumulative nature of the chemical, and it exposed that the persistent characteristic of DDT, which used to be seen as one of its advantages, is extremely harmful to the environment.<sup>89</sup> Since then, this pesticide has been banned by a large number of countries around the world.

After the truth was uncovered about the most commonly used pesticide in the world at the time, people were reluctant to introduce new chemical pesticides to replace it. Thus, around the 1970s, talks of Integrated Pest Management (IPM) began.<sup>90</sup> The central goal of the creation of this method was to lower the use of chemical pesticides. This method began as a way of using pesticides in selective ways that would preserve the greatest amount of natural predators of the unwanted pest.<sup>91</sup> As time progressed, the term IPM has grown to encompass biological methods such as GMOs and physical methods such as nets in its definition.

## Past Action

The Food and Agriculture Organization of the United Nations (FAO) is the main force against world hunger. With 42 original members that have since expanded to 142, the goals of the organization were: “raising the levels of nutrition and standards of living of the peoples under their respective jurisdictions; securing improvements in the efficiency of the production and distribution of all food and agricultural products; bettering the condition of rural populations; and thus contributing toward an expanding world economy and ensuring humanity's freedom from hunger.”<sup>92</sup> Notable actions made by the alliance include the creation of Farmer Field School (FFS) in 1989 and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in 2001.<sup>93</sup>

The former was a program first implemented in Indonesia that educated farmers on the use of IPM. At that time, rice farmers depended heavily on the use of pesticides, which damaged water supplies and the health of the surrounding ecosystem. An impact study conducted in 1993 showed that farmers who had participated in FFS used on average 61% less pesticides than those who had not.<sup>94</sup> Another study conducted in 1996 reported that program graduates learned not only pest management strategies, but also communication and critical thinking skills. As a result of the new skills learned, FFS farmers became advisors to other farmers and were able to sway public decisions and local policies in favor of IPM.<sup>95</sup> The success of FFS programs in Indonesia caused the global expansion of the project in over 30 countries today.

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<sup>89</sup><https://www.nrdc.org/stories/story-silent-spring>

<sup>90</sup><https://museumpests.net/history-of-ipm/#:~:text=The%20term%20Integrated%20Pest%20Management,side%20Defects%20of%20pesticide%20overuse.&text=The%20term%20was%20used%20soon,the%20term%20%E2%80%9Cpest%20control%E2%80%9D>

<sup>91</sup><https://landscapeipm.tamu.edu/what-is-ipm/history-of-ipm/>

<sup>92</sup><http://www.fao.org/3/p4228e/P4228E03.htm#ch3>

<sup>93</sup>Ibid

<sup>94</sup><http://www.fao.org/3/ad487e/ad487e04.htm#TopOfPage>

<sup>95</sup>Ibid

The International Treaty on Plant Genetic Resources for Food and Agriculture was created with the ultimate goal of stabilizing the global agricultural economy.<sup>96</sup> The genetic material of 64 of the most commonly used crops were made accessible to the 131 parties in the agreement.<sup>97</sup> These 64 crops make up 80% of human diets. Treaty members are encouraged to adapt their agriculture policies to protect farmers' rights and to help expand the resources of the multilateral system. In addition, under Article 5 of the treaty, members must perform a number of tasks in order to protect the genetic resources such as "monitor and maintain the systems of collection for plant genetic resources for food and agriculture."<sup>98</sup> The crop samples in the system grew to approximately 1.3 million in 2010. This is partially due to the additional resources from the International Agricultural Research Centres of the Consultative Group on International Agricultural Research (CGIAR) added in October 2006, and partially from the resource banks of participating parties.<sup>99</sup>

## Current Situation

Hunger is defined by the UN as when groups of people go days without eating due to a variety of reasons including financial struggles.<sup>100</sup> Despite advancements, around 811 million people globally are still deprived of food. This is about 10% of the global population. The number of people suffering from hunger is still rising daily. To add onto this, the population growth rate, despite showing signs of slowing, is still very high. From 2009 to 2050, the global population is estimated to increase by 2.3 billion.<sup>101</sup> These factors create a huge market demand for food. The demand for just cereal crops alone is projected to increase by 900 million tonnes in 2050 compared to today.<sup>102</sup> In order to solve world hunger and provide food for everyone, this committee needs to consider a number of factors.

## Climate Change

Agriculture releases greenhouse gas emissions, which contribute to global warming, which in turn, negatively affects farming. When you disturb certain types of soil, organic matter reacts with the oxygen in the air to create carbon dioxide emissions. Turning over soil is a necessary aspect of farming, and its contribution to climate change remains overlooked.<sup>103</sup> Another hidden way the agriculture industry speeds up global warming is deforestation for the sake of creating farmland. Not only are you getting rid of carbon sequestering trees, the process of logging also releases a high amount of emissions.

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<sup>96</sup><https://passel2.unl.edu/view/lesson/fefc45a36b9c/2>

<sup>97</sup><http://www.fao.org/plant-treaty/overview/en/>

<sup>98</sup>Ibid

<sup>99</sup><https://passel2.unl.edu/view/lesson/fefc45a36b9c/4>

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<sup>101</sup>[http://www.fao.org/fileadmin/templates/wsfs/docs/Issues\\_papers/HLEF2050\\_Global\\_Agriculture.pdf](http://www.fao.org/fileadmin/templates/wsfs/docs/Issues_papers/HLEF2050_Global_Agriculture.pdf)

<sup>102</sup>[https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/cereal-crop#:~:text=Food%20Industries%2C%202008-,Introduction,a%20fruit%20called%20a%20caryopsis\).&text=The%20seven%20principal%20cereals%20grown,because%20of%20the%20bread%20produced.](https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/cereal-crop#:~:text=Food%20Industries%2C%202008-,Introduction,a%20fruit%20called%20a%20caryopsis).&text=The%20seven%20principal%20cereals%20grown,because%20of%20the%20bread%20produced.)

<sup>103</sup><https://www.forbes.com/sites/jeffmcmahon/2019/12/02/5-reasons-agricultures-greenhouse-gas-emissions-are-usually-underestimated/?sh=1be391256ac8>

The climate has the biggest outward influence on agriculture. The period of time crops take to mature and the time of harvest all depend on a season's conditions.<sup>104</sup> The climate also decides the breed of pests, the size of the pest population, and subsequently the amount and type of pesticide needed. The temperature and humidity even affect crops after they are grown, because it impacts the transportation process. As such, at first, global warming may appear to be beneficial to agriculture. Warm temperatures are more ideal than cold ones, so the growing season in colder places can lengthen and plants can flourish.<sup>105</sup> While this may seem true in theory, climate change also brings about natural disasters and causes huge weather pattern changes that can prove detrimental to the agriculture industry. These negative impacts outweigh the positive ones completely.

Precipitation patterns will change drastically. In Canada, for instance, the climate crisis will cause drier summers but will increase precipitation in the winter and spring seasons.<sup>106</sup> The cold climate of Canada already only allows for a short growing period, but now the conditions of the crucial summer months are going to be less than ideal and will require increased irrigation and farms will likely produce less yields. Farmers are accustomed to growing crops suited for Canada's brisk climate. The rapid pace of global warming today leaves no time for farmers to change crops and adapt their farming methods to accommodate the changes in climate.

Natural disasters have also been exacerbated by climate change. The unpredictability of weather conditions give farmers no forewarning and no time to adapt, thereby hurting the productivity of farms. For example, the Canadian prairie provinces went through sudden drought in the beginning of 2016, but that same summer, intense rainfall caused flooding.<sup>107</sup>

### **Synthetic Fertilizers, Pesticides, and Herbicides**

Before the invention of synthetic fertilizers, organic fertilizers were used. They were made of natural materials such as animal manure, and when applied, they release nutrients slowly. Synthetic fertilizers are often a crystalline substance made of pure nutrients like nitrogen and phosphorus, and release the nutrients into the soil quickly.<sup>108</sup> Due to their fast-acting nature and easy-to-transport structure, synthetic fertilizers quickly dominated the market; in 2020, the market was valued at 127.57 billion USD.<sup>109</sup>

Synthetic fertilizers, while easy to apply and boost crop yields at a low cost, come with many drawbacks. They are deadly to microorganisms that naturally create organic matter in the soil.<sup>110</sup> The form synthetic fertilizers come in do not support the structure of the soil, making it easy for nutrient runoff to occur when it rains. When excess nutrients are washed into waterways, the process of eutrophication, which causes

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<sup>104</sup><https://climateatlas.ca/agriculture-and-climate-change>

<sup>105</sup>Ibid

<sup>106</sup><https://climateatlas.ca/agriculture-and-climate-change#:~:text=Climate%20models%20show%20that%20Canada's%20agricultural%20regions%20will%20likely%20see,all%20in%20the%20same%20year.>

<sup>107</sup>Ibid

<sup>108</sup><https://homeguides.sfgate.com/effects-synthetic-fertilizers-45466.html>

<sup>109</sup><https://www.businesswire.com/news/home/20210426005401/en/Global-Chemical-Fertilizers-Market-Report-2021-COVID-19-Impact-and-Recovery-to-2030---ResearchAndMarkets.com>

<sup>110</sup>Ibid



algal blooms, kills many aquatic organisms due to lack of oxygen or lack of sunlight.<sup>111</sup> Furthermore, plants grown in fields that have been using synthetic fertilizers for several cycles are less nutritious. Crops fertilized this way often lack substances like iron, zinc, and even protein.<sup>112</sup>

Synthetic pesticides and herbicides, as detailed in the Timeline and Historical Analysis sections, have been widely used since the beginning of the 20th century. As a result of constant usage, The Pesticide Treadmill Effect has occurred. This describes a situation where more and more chemicals are required to kill the same amount of pests. When you first use pesticides on a certain insect, most insects of that species will die off. The ones that survive possess natural resistance to the chemical, and when they mate with each other and reproduce, less of their offspring will die from the same amount of pesticide used to kill the majority of the first generation of pests. Therefore, to maintain crop yields, more pesticides are applied to this new generation. This endless cycle is also seen in the usage of herbicides via a similar process.

The increased use of these chemicals has caused major social and environmental damage. The toxins accumulate in your body, which in small amounts can elicit allergic reactions, and in high amounts can be linked to cancer and other alarming diseases.<sup>113</sup> Most often, pesticides damage human nervous systems and affect pregnancies by causing birth defects. Regarding the ecological impact, herbicides and pesticides can contaminate water supplies through runoff. Best case scenario, they will mildly damage aquatic ecosystems by stunting the growth of certain organisms and kill a negligible number of aquatic plants.<sup>114</sup> In the worst case scenario, however, the chemicals kill off a significant amount of organisms which can endanger entire food chains and their surrounding ecosystems.

## Possible Solutions

### GMOs

There are plenty of benefits genetically modified crops provide. To increase the yields of a certain crop, there are GM plants that are resistant to herbicides. This way, you can ensure that you spray as many chemicals as you would like so that there are no weeds stunting the growth of the crop, without having to worry about whether it is hurting the crop or not. To reduce the use of pesticides, there are modified crops which have built-in pesticides. In response to the western corn rootworm, which caused billions in damage, corn was edited to produce *Bacillus thuringiensis* (Bt), a toxin that killed larvae of pests while being of no harm to humans.<sup>115</sup>

GMOs can even help solve malnutrition. In the future, there is the possibility of engineering easy to grow crops to contain all the micronutrients necessary for a person to survive. In fact, there already are GM crops designed with added health benefits; Golden Rice, which is GM rice modified to contain

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<sup>111</sup>Ibid

<sup>112</sup>Ibid

<sup>113</sup>[https://www.ccohs.ca/oshanswers/chemicals/pesticides/health\\_effects.html](https://www.ccohs.ca/oshanswers/chemicals/pesticides/health_effects.html)

<sup>114</sup>Ibid

<sup>115</sup><https://www.nature.com/scitable/knowledge/library/use-and-impact-of-bt-maize-46975413/>

beta-carotene, has been invented for years but has yet to become commercially available.<sup>116</sup> If more research is dedicated towards biofortification, it could be the solution to the issue of 161 million children affected by malnutrition.<sup>117</sup> Furthermore, because the concept of biotechnology is relatively new, the possibilities for this field could be endless.

Biotechnology has brought significant advancements in the field of agriculture and has been widely used in the 21st century. For some countries, it could be the future of their food production. However, GMOs provide cons as well.

There is a risk of GMO crops being accidentally grown in the wild through methods such as wind blowing their seeds. Additionally, there is the risk of genetic pollution due to the potential of GM plants breeding with wild plants to create an entirely new species. Both of these situations could lead to lack of biodiversity in the wild, which would happen if the biotechnological plants outcompete native species. Furthermore, while crops modified to be resistant to pesticides or herbicides have its benefits, the increased use of the chemicals that comes with it is extremely harmful to the environment. When deciding on their stance on this solution, delegates should look into their countries' policies and participation in GMO related treaties.

### **Regulatory Guidelines**

Delegates can work together on creating a solution which sets an international standard on the amount of chemicals allowed to be used on crops. Delegates should carefully research before deciding on the limit amount of herbicides and pesticides, as if it is too low, countries may be unhappy due to a large economic loss. Yet if the amount is too high, barely any harm will be reversed.

In response to one of the downsides of growing GM crops, the risk of genetic pollution, international regulations could be set in place that require all biotechnologically modified plants to be modified to be infertile. The crops would then neither be able to crossbreed with other plants, nor would their seeds be able to germinate and grow, successfully alleviating the risk of loss of biodiversity from GMOs. This specific type of biotechnology is called GURTs, short for Genetic Use Restriction Technologies.<sup>118</sup>

However, as this type of technology is relatively new, the infertility of seeds cannot be trusted 100%.<sup>119</sup> Due to this unreliability, using plants modified with GURT still has the risk of cross-breeding with wild plants, and the negative impacts would be even greater; plant species in the wild could go extinct if rendered sterile. In addition, smaller, local farmers and farmers from developing countries will likely be financially damaged from this.<sup>120</sup> Sterile plants mean they can no longer save seeds from one season to the next. Instead, farms will be forced to buy new seeds every season, which may be not financially viable for

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<sup>116</sup><https://sitn.hms.harvard.edu/flash/2015/good-as-gold-can-golden-rice-and-other-biofortified-crops-prevent-malnutrition/>

<sup>117</sup>Ibid

<sup>118</sup><https://royalsociety.org/topics-policy/projects/gm-plants/what-can-be-done-to-prevent-cross-breeding-of-gm-crops/>

<sup>119</sup>Ibid

<sup>120</sup><https://edepot.wur.nl/39033>

some due to the hefty price. GMO seeds can cost a whopping 150 USD more than non-GMO seeds per bag.<sup>121</sup> Non-GMO corn can save farmers around 81 USD per acre every season, which is 81 000 USD in savings on a 1000-acre large farm per season.<sup>122</sup>

## Bloc Positions

### Africa

The agriculture industry of this continent is faced with the challenge of having to feed the highest rate of population growth in the world; in fact, Africa's population is expected to grow to a staggering 2.2 billion people by 2050.<sup>123</sup> The poverty crisis there is also severe. While it has decreased from 54% in 1990, the poverty rate still remains at an alarming 36% of the total population, or 490 million people.<sup>124</sup> Agriculture is a huge part of Africa's economy. 25% of the entire continent's GDP comes from agriculture, as does 70% of its jobs.<sup>125</sup> The countries in this bloc have experienced significant growth in their agricultural sector: 100% in 30 years. Despite this, Africa still imports about 35 billion USD worth of food every year due to the booming population and low yields.<sup>126</sup>

The Africa bloc is likely to want outside support in creating their own self-sufficient and effective agriculture system. This region would be likely to support the solution of agricultural industrialization, as it may be an efficient way to grow economically and increase the average quality of life. Another priority of this bloc may be the creation of jobs. Members of this bloc might look specifically for a resolution that supports the growth of the agriculture job market. Environmental impacts of agriculture is definitely not a first concern for these countries, but they may vote for a resolution that reduces said impacts if it benefits their economy.

### Countries Reliant on GMOs

The countries in this bloc include Brazil, Canada, United States of America, India, Argentina. This assortment of countries might differ in other views regarding the agriculture industry, but they agree on the topic of GMOs. Canada and the USA alone have hundreds of millions of acres of these crops that use GMOs, and combined, they have made over 105 billion USD in profit from 1996 to 2018. These countries are most likely in support of a resolution highlighting and endorsing GMOs, and some of these countries may contribute to funding biotechnology research for struggling countries. This bloc is the model of successful GM markets and countries can also study them and model their GM markets after these ones.

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<sup>121</sup><https://www.cornucopia.org/2014/01/farmers-abandoning-gmo-seeds-reason-will-surprise/#:~:text=GMO%20seed s%20can%20cost%20up, don't%20want%20GMO%20seeds.>

<sup>122</sup>Ibid

<sup>123</sup>Ibid

<sup>124</sup><https://www.developmentaid.org/#!/news-stream/post/84943/highest-poverty-rates-in-africa>

<sup>125</sup>[https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/AEB\\_Volume\\_8\\_Issue\\_7\\_Transforming\\_Africa\\_s\\_Agriculture\\_through\\_Agro-Industrialization\\_B.pdf](https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/AEB_Volume_8_Issue_7_Transforming_Africa_s_Agriculture_through_Agro-Industrialization_B.pdf)

<sup>126</sup>Ibid

## Latin America

This group of countries is a huge exporter of a variety of crops: corn, maize, coffee beans, soybeans, and such.<sup>127</sup> Brazil, Argentina, and Mexico are the three leading countries, with a combined export value of around 146.8 billion USD in 2017.<sup>128</sup> Agriculture is an important part of the Latin American economy. While it is a small amount compared to Africa, agriculture in Latin America accounts for 4.7% of their GDP.<sup>129</sup>

A major problem, however, is the El Niño Southern Oscillation (ENSO) that happens every 3-7 years.<sup>130</sup> La Niña and El Niño are natural climate patterns that drastically change the global wind patterns, nutrient cycling in the ocean, rainfall patterns, and much more. Latin America is among the places most affected by this phenomenon. During the El Niño that lasted from 1982-1983, this group of countries suffered from extreme droughts and floods, which resulted in a 15% loss in crop harvest.<sup>131</sup> Countries in this bloc would likely be looking for a resolution that helps their agriculture market stay stable during ENSO, and also, they would likely value their export market above the environment.

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<sup>127</sup>[http://www.fao.org/3/CA4076EN/CA4076EN\\_Chapter2\\_Latin\\_American\\_Agriculture.pdf](http://www.fao.org/3/CA4076EN/CA4076EN_Chapter2_Latin_American_Agriculture.pdf)

<sup>128</sup>Ibid

<sup>129</sup>Ibid

<sup>130</sup><https://www.climate.gov/news-features/understanding-climate/el-ni%C3%B1o-and-la-ni%C3%B1a-frequently-asked-questions#:~:text=What%20are%20El%20Ni%C3%B1o%20and,for%20El%20Ni%C3%B1o%2DSouthern%20Oscillation>.

<sup>131</sup><https://reliefweb.int/report/world/impact-el-ni%C3%B1o-agriculture-fisheries-and-forestry>

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