

# NHSMUN

National High School Model United Nations

2023

## UPDATE PAPER: UNEA

**Topic A:** The Disproportionate Impact of Climate Change on the Global South

**Topic B:** The Environmental Impact of the Pharmaceutical Industry

**Secretary-General**  
**Ming-May Hu**

**Director-General**  
**Ana Margarita Gil**

**Chiefs of Staff**  
**Victor Miranda**  
**Kylie Watanabe**

**Conference Services**  
**Yohan Mutta**  
**Dennis Zhang**

**Delegate Experience**  
**Max Bross**  
**Yui Ogihara**

**Global Partnerships**  
**Pierre-Etienne**  
**Courrier**  
**Safa Elzanfali**

**Under-Secretaries-General**  
**Joseph Agarwal**  
**Hunter Atkins**  
**Ananya Chandra**  
**Samantha Chen**  
**Christian Hernandez**  
**Brandon Lin**  
**Rekha Marcus**  
**Kara Murphy**  
**Rhea Raman**  
**Scarlett Royal**  
**Therese Salomone**  
**Meg Torres**  
**Sachee Vora**  
**Amy Zeng**

Dear Delegates,

My name is Asunción Figueroa, and I will be the Assistant Director for Session I of the United Nations Environment Assembly (UNEA). Along with Zaheer, Kruttika, Ana, and all the other staff, we have worked tremendously to give you an incredible experience at the conference. This includes researching thoroughly so you can go as prepared as possible!

I have attended NHSMUN two times before, and both times were amazing! First, I went with a partner to this same committee in 2020 (just before COVID got to New York). This moment helped me to raise my voice, form my own opinions, meet many people from all over the world, and it made me more interested in environmental aspects. However, that was not enough for me. That is when I attended again last year (2022), my senior year of high school. I attended UNICEF alone, where it was certainly a big challenge. I had to do everything by myself and develop my public speaking skills even more. I could not be happier about these opportunities that I had, and I thought that my time in Model UN was done (in my country, we only go with my school). Fortunately, I saw an Instagram post about applying to staff NHSMUN. So, here we are! In my first year on staff, I have already learned **a lot**, and I have had an amazing time with all these great people.

Now let me tell you a little about myself. I am from Chile! Yep, deep south and probably away from where you are reading this. I just finished high school in November, and now I am planning to study civil engineering in Pontificia Universidad Católica here in Santiago. Hoping that I get accepted (fingers crossed!) I have always been interested in the environment, being the leader of the environmental committee in my school. I have been actively participating in everything involving school and social projects. In fact, I ran a small business for the last three years of high school. I also am a fan of Taylor Swift (Swifties!), love hiking and exploring new places, baking, and playing the guitar.

We have been working on this Update Paper so you can have the most recent information and developments to complement your solutions and research. Both of these topics are exciting and essential to our current world. Along with the Background Guide, this paper is intended so you can have a better understanding of the topic and what it entails. However, do not limit yourself to this information! The best thing is to do your own research, analyzing and discovering things on your own. I hope you have fun reading and learning about the topic as I did!

Finally, if you have any doubts, concerns, questions, suggestions, or anything else, please reach out to any member of the UNEA or NHSMUN, and we will gladly help you.

Wishing you all the best for this period,

Asunción Figueroa  
United Nations Environment Assembly  
Session I



**Secretary-General**  
**Ming-May Hu**

**Director-General**  
**Ana Margarita Gil**

**Chiefs of Staff**  
**Victor Miranda**  
**Kylie Watanabe**

**Conference Services**  
**Yohan Mutta**  
**Dennis Zhang**

**Delegate Experience**  
**Max Bross**  
**Yui Ogihara**

**Global Partnerships**  
**Pierre-Etienne**  
**Courrier**  
**Safa Elzanfali**

**Under-Secretaries-**  
**General**

**Joseph Agarwal**  
**Hunter Atkins**  
**Ananya Chandra**  
**Samantha Chen**  
**Christian Hernandez**  
**Brandon Lin**  
**Rekha Marcus**  
**Kara Murphy**  
**Rhea Raman**  
**Scarlett Royal**  
**Therese Salomone**  
**Meg Torres**  
**Sachee Vora**  
**Amy Zeng**

Dear Delegates,

Welcome to the United Nations Environment Assembly (UNEA) in this 2023 edition of the National High School Model United Nations conference held in the beautiful city of New York. My name is Ana Tejada, and I am pleased to be your Assistant Director of the UNEA for Session II. MUN has been part of my life since high school, and it definitely started to make sense when I attended the 2020 conference of NHSMUN (yes, before the pandemic!) As a delegate, I had the most amazing experience that changed my perspective on international topics. Now, I can have a different perspective on the conference since it is my first year as part of the staff.

NHSMUN is an international conference that provides all of the UN experience involving students from all over the world to make solutions according to the topics and the Committee of choice. It involves a lot of different aptitudes and skills that will grow during the conference, such as leadership, collaboration, and creativity to propose, with the other delegations, solutions for the problems that are ahead of the world.

Currently, I am studying international relations at the Anahuac Mayab University with a minor in marketing. I am almost a senior since I am graduating in a year! I love topics that involve gender, climate change, and the economic sector. Since high school, I have been in several Model UNs nationally and internationally, and currently, I am working in international marketing with several national organizations. I live in Merida, México, but I was born in Cancun, where the beach and sun are the most beautiful views in the world. I have many passions, and the arts are one of them. I love dancing and reading novels in my free time.

I hope you have the opportunity to take a deep look at the official documents, especially the Background guide that our lovely director wrote and the UP! This is a document that I have been working on for the past few months and contains key facts for you to completely understand the topics of this Assembly. This document will provide you with an actual perspective of the topics in different areas, such as gender, development, loss and damage, and innovation regarding the two topics. These will be a key to your future investigation for the position paper, which I am very excited to read!

I hope to see you very soon. If you have any questions or doubts, remember to always feel free to reach me or my director Kruttikka! Prepare all your best outfits because we will see you in only a few months. Wish you the best!

Love,

Ana Tejada  
United Nations Environment Assembly  
Session II





UNEA

NHSMUN 2023



# TOPIC A: THE DISPROPORTIONATE IMPACT OF CLIMATE CHANGE ON THE GLOBAL SOUTH

Photo Credit: Zaian

## Introduction

The climate crisis in the Global South has been destructive. The countries that are part of the Global South are vulnerable and do not have the resources to take action during natural disasters. The effects of climate change in the past few months have been difficult for several states. This has been evidenced by situations like the cyclones in Mozambique and the droughts in Madagascar and Argentina. These have large-scale effects that include poverty, displacement, and destruction of property.<sup>1</sup> Statistics show that in 2022, global CO<sub>2</sub> emissions were 1.2 percent above the past few years. These emissions came from all around the world, including places like India, the United States, and Europe. All countries in the UNEA must consider the importance of the current situation and the changes that have occurred in the last few months. This is especially true for the countries of the Global South, as many countries in this region lack adequate financial resources. As a result, they often do not have resilient infrastructure. Collaboration between private sectors and governments is necessary for equitable progress among the population without neglecting anyone.

## COP27, Finance and Adaptation Process for South Global Countries

International conferences can have a large impact when it comes to creating change. These will often establish an agenda with solutions and actions that bring active change to the topic discussed. International collaboration can create mechanisms to put change in place where it is most needed. For example, these can make funding and financial systems more adaptive for countries. Specifically, these conferences can help finance solutions to climate change.

The Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change is an international forum of negotiations that includes all UN Member States. These conferences allow discussion on topics like climate change and seek to facilitate solutions for every state.<sup>2</sup> The previous conference, COP26 in Glasgow, was full of the expectations of thousands of people that were concerned about the impact of climate change. A commitment was made that addressed many of the issues raised in this year's conference.<sup>3</sup> Many of the topics addressed in the past

discussions were centered on deforestation, the inclusion and protection of Indigenous people, and the effects of global warming on the environment.

COP27, held in November, brought forth many solutions and new goals. This set a new course for the attending countries toward solving the problem of climate change. It also emphasized the agreement on loss and damage funding for vulnerable countries affected by climate disasters.<sup>4</sup> The COP27 agreement, the Sharm el-Sheikh Implementation Plan, made historic commitments to include the richest states in providing help to developing countries. Many of these countries required help to recover from the loss and damage from the impacts of climate change.<sup>5</sup> The financing to achieve the actions established in this agenda is essential to achieve its goals.

The topic of financing was a high priority because there are countries that do not have the capacity to combat the effects of climate change but are nonetheless put at risk. As a result, many regional goals toward combatting and mitigating climate justice are not achieved. Many of these countries

1 Gerardo Bandera, "How Climate Colonialism and Climate Apartheid Affect the Global South," FairPlanet, September 28, 2022, <https://www.fairplanet.org/story/how-climate-colonialism-affects-the-global-south/>.

2 "What Is the United Nations Framework Convention on Climate Change?," UNFCCC, accessed December 16, 2022, <https://unfccc.int/process-and-meetings/what-is-the-united-nations-framework-convention-on-climate-change>.

3 "COP26: What Happened?," Client Earth, November 5, 2021, <https://www.clientearth.org/latest/latest-updates/news/cop26-what-happened/>.

4 "COP27 Reaches Breakthrough Agreement on New 'Loss and Damage' Fund for Vulnerable Countries," UNFCCC, November 20, 2022, <https://unfccc.int/news/cop27-reaches-breakthrough-agreement-on-new-loss-and-damage-fund-for-vulnerable-countries>.

5 UNFCCC, "COP27 Reaches Breakthrough Agreement."

cannot implement solutions to the same degree as developed countries. In this sense, COP27 made important advances in terms of transparency. Many of the representatives of countries in the Global South were present to share relevant issues in their states.<sup>6</sup> For example, countries in the Horn of Africa shared their struggles with extreme drought. In some areas of Kenya, over 90 percent of water sources have dried up. Over 20 million people across the region are struggling to find enough to eat after crops have repeatedly failed.<sup>7</sup> Conferences such as COP27 enable countries to share their struggles and be involved in the development of solutions that directly impact them.

One of the most important aspects of this conference was the creation of goals that benefit everyone. In previous conferences, many perspectives were often left out. In the past, there would be no action due to the discussions. Instead, there has been a setback in actions, and global warming has only worsened.<sup>8</sup> While this year's conference had great accomplishments, many aspects were criticized after this event. Activists have expressed their concerns that the needs of businesses were favored over environmental needs. COP27 failed to secure commitments to stopping greenhouse gas emissions from rising above thresholds that worsen global warming.<sup>9</sup> Other activists emphasized that the negotiation process does not hold political leaders accountable. The conference is meant to push world leaders to make commitments to environmental action. However, country representatives will spend days debating single words in the proposed documents.<sup>10</sup> These issues must be taken into consideration for COP28.

The successes and failures of COP27 must be taken into consideration for future conferences. It is important to include the perspectives of all countries in the international community when creating solutions to climate change. By considering the financial situations of countries in the Global

South, solutions were made that would directly benefit these states. This is an essential starting point, but more must be done to make these conferences inclusive. COP27 also demonstrated the importance of focused discussion to ensure that time is used efficiently and effectively. Some issues were addressed, but many were left unsolved. Countries need more than just funding if they are going to contribute to fighting climate change.

## Loss and Damage

The impacts of climate change have alerted many of the world's leaders to reduce the impact of gas emissions. It is important for political spaces to have conversations about how their actions impact these issues. This enables international cooperation and support for solutions. The term Loss and Damage is used in the UN climate negotiations. It emphasizes both economic and non-economic solutions and ways to adapt to climate change and its effects. This specifically takes into account destruction due to extreme weather events caused by climate change. As climate change progresses, the concept of loss and damage has drawn increasing attention.<sup>11</sup>

Over 3.5 billion people live in situations of vulnerability due to the effects of climate change. Almost half of the world's population suffers from some effects of global warming and the problems caused by climate change.<sup>12</sup> As a result, loss and damage is an urgent issue that must be addressed. Exposure to climate change can cause displacement, food insecurity, animal extinction, and ecosystem degradation. Losses and damages are often not understood by international conferences. Representatives do not understand the need for funding to repair existing damages from environmental disasters. This is particularly true for developing countries. These states often have insufficient mechanisms to carry out important actions

6 Amelia Womack, "The Global South Needs Urgent Action on COP27's Loss and Damage Deal," Open Democracy, November 22, 2022, <https://www.opendemocracy.net/en/the-global-south-needs-urgent-action-on-cop27s-loss-and-damage-deal/>.

7 Womack, "The Global South Needs Urgent Action."

8 Womack, "The Global South Needs Urgent Action."

9 David Tindall, "COP27 failed. So why continue with these UN climate summits?" The Conversation, November 30, 2022, <https://theconversation.com/cop27-failed-so-why-continue-with-these-un-climate-summits-195348>.

10 Ehsan Masood, Jeff Tollefson, and Aisling Irwin, "COP27 Climate Talks: What Succeeded, What Failed and What's Next," Nature News, November 21, 2022, <https://www.nature.com/articles/d41586-022-03807-0>.

11 Cynthia Liao et al., "What Is Loss and Damage?," Chatham House International Affairs Think Tank, December 6, 2022, <https://www.chathamhouse.org/2022/08/what-loss-and-damage>.

12 Global Witness, "Loss and Damage Is Not Enough: Why We Need Climate Reparations," November 11, 2022, <https://www.globalwitness.org/en/blog/loss-and-damage-is-not-enough-why-we-need-climate-reparations/>.

to generate lasting changes.

In Mozambique, recent cyclones have had heavy effects. Since 2019, the country has been hit by multiple cyclones every year, each leaving more destruction than the last. Each storm displaces individuals from their homes, destroys crops leading to increased food insecurity, and spreads illnesses.<sup>13</sup> These storms launched many families into poverty, and women and girls felt these effects firsthand. Currently, 56 percent of women are illiterate, with the number increasing to 70 percent in rural areas. With increased poverty and food insecurity, many women cannot complete their schooling and must stay back to tend to their families. All of these factors compounded into Mozambique being ranked the highest on the Global Climate Risk Index. This index measures both how affected countries are by climate change as well as how prepared they are to deal with these events. Being ranked first, Mozambique is most at risk and least prepared to deal with these events.<sup>14</sup>

However, Mozambique is not the only country affected by

<sup>13</sup> *Mozambique: Tropical Cyclones Idai and Kenneth - Emergency Appeal n° MDRMZ014, Final Report* (Mozambique: International Federation of Red Cross and Red Crescent Societies, December 6, 2022),

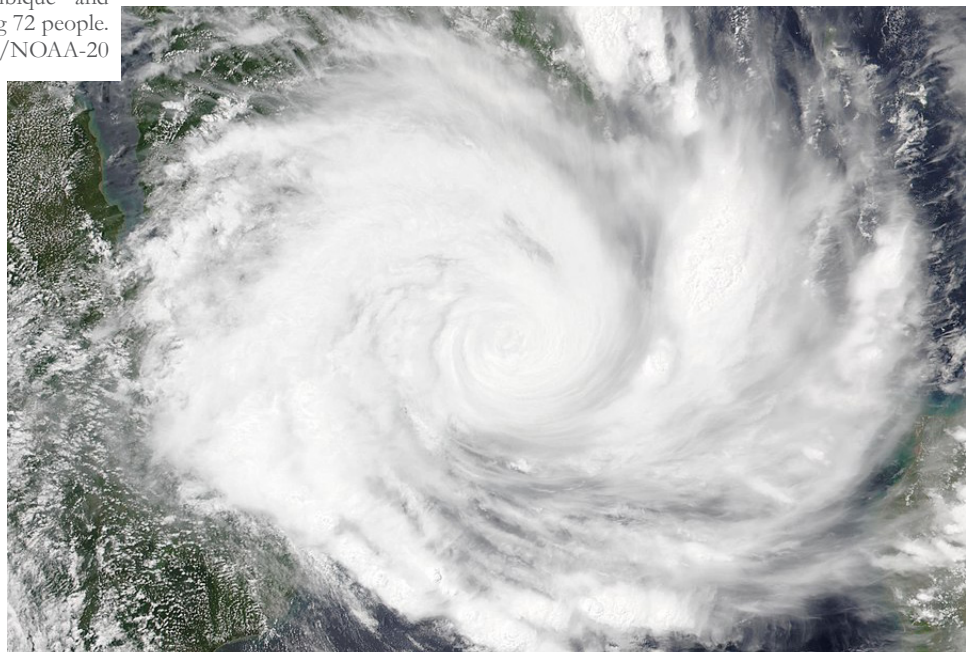
<https://reliefweb.int/report/mozambique/mozambique-tropical-cyclones-idai-and-kenneth-emergency-appeal-ndeg-mdrmz014-final-report>.

<sup>14</sup> *Mozambique: Tropical Cyclones Idai and Kenneth*.

<sup>15</sup> David Piling and Charlie Bibby, “Why famine in Madagascar is an alarm bell for the planet,” *Financial Times*, August 1, 2022, <https://www.ft.com/content/8fa3596e-9c6a-4e49-871a-86c20e0d170c>.

<sup>16</sup> Maximilian Heath, “Arid wheat fields and dead cows: a snapshot of Argentina’s worst drought in decades,” *Reuters*, December 9, 2022, <https://www.reuters.com/business/environment/arid-wheat-fields-dead-cows-snapshot-argentinas-worst-drought-decades-2022-12-09/>.

Tropical Storm Gombe struck Mozambique and neighboring countries in March 2022, killing 72 people.  
Credit: NASA/NOAA-20



extreme weather events. In Madagascar, climate change-induced droughts have created massive amounts of food insecurity. This has led to the collapse of their agricultural systems. According to the Integrated Food Security Phase Classification, one-third of the population lives in crisis. Children are seen in the streets begging for rice and water. Simple commodities have become precious in this food crisis. Although some humanitarian organizations are doing what they can to mitigate the crisis, it is estimated that 26 individuals die from starvation daily.<sup>15</sup> With the adoption of new legislation with COP27, there is hope that they will finally receive the aid they need. However, there is still much to be done to ensure the situation in Madagascar does not become a reality around the world.

Across the globe, Argentina faces a similar situation. For the past two years, rain levels have been only a fraction of what they should be. This has led to a massive decrease in crop production and the death of important farm livestock.<sup>16</sup> Mass amounts of dead fish are washing up on the shore of the Salado

river in Buenos Aires. Increased temperatures and drying riverbeds are leading to the deaths of essential livestock.<sup>17</sup> The decreases in agriculture and fishing lead to increasing levels of food insecurity around the country. Without help from the international community, the situation will only worsen.

The effects of climate change are being felt around the world. In late 2021, the World Health Organization estimated that between 2030 and 2050, climate change would cause approximately 250,000 deaths a year. These would result from the outcomes of climate change, such as malnutrition, disease, and heat stress. Weak health infrastructure, insufficient shelter, and unsafe drinking water would also contribute to this possible future.<sup>18</sup> This would mainly affect countries in the Global South, which do not have access to enough resources to combat these problems. The international community must come together to solve major global issues caused by climate change. It is evident that these extreme weather events are not happening in isolation but rather as a result of increased human activity and global warming. Although it is important to come together to slow global warming, the UNEA must recognize and help those most affected by climate change. These effects cannot be reversed, but finance is the key to making a change and ensuring that affected communities can bounce back.

## Climate Justice Needs Gender Justice

Gender equality has been evolving due to the promotion of human rights in an equitable manner. This not only involves issues such as freedom of speech but also ensures the same opportunities in all areas for women and men. Every crisis produces negative effects on communities. These largely affect minorities and vulnerable groups, including women and girls. As a result of all the disasters caused by climate change, it is more difficult to ensure the safety of these populations.

In regions where equality is not upheld, this becomes even more challenging.

The exclusion of women from the conversation on climate change has generated a dispute. To generate change, the greatest number of people need to be involved in solving the issue. Not only does this include more perspectives, but it makes it easier to empower entire communities to improve policies. Including women can help prevent inequality and human rights issues that impact climate justice. For example, at COP27, gender was one of the main topics. However, this conversation was not led by women. Only seven women heads of state attended the conference.<sup>19</sup> Expanding the discussion to all of the diverse groups, including women, makes investment more efficient. Making space for everyone ensures that no one is left out when it comes to the effects of climate change.<sup>20</sup>

Around the world, many women are affected by energy poverty. This is defined as a lack of access to clean, reliable energy or electricity. Women are often limited in their access to education due to energy poverty. Instead of studying or attending school, they must spend time collecting firewood to use as fuel. In India, Bangladesh, and Nepal, women have been found to spend upwards of 20 hours a week collecting firewood. In South Sudan, they can spend up to five hours each day on the same task. If firewood resources are scarce, they can be victims of gender-based violence.<sup>21</sup> Expanding access to clean, reliable energy must consider those women who spend valuable time producing energy in their homes.

In South Africa, the transition to clean energy is often centered around its effects on the male workforce. However, by including women, the entire country could benefit. In the coal industry, women are exposed to more effects of the energy transition. As their male family members are left without work, they are often employed in the informal sector, where they

17 “Argentina: Thousands of Dead Fish Appear Floating on Rivers Banks,” Outlook India, last modified January 24, 2023, <https://www.outlookindia.com/international/argentina-thousands-of-dead-fish-appear-floating-on-river-banks-photos-256247?photo-1/>.

18 “Climate Change and Health,” World Health Organization, October 30, 2021, <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>.

19 Jenny Wilson, “Five things I took away from COP27 - on women, young people and climate action,” World Food Programme, November 18, 2022, <https://www.wfp.org/stories/five-things-i-took-away-cop27-women-young-people-and-climate-action>.

20 UN Women, “Explainer: Why Women Need to Be at the Heart of Climate Action,” March 1, 2022, <https://www.unwomen.org/en/news-stories/explainer/2022/03/explainer-why-women-need-to-be-at-the-heart-of-climate-action>.

21 *Gender and the Environment* (OECD, May 21, 2019), <https://go.openathens.net/redirector/ubc.ca?url=https%3A%2F%2Fdoi.org%2F10.1787%2F3d32ca39-en>.



face heightened risks of abuse. Many women are often asked for sexual favors in return for work in the fossil fuel industry.<sup>22</sup> By including women in the transition to clean energy, many of them could obtain employment opportunities where they are valued rather than abused. This can also help address the disparity in pay between men and women. However, there is often a lack of transparency in the industry. In the town of Komati, the recent closure of a coal plant raised questions surrounding the decision. The area is expected to become agricultural land and renewable energy plants. However, many of the locals were unaware of this reasoning. With the closure of the coal plant, many women were left with the burden of providing for their families with no knowledge of the future plans for their husbands' employment.<sup>23</sup> To ensure that the transition to clean energy is just, local communities and the women in these communities must be consulted.

Women and men often have different opinions when it comes to energy policy. However, energy is currently a male-dominated sector. This means that valuable perspectives are lost when it comes to creating legislation. Women are often the primary energy managers in a household. When they are incorporated into decision-making processes, they can lead policies to more sustainable energy use. Women are underrepresented at all levels of policy-making and do not have the opportunities to share their knowledge on the topic. Women must be included in order to effectively address energy poverty.<sup>24</sup>

The participation of women and youth in creating solutions was a major focus of this year's COP27. Many of the proposed measures include financing systems in the short and long term. These would cover a wide variety of issues. Gender responsiveness has been one of the main measures to be adopted during various international conferences. The activism of many women has opened the door to the visualization of problems involving climate change and gender issues. One of the main highlights was the discussion of a Gender Responsive Climate Financiation. This discussion showed how loss and damage affects people of different genders.<sup>25</sup> Women must be

included in all aspects of addressing climate change. This is imperative to fulfill Sustainable Development Goal 5: Gender Equality. Governments must contribute to climate justice with a gender perspective to ensure that everyone's voices are heard.<sup>26</sup>

## Conclusion

Climate change requires appropriate action and must occupy a role in the international discussions that take place every year. However, it is important to deepen these conversations to take into account those who are often left behind. The Global South is often excluded from these discussions, but the successes at COP27 have demonstrated the importance of international cooperation. Climate change affects everyone, but certain communities are more vulnerable. It is necessary to equip states with the support and resources they need to support their populations. Sustainable solutions must be created that will address environmental issues for generations to come. Delegates must have a broad understanding of the topic, as well as innovative ideas for the future.

The importance of this topic, especially for the Global South, cannot be understated. As we have seen, the inclusion of the largest number of people in the solutions to the problem makes the impact of change real and inclusive for all countries. To promote change, delegates in this committee should discuss holistic, inclusive solutions that take everyone into account. International collaboration is the only way to resolve this issue.

22 Dinah Chiyangwa, "South Africa's women need the climate transition to work for them," China Dialogue, January 24, 2023, <https://chinadialogue.net/en/energy/south-africas-women-need-the-energy-transition-to-work-for-them/>.

23 Chiyangwa, "South Africa's women need the climate transition to work for them."

24 *Gender and the Environment*.

25 Marlene Achoki, "Dear COP27: Climate Justice Must Be Gender Justice," CARE, November 9, 2022, <https://www.care.org/news-and-stories/perspectives/dear-cop27-climate-justice-must-be-gender-justice/>.

26 Achoki, "Dear COP27: Climate Justice Must Be Gender Justice."



UNEA

NHSMUN 2023

# TOPIC B: THE ENVIRONMENTAL IMPACT OF THE PHARMACEUTICAL INDUSTRY

Photo Credit: Lynn Betts

## Introduction

The impact of the pharmaceutical industry on the environment is a multifaceted issue. Many subtopics must be considered to create thorough solutions. Over the years, the pharmaceutical industry has grown into one of the biggest in the world, providing billions of dollars to some countries. In fact, it was valued at USD 1.42 trillion at the end of 2021.<sup>1</sup> These companies may provide economic success to some people, but they cause a lot of harm to the environment. The pharmaceutical industry is tied to increasing Greenhouse Gas (GHG) Emissions, Environmentally Persistent Pharmaceutical Pollutants (EPPPs), antimicrobial resistance, and environmental degradation. Many of the industry's practices release harmful substances and contaminate different natural resources. These have direct effects on human health. The various problems in this growing field must be considered when tackling the issue. There have been many developments regarding these concerns. Pharmaceutical companies are finally putting more emphasis on environmental care, which is reflected in some of their policies. All of the current improvements should be taken into consideration to fully address this topic.

## Recent Shifts in ESG Commitments

When considering where to buy products, work, or invest, people should consider the company's environmental, social, and governance (ESG) commitments. This framework helps buyers and investors understand what a brand is doing to support these three areas. It helps measure and quantify how the brand is acting in a more sustainable way. The first term, "environmental," takes into account all things climate change. This includes GHG emissions, the management of natural resources, and the efforts to decrease the brand's environmental damage. The second aspect, "social," concerns fair wages, quality work conditions, and relationships inside the company and with stakeholders. Finally, "governance" contemplates how the company is managed, leadership programs, and corporate relations between partners. Many professionals say that if this last aspect is not well-managed, the other two aspects may break down.<sup>2</sup>

The pharmaceutical industry has recently been shifting its

sustainability commitments. Companies are pursuing a balance between the companies' success and the environment's health.<sup>3</sup> In fact, as of November 2022, Race to Zero has been joined by 46 percent of significant pharmaceutical and medical technology companies. Race to Zero is a campaign created by the UN Climate Change High-Level Champions and the Marrakech Partnership. Its objective is to reduce 50 percent of carbon emissions by 2030.<sup>4</sup> Alongside this initiative, the "My Green Lab Certification" program trains companies in leadership toward change.<sup>5</sup> This recognition aims to reduce emissions during laboratory processes and supply chain transport. The program takes into consideration various aspects regarding sustainability. It motivates companies to recycle, lessen waste, improve materials, and utilize cold storage. There are five levels for the certification, where companies have to accomplish a minimum of 40 percent of the requirements to get the Bronze certification (the lowest one) and 80 percent or more for the highest (Green).<sup>6</sup>

Some of the largest brands have joined the cause to obtain

1 Matej Mikulic, "Pharmaceutical Market: Worldwide Revenue 2001-2021," Statista, October 10, 2022, <https://www.statista.com/statistics/263102/pharmaceutical-market-worldwide-revenue-since-2001/>.

2 Kyle Peterdy, "ESG (Environmental, Social and Governance)," Corporate Finance Institute, last modified November 24, 2022, <https://corporatefinanceinstitute.com/resources/esg/esg-environmental-social-governance/>.

3 Geena Malhotra, "How Pharma Companies are Practicing Authentic ESG Towards Meeting their Sustainable Goals," Business Today, December 2, 2022, <https://www.msn.com/en-in/money/topstories/how-pharma-companies-are-practicing-authentic-esg-towards-meeting-their-sustainable-goals/ar-AA14OuXW>.

4 "Pharmaceuticals - Climate Champions," Climate Champions, accessed December 9, 2022, <https://climatechampions.unfccc.int/system/pharmaceuticals/>.

5 Stephanie Millar and James Connelly, "Almost Half of the Pharma and Biotech Sector has Joined the Race to Zero. Here's Why it Must Go Further," Climate Champions, November 11, 2022, <https://climatechampions.unfccc.int/almost-half-of-the-pharma-and-biotech-sector-has-joined-the-race-to-zero-heres-why-it-must-go-further/>.

6 "My Green Lab Certification, Certification Process," My Green Lab, accessed December 18, 2022, <https://www.mygreenlab.org/green-lab-certification.html/>.

this certification. These include Lundbeck A/S (Germany), SANOFI (France), Novartis Pharma AG (Switzerland), AstraZeneca (United Kingdom), and Johnson & Johnson (USA).<sup>7</sup> Despite this, 91 percent of the companies analyzed by the My Green Lab study have not yet committed to a greener future.<sup>8</sup>

In order to accomplish these commitments, companies analyze the methods that have proven to be successful so far. When it comes to the energy consumed while manufacturing, the industry focuses on energy efficiency rather than reducing energy use. The processes of ventilating and cleaning are some of the most energy-consuming, which is why they require increased focus. Instruments such as cost-efficient motors and optimized air compression systems have been shown to improve these areas. Moreover, the industry should also take into consideration different ways to improve energy sources, such as solar panels or heat pumps.<sup>9</sup> Many brands use electrical power units since it is an easy change to implement. However, this may not be the most efficient way of providing energy. Heat pumps collect energy from the ambient air and move it according to specific ventilation needs. This results in much less energy waste. In fact, heat pumps are 800 percent more efficient. Some companies have been able to power their entire operational plant with renewable energy. Not only does this decrease their expenses, but it also helps the environment.<sup>10</sup>

The pharmaceutical industry is a major polluter when it comes to GHG emissions. This is a result of the great number of steps in the supply chain and other factors. Taking this into consideration, it has been shown that companies that replace traditional batch manufacturing with a continuous chain are able to reduce their carbon footprint by 70–80 percent.<sup>11</sup> The difference between these two methods of production is

very simple: batch manufacturing has numerous steps, and each one is done in a different place. On the other hand, a continuous chain only takes place in one setting and does not need coordination between different facilities. While this may seem easy for companies to implement immediately, many are used to batch manufacturing and already have the equipment or a system that works well. Moreover, they would have to invest money and time into changing their machinery, training workers for a new method of production. Many companies are reluctant to change when they already have a working system.

Although there are challenges, the continuous chain may reduce the company's expenses. It would improve efficiency and simplify the process in a great way. It also reduces the industry's contamination, as the products do not have to travel from one location to another, minimizing their emissions.<sup>12</sup> Some large companies have started implementing this way of producing. For instance, Amgen opened a plant in 2014 with this method. More recently, when making the vaccines, Pfizer-BioNTech and Moderna included a continuous process.<sup>13</sup> In order to reduce the impact on the environment, companies should be incentivized to meet ESG commitments.

## Developments with Green Chemistry

Over the last 20 years, green chemistry has gained increasing importance in the pharmaceutical industry. It was endorsed by the UN's Sustainable Development Agenda.<sup>14</sup> This practice was first brought to life in 1998 when Paul Anastas and John C. Warner published "12 Principles of Green Chemistry."<sup>15</sup> It talked about different methods to make chemistry more sustainable and reduce the amount of waste produced. These principles include reusing waste to make new materials, making

7 "Who's in? - Climate Champions," UNFCCC, accessed January 14, 2023, <https://racetozero.unfccc.int/join-the-race/whos-in/>.

8 Millar and Connelly, "Half of the Pharma and Biotech Sector."

9 Malhotra, "Pharma Companies are Practicing Authentic ESG."

10 Jeff Wegner, "Decarbonization for pharma manufacturing: a sustainable heating strategy," CRB Group, accessed January 13, 2023, <https://www.crbgroup.com/insights/pharma-manufacturing-sustainable-heating-strategy>.

11 Malhotra, "How Pharma Companies are Practicing Authentic ESG Towards Meeting their Sustainable Goals."

12 Shane McLaughlin, "Continuous Manufacturing vs Batch Manufacturing in the Pharmaceutical Industry," SL Controls, <https://slcontrols.com/continuous-manufacturing-vs-batch-manufacturing-in-the-pharmaceutical-industry/>.

13 Adam Zamecnik, "Continuous manufacturing builds on hype but adoption remains gradual," Pharmaceutical Technology, May 20, 2022, <https://www.pharmaceutical-technology.com/features/continuous-manufacturing-builds-on-hype-but-adoption-remains-gradual/>.

14 Deepak Ghaisas, "A Plan for a Sustainable Future in Green Chemistry," ET Health World, November 23, 2022, <https://health.economicstimes.indiatimes.com/news/industry/a-plan-for-a-sustainable-future-in-green-chemistry/95699038>.

15 Jyoti Bashyal, "12 Principles of Green Chemistry," Chemistry Notes, December 17, 2022, <https://thechemistrynotes.com/12-principles-of-green-chemistry/>.

manufacturing procedures more efficient, and minimizing the use of energy and chemicals.<sup>16</sup> Green chemistry was created with the goal of reducing the impact that hazardous chemicals have on the environment. The practice designed products that do not include these harmful materials or contaminate the surroundings.<sup>17</sup>

One notable pharmaceutical company that has recently made progress with green chemistry is AstraZeneca. This company has a particular focus on cancer research, biopharmaceuticals, and rare diseases. The company works towards creating innovative vaccines, medications, and treatments.<sup>18</sup> In 2019, they created the Ambition Zero Carbon program with the goal of reducing their carbon footprint by 90 percent by 2045. They also aimed to reduce their GHG emissions by 98 percent by 2026.<sup>19</sup> The company found that the production of a lot of its active ingredients was a major cause of contamination. As a result, they are now focusing on finding innovative ways to manufacture these products.<sup>20</sup>

16 “Basics of Green Chemistry,” United States Environmental Protection Agency, last modified May 17, 2022, <https://www.epa.gov/greenchemistry/basics-green-chemistry#definition>.

17 United States Environmental Protection Agency, “Basics of Green Chemistry.”

18 “About Our Company - AstraZeneca,” AstraZeneca, accessed December 18, 2022, <https://www.astrazeneca.com/our-company.html>.

19 Jessica Wong, “How Green Pharma Can Cure Disease and (Possibly) Save the Planet,” Entrepreneur, November 30, 2022, <https://www.entrepreneur.com/growing-a-business/how-green-pharma-can-cure-disease-and-save-the-planet/438083>.

20 Wong, “How Green Pharma Can Cure Disease and (Possibly) Save the Planet.”

21 James Douglas and Magnus Johansson, “Striving for Sustainable Drug Discovery Using Green Chemistry,” AstraZeneca, May 27, 2022, <https://www.astrazeneca.com/what-science-can-do/topics/sustainability/Striving-for-sustainable-drug-discovery-using-Green-Chemistry.html>.

22 Douglas and Johansson, “Striving for Sustainable Drug Discovery Using Green Chemistry.”

AstraZeneca’s progress toward its Ambition Zero Carbon plan.

Credit: AstraZeneca

Taking these things into consideration, AstraZeneca has been developing methods with green chemistry to achieve the goals of its program. One of the best discoveries is the use of light to accelerate chemical reactions when creating medications. It has proven to be a more sustainable technique when making common materials. The company also found a way to recycle carbon dioxide into other materials needed in the manufacturing process. This helps reuse greenhouse gas emitted and makes the process safer.<sup>21</sup>

Current research has helped improve the lengthy process of creating pharmaceuticals. One German study found a way to create a specific molecule for drug manufacturing. As a result of this discovery, the group was able to create 22 new drug compounds much more effectively than previous methods. The process was much shorter, eliminating over 100 steps. This also minimized the amount of waste created.<sup>22</sup> Research like this can make a significant impact on the industry. New findings help reduce waste produced by pharmaceutical

<p><b>2026 target</b> 98% absolute reduction of Scope 1 and 2 GHG emissions from 2015 base year</p> <p><b>Status: On Plan</b></p>	<p><b>2021 progress</b> 59% Scope 1 and 2 GHG emissions reduction, including 9% reduction in energy consumption</p>
<p><b>2030 target</b> 50% absolute reduction of Scope 3 GHG emissions from 2019 base year</p> <p><b>Status: On Plan</b></p>	<p><b>2021 progress</b> 15% GHG increase in total Scope 3 emissions, including a 17% decrease in Scope 3 emissions relative to revenue; 7% of spend in purchased goods and services and capital goods with companies with approved SBTs</p>

companies. This would decrease their carbon footprint and benefit the environment.

Many companies are making commitments to a greener future. For example, Pfizer has created many strategies to lessen their impact on the environment. They have taken steps to reduce their waste and carbon emissions. The strategies also include creating a more continuous chain and reducing transportation and excessive waste. Pfizer has also reduced the amount of nonrenewable raw materials they use, changing them for more environmentally-friendly options.<sup>23</sup> Furthermore, the company Merck has also made advances in green chemistry. This company found a more sustainable method to make an antiviral for COVID-19. They simplified the manufacturing process from five to three steps. Not only did this reduce solvent waste, but it also produced more products.<sup>24</sup> The company Amgen created a greener way of manufacturing Lumakras, a medication to treat lung cancers. They eliminated a cleansing step that produced a great amount of waste. This helped to improve yield and reduce their yearly budget.<sup>25</sup>

These innovations may seem easy to implement, and it can be difficult to understand why other brands do not try the same. To implement greener technologies, companies must rethink long-standing mindsets. Companies need to invest and reevaluate their entire supply chain and manufacturing process.<sup>26</sup> Also, the industry can not ignore safety when creating pharmaceutical drugs, as their products have a direct impact on human health. When developing new processes, they have to make sure that these renewed methods are safe for human consumption.<sup>27</sup>

Green chemistry plays a large role in directing the pharmaceutical industry toward a more sustainable approach. Through the past few years, the practice has shown several successful methods in different aspects of the production

chain of medications. However, more companies must invest in green pharma and support each other. All companies must pursue better solutions and more effective ways of reducing the industry's industry's impact on the environment.

## Overconsumption of Prescribed Drugs

With the rise of the COVID-19 pandemic, the prescription of medications such as antibiotics and antidepressants has increased. The overuse or misuse of these pharmaceutical drugs can lead to multiple issues that cause environmental damage.<sup>28</sup> These can lead to increased carbon emissions and contamination. Excess use of medications can also contribute to bacterial resistance and create a need to produce more drugs.<sup>29</sup> This committee must address the many issues related to the overconsumption of pharmaceuticals.

A recent study evaluated the medical supply and pharmaceutical costs from 2010–2021 at Nagoya University's Hospital and Graduate School of Medicine. This is one of the biggest medical centers in Japan, servicing around half a million patients each year. They analyzed that the center's overall carbon footprint increased over the years. There was a slight decrease in 2020, possibly due to the pandemic. During this time, patients were hospitalized longer for COVID-19 treatments. More patients needed intensive treatment, meaning that more pharmaceuticals needed to be used. This increased carbon emissions. While the overall carbon footprint of the hospital decreased, the emissions for each hospitalization increased.<sup>30</sup> Experts explained that it is difficult to decrease the quantity of medications used for patient care because of the aging population in the country. Nevertheless, it is important to analyze the quantity of supplies used when managing illness. Hospitals must focus on necessary treatments in order

23 Jodi Helmer, "Green Chemistry: A More Sustainable Approach to Medicine Development," Pfizer, November 23, 2022, [https://www.pfizer.com/news/articles/green\\_chemistry\\_a\\_more\\_sustainable\\_approach\\_to\\_medicine\\_development](https://www.pfizer.com/news/articles/green_chemistry_a_more_sustainable_approach_to_medicine_development).

24 Jonathan Agbenyega, "Green Chemistry in the Pharmaceutical Industry: Sustainable Pastures for Those Who Innovate," CAS, September 23, 2022, <https://www.cas.org/resources/cas-insights/sustainability/green-chemistry-pharma-industry>.

25 Agbenyega, "Green Chemistry in the Pharmaceutical Industry: Sustainable Pastures for Those Who Innovate."

26 Helmer, "Green Chemistry: A More Sustainable Approach to Medicine Development."

27 "Future of Sustainable Drug Discovery," News Medical, last modified May 31, 2022, <https://www.news-medical.net/health/Future-of-Sustainable-Pharmaceuticals.aspx>.

28 Michael A. Campitelli et al., *Comparison of Medication Prescription Before and After the COVID-19 Pandemic Among Nursing Home Residents in Ontario, Canada* (Ontario: Jama Network Open, 2021), <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2782576>.

29 Campitelli et al., *Comparison of Medication Prescription Before and After the COVID-19 Pandemic*.

30 "Growing use of pharmaceuticals found to have increased carbon emissions during the COVID-19 pandemic," Nagoya University, December 19, 2022, <https://phys.org/news/2022-12-pharmaceuticals-carbon-emissions-covid-pandemic.html>.

to reduce their carbon footprint.<sup>31</sup>

A US study looked at the use of antibiotics in hospitalized patients from February to July 2020 in five thousand hospitals. It showed interesting results regarding the use of antibiotics and the number of patients that actually had a bacterial infection. In the study, 52 percent of hospitalized patients were given at least one antibiotic prescription. 36 percent were given several antibiotics. Also, 96 percent of the patients infected with COVID-19 were prescribed antibiotics within the first 48 hours of hospitalization. This may not seem surprising; however, bacterial infections are generally only confirmed after 48 hours. This means that most doctors prescribed drugs before they confirmed that the patient had an infection. In fact, only 20 percent of the admitted patients were actually diagnosed with a bacterial infection.<sup>32</sup> This suggests that the medication was wasted and could have been saved for patients with bacterial infections.

The Washington University of Medicine in St. Louis also conducted a study on the rising mental health issues due to COVID-19. The research showed that patients infected with the virus were 60 percent more likely to experience mental health problems than those with different diseases or none. In fact, out of the 403 million people infected by COVID-19 in the world, there were 14.8 million new cases of mental health disorders. This number does not include silent cases from people who did not seek help. This led to a rise in the pharmaceutical drugs consumed, such as anxiety and depression-related medication.<sup>33</sup> However, the problem is the misuse of these products. There are a great number of people who do require these treatments. Nevertheless, other practices such as therapy, physical activity, and a healthy diet may help to reduce the amount of pharmaceuticals consumed and their overprescription. This can then lead to decreased waste in the pharmaceutical industry.

If no action is taken, illnesses will continue to grow. As a

result, more medications will be prescribed, and our planet will be more damaged.<sup>34</sup> That is why it is imperative for the UNEA to come together to find solutions that will reduce the amount of pharmaceutical products that are consumed. While humans have come a long way in developing the medical industry, sometimes medication is not the best treatment for a condition. Rather, they should seek alternatives that will improve both environmental and social sustainability.

## Conclusion

It is clear that the environmental impact of the pharmaceutical industry is a complex issue. It is not enough to only know the causes, consequences, and major participants in the topic. Delegates must also be informed about recent developments and innovative projects that have been created for a more sustainable industry. Many companies have used innovative methods to shift their focus onto ESGs. Additionally, many incredible projects have been created with the help of Green Chemistry. These make manufacturing processes more sustainable and produce less hazardous final medication products. It is important to consider how the COVID-19 pandemic created an increase in mental health disorders, as well as contributed to an overall rise in the overuse of pharmaceutical drugs. More change is needed in the pharmaceutical industry. It is important to continue the momentum from recent developments and implement innovative solutions worldwide.

31 Hikaru Morooka et al., "Influence of COVID-19 on the 10-year carbon footprint of the Nagoya University Hospital and medical research centre," *Globalization and Health* 18, no. 92 (November 2022), <https://doi.org/10.1186/s12992-022-00883-9>.

32 David Hyun and Rachel Zetts, "Could Efforts to Fight the Coronavirus Lead to Overuse of Antibiotics?" The Pew Charitable Trusts, March 10, 2022, <https://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2021/03/could-efforts-to-fight-the-coronavirus-lead-to-overuse-of-antibiotics>.

33 Kristina Sauerwein, "COVID-19 Survivors Face Increased Mental Health Risks Up to a Year Later," Washington University School of Medicine in St. Louis, February 16, 2022, <https://medicine.wustl.edu/news/covid-19-survivors-face-increased-mental-health-risks-up-to-a-year-later/>.

34 Sauerwein, "COVID-19 Survivors Face Increased Mental Health Risks Up to a Year Later."

## Works Cited

### Topic A

#### UN Sources

- UNFCCC. “COP27 Reaches Breakthrough Agreement on New ‘Loss and Damage’ Fund for Vulnerable Countries.” November 20, 2022. <https://unfccc.int/news/cop27-reaches-breakthrough-agreement-on-new-loss-and-damage-fund-for-vulnerable-countries>.
- UNFCCC. “What Is the United Nations Framework Convention on Climate Change?” Accessed December 16, 2022. <https://unfccc.int/process-and-meetings/what-is-the-united-nations-framework-convention-on-climate-change>.
- United Nations. “COP27: What You Need to Know about This Year’s Big UN Climate Conference.” October 28, 2022. <https://news.un.org/en/story/2022/10/1129947>.
- United Nations. “Loss and Damage: A Moral Imperative to Act.” Accessed December 10, 2022. <https://www.un.org/en/climatechange/adelle-thomas-loss-and-damage>.
- UN Women. “Explainer: Why Women Need to Be at the Heart of Climate Action.” March 1, 2022. <https://www.unwomen.org/en/news-stories/explainer/2022/03/explainer-why-women-need-to-be-at-the-heart-of-climate-action>.
- World Health Organization. “Climate Change and Health.” October 30, 2021. <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>.

#### Non-UN Sources

- Achoki, Marlene. “Dear COP27: Climate Justice Must Be Gender Justice.” CARE. November 9, 2022. <https://www.care.org/news-and-stories/perspectives/dear-cop27-climate-justice-must-be-gender-justice/>.
- “Argentina: Thousands of Dead Fish Appear Floating on Rivers Banks.” Outlook India. Last modified January 24, 2023. <https://www.outlookindia.com/international/argentina-thousands-of-dead-fish-appear-floating-on-river-banks-photos-256247?photo-1/>.
- Bandera, Gerardo. “How Climate Colonialism and Climate Apartheid Affect the Global South.” FairPlanet. September 28, 2022. <https://www.fairplanet.org/story/how-climate-colonialism-affects-the-global-south/>.
- Chiyangwa, Dinah. “South Africa’s women need the climate transition to work for them.” China Dialogue. January 24, 2023. <https://chinadialogue.net/en/energy/south-africas-women-need-the-energy-transition-to-work-for-them/>.
- Client Earth. “COP26: What Happened?” November 5, 2021. <https://www.clientearth.org/latest/latest-updates/news/cop26-what-happened/>.
- Gender and the Environment*. OECD. May 21, 2019. <https://go.openathens.net/redirector/ubc.ca?url=https%3A%2F%2Fdoi.org%2F10.1787%2F3d32ca39-en>.
- Global Witness. “‘Loss and Damage’ Is Not Enough: Why We Need Climate Reparations.” Global Witness. November 11, 2022. <https://www.globalwitness.org/en/blog/loss-and-damage-is-not-enough-why-we-need-climate-reparations/>.
- Heath, Maximilian. “Arid wheat fields and dead cows: a snapshot of Argentina’s worst drought in decades.” Reuters. December 9, 2022. <https://www.reuters.com/business/environment/arid-wheat-fields-dead-cows-snapshot-argentinas-worst-drought-decades-2022-12-09/>.
- Liao, Cynthia, Nina Jeffs, Anna Åberg, and Jon Wallace. “What Is Loss and Damage?” Chatham House International Affairs Think Tank. December 6, 2022. <https://www.chathamhouse.org/2022/08/what-loss-and-damage>.
- Masood, Ehsan, Jeff Tollefson, and Aisling Irwin. “COP27 Climate Talks: What Succeeded, What Failed and What’s Next.” Nature News. November 21, 2022. <https://www.nature.com/articles/d41586-022-03807-0>.



- Mozambique: Tropical Cyclones Idai and Kenneth - Emergency Appeal n° MDRMZ014, Final Report.* Mozambique: International Federation of Red Cross and Red Crescent Societies. December 6, 2022. <https://reliefweb.int/report/mozambique/mozambique-tropical-cyclones-idai-and-kenneth-emergency-appeal-ndeg-mdrmz014-final-report>.
- Piling, David and Charlie Bibby. “Why famine in Madagascar is an alarm bell for the planet.” *Financial Times*. August 1, 2022. <https://www.ft.com/content/8fa3596e-9c6a-4e49-871a-86c20e0d170c>.
- Tindall, David. “COP27 failed. So why continue with these UN climate summits?” *The Conversation*. November 30, 2022. <https://theconversation.com/cop27-failed-so-why-continue-with-these-un-climate-summits-195348>.
- Wilson, Jenny. “Five things I took away from COP27 - on women, young people and climate action.” *World Food Programme*. November 18, 2022. <https://www.wfp.org/stories/five-things-i-took-away-cop27-women-young-people-and-climate-action>.
- Womack, Amelia. “The Global South Needs Urgent Action on COP27’s Loss and Damage Deal.” *Open Democracy*. November 22, 2022. <https://www.opendemocracy.net/en/the-global-south-needs-urgent-action-on-cop27s-loss-and-damage-deal/>.

## Topic B

### UN Sources

- Climate Champions. “Pharmaceuticals - Climate Champions.” Accessed December 9, 2022. <https://climatechampions.unfccc.int/system/pharmaceuticals/>.
- Millar, Stephanie, and James Connelly. “Almost Half of the Pharma and Biotech Sector has Joined the Race to Zero. Here’s Why it Must Go Further.” *Climate Champions*. November 11, 2022. <https://climatechampions.unfccc.int/almost-half-of-the-pharma-and-biotech-sector-has-joined-the-race-to-zero-heres-why-it-must-go-further/>.
- UNFCCC. “Who’s in? - Climate Champions.” Accessed January 14, 2023. <https://racetozero.unfccc.int/join-the-race/whos-in/>.

### Non-UN Sources

- AstraZeneca. “About Our Company - AstraZeneca.” Accessed December 18, 2022. <https://www.astrazeneca.com/our-company.html>.
- Agbenyega, Jonathan. “Green Chemistry in the Pharmaceutical Industry: Sustainable Pastures for Those Who Innovate.” *CAS*. September 23, 2022. <https://www.cas.org/resources/cas-insights/sustainability/green-chemistry-pharma-industry>.
- Bashyal, Jyoti. “12 Principles of Green Chemistry.” *Chemistry Notes*. December 17, 2022. <https://thechemistrynotes.com/12-principles-of-green-chemistry/>.
- Campitelli, Michael A., Susan E. Bronskill, Laura C. Maclagan, Daniel A. Harris, Cecilia A. Cotton, Mina Tadrous, Andrea Gruneir, David B. Hogan, and Colleen J. Maxwell. *Comparison of Medication Prescription Before and After the COVID-19 Pandemic Among Nursing Home Residents in Ontario, Canada*. Ontario: Jama Network Open, 2021. <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2782576>.
- Douglas, James and Magnus Johansson. “Striving for Sustainable Drug Discovery Using Green Chemistry.” *AstraZeneca*. May 27, 2022. <https://www.astrazeneca.com/what-science-can-do/topics/sustainability/Striving-for-sustainable-drug-discovery-using-Green-Chemistry.html>.
- Ghaisas, Deepak. “A Plan for a Sustainable Future in Green Chemistry.” *ET Health World*. November 23, 2022. <https://health.economictimes.indiatimes.com/news/industry/a-plan-for-a-sustainable-future-in-green-chemistry/95699038>.
- Helmer, Jodi. “Green Chemistry: A More Sustainable Approach to Medicine Development.” *Pfizer*. November 23, 2022. [https://www.pfizer.com/news/articles/green\\_chemistry\\_a\\_more\\_sustainable\\_approach\\_to\\_medicine\\_development](https://www.pfizer.com/news/articles/green_chemistry_a_more_sustainable_approach_to_medicine_development).
- Hyun, David and Rachel Zetts. “Could Efforts to Fight the Coronavirus Lead to Overuse of Antibiotics?” *The Pew Charitable*

- Trusts. March 10, 2022. <https://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2021/03/could-efforts-to-fight-the-coronavirus-lead-to-overuse-of-antibiotics>.
- Malhotra, Geena. "How Pharma Companies are Practicing Authentic ESG Towards Meeting their Sustainable Goals." *Business Today*. December 2, 2022. <https://www.msn.com/en-in/money/topstories/how-pharma-companies-are-practicing-authentic-esg-towards-meeting-their-sustainable-goals/ar-AA14OuXW>.
- Mikulic, Matej. "Pharmaceutical Market: Worldwide Revenue 2001-2021." *Statista*. October 10, 2022. <https://www.statista.com/statistics/263102/pharmaceutical-market-worldwide-revenue-since-2001/>.
- McLaughlin, Shane. "Continuous Manufacturing vs Batch Manufacturing in the Pharmaceutical Industry." *SL Controls*. <https://slcontrols.com/continuous-manufacturing-vs-batch-manufacturing-in-the-pharmaceutical-industry/>.
- Morooka, Hikaru, Takanori Yamamoto, Akihito Tanaka, Kazuhiro Furuhashi, Yasuhiro Miyagawa, and Shoichi Maruyama. "Influence of COVID-19 on the 10-year carbon footprint of the Nagoya University Hospital and medical research centre." *Globalization and Health* 18, no. 92 (November 2022). <https://doi.org/10.1186/s12992-022-00883-9>.
- My Green Lab. "My Green Lab Certification, Certification Process." Accessed December 18, 2022. <https://www.mygreenlab.org/green-lab-certification.html/#certificationprocess>.
- Nagoya University. "Growing use of pharmaceuticals found to have increased carbon emissions during the COVID-19 pandemic." December 19, 2022. <https://phys.org/news/2022-12-pharmaceuticals-carbon-emissions-covid-pandemic.html>
- News Medical. "Future of Sustainable Drug Discovery." Last modified May 31, 2022. <https://www.news-medical.net/health/Future-of-Sustainable-Pharmaceuticals.aspx>.
- Peterdy, Kyle. "ESG (Environmental, Social and Governance)." *Corporate Finance Institute*. Last modified November 24, 2022. <https://corporatefinanceinstitute.com/resources/esg/esg-environmental-social-governance/>.
- Sauerwein, Kristina. "COVID-19 Survivors Face Increased Mental Health Risks Up to a Year Later." *Washington University School of Medicine in St. Louis*. February 16, 2022. <https://medicine.wustl.edu/news/covid-19-survivors-face-increased-mental-health-risks-up-to-a-year-later/>.
- United States Environmental Protection Agency. "Basics of Green Chemistry." Last modified May 17, 2022. <https://www.epa.gov/greenchemistry/basics-green-chemistry#definition>.
- Wegner, Jeff. "Decarbonization for pharma manufacturing: a sustainable heating strategy." *CRB Group*. Accessed January 13, 2023. <https://www.crbgroup.com/insights/pharma-manufacturing-sustainable-heating-strategy>.
- Wong, Jessica. "How Green Pharma Can Cure Disease and (Possibly) Save the Planet." *Entrepreneur*. November 30, 2022. <https://www.entrepreneur.com/growing-a-business/how-green-pharma-can-cure-disease-and-save-the-planet/438083>.

The National High School Model United Nations Conference (NHSMUN) is a project of IMUNA, a non-profit organization formally associated with the United Nations Department of Global Communications (UNDGC). IMUNA is dedicated to promoting global issues education through simulation.

Written by Ana Tejada and Asunción Figueroa

Edited by Ana Margarita Gil, Ming-May Hu, Victor Miranda, Rekha Marcus, Therese Salomone, and Kylie Watanabe

© 2023 IMUNA. All Rights Reserved.

