

# NHSMUN

National High School Model United Nations

2023

## UPDATE PAPER: FAO

**Topic A:** Diseases and the Global Food Supply Chain

**Topic B:** Reducing Food Waste to Combat Hunger

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

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

**Chiefs of Staff**  
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**Under-Secretaries-General**

**Joseph Agarwal**  
**Hunter Atkins**  
**Ananya Chandra**  
**Samantha Chen**

**Christian Hernandez**

**Brandon Lin**  
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**Kara Murphy**  
**Rhea Raman**  
**Scarlett Royal**

**Therese Salomone**  
**Meg Torres**  
**Sachee Vora**  
**Amy Zeng**

Dear Delegates,

Welcome to the United Nations Food and Agriculture Committee at NHSMUN 2023! My name is Sameer Ameen, and I am honored to join the NHSMUN staff this year as a first-time Assistant Director for Session I. I am excited to hear and discuss all the wonderful perspectives all of you will bring to our two topics this year.

I am from Los Angeles, California, and I started Model UN in the summer of my junior year during the height of the pandemic. After falling in love with it through a virtual summer program, I brought Model UN to my high school. I loved teaching MUN procedures, competing at conferences, and learning about international issues through speeches and resolutions. I'm currently a second-year student at the University of California, Berkeley, majoring in Society & Environment with a minor in politics, philosophy, and law. I serve as the Organizational Partnership and Philanthropy Officer for Berkeley Model United Nations and our student government's Environmental Justice Executive. I am passionate about environmental issues that affect people around the world and am working on campus to find solutions to lower our carbon emissions. Agriculture is a big part of this, and so I am thrilled to be discussing this with you all come March. In my free time, I enjoy podcasts, music, cooking, and going to the gym!

Our first topic, Topic A, "Diseases and the Global Food Supply Chain," covers the interconnectedness of human health and its effect on global commerce. Topic B, "Reducing Food Waste to Combat Hunger," dives into food insecurity and how the global community plays a role in ensuring that excess food gets into the hands of those who need it. The Session II Assistant Director, Alex, and I are thrilled to share these topic updates with you all. My update on Topic A explores the impact wet markets have on the economies of countries around the world and how their conditions have contributed to the spread of zoonotic diseases. This results from how animals are kept close to one another, creating an environment for diseases to jump easily from one species to another. In addition, the COVID-19 pandemic, likely a disease originating from animals, has continued to cause economic disparities in regions in China and Africa, but adaptations in policies and supply chains have helped both communities stay resilient.

I am greatly looking forward to meeting with all of you and hearing your amazing thoughts and solutions on the topics as we discuss them over the conference weekend. You all are equipped with unique sets of skills and bring diverse perspectives. As you work with the delegates around you, remember to work as a team to bring out the best in each other. Being a delegate means bringing solutions to the table but it also means being diligent, respectful, and kind to those you work with. I look forward to seeing you all in New York come March!

Sincerely,

Sameer Ameen

United Nations Food and Agriculture Organization

Session I



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**Therese Salomone**  
**Meg Torres**  
**Sachee Vora**  
**Amy Zeng**

Dear Delegates,

Welcome to the Food and Agriculture Organization at NHSMUN 2023! My name is Alex Jeffords, and I am so excited to join the NHSMUN staff this year as your Assistant Director for Session III! These topics are very interesting to me, and I cannot wait to discuss them with you.

I am from Manhattan Beach, California, but I currently live in Baltimore, Maryland. Model UN was a huge part of my life, as I did it all four years of high school, and I was even able to go to NHSMUN last year after the conference was in person again post the COVID-19 pandemic. Model UN helped me meet many interesting people, learn about the world on a greater scale, and educate myself on topics outside of my comfort zone. As I said, I'm currently living in Baltimore and attending Johns Hopkins University. There, I am majoring in Behavioral Biology, and I'm hopefully going to study zoology after college. I am also part of the fencing team at Johns Hopkins (Go Blue Jays)! In my free time, you can find me planning my next Dungeons and Dragons campaign, watching *Criminal Minds*, or listening to music.

We have two topics of discussion for this session. Topic A, "Diseases and the Global Food Supply Chain," focuses on the relationship between disease spread and the way food is processed and packaged. Topic B, "Reducing Food Waste to Combat Hunger," focuses on mitigating food waste to increase food security and reduce hunger. I am so excited to see what you all have come up with to address these topics! To help you out, my update on Topic B explores a few different areas of the world that are all impacted by food waste: carbon emissions and global warming, the Russia-Ukraine Crisis, and the impact of social business on food waste. Food waste has massively contributed to rising greenhouse gas emissions, deforestation, and water wastage. The Russia-Ukraine Crisis has contributed to the inflation of food prices and caused massive food insecurity in Ukraine. Finally, social business has made strides in reducing food insecurity and waste through partnerships with restaurants and hotels. While very different, these three topics come together to make up the multifaceted problem of food waste. This is why, as you discuss and debate in committee, you should be thinking about all sides to this story.

I am super excited to meet all of you in New York, and I cannot wait to hear the creative, innovative, and all-around spectacular ideas you have come up with to address this issue. When I was in your shoes just last year, I had a blast coming up with solutions with my peers, and I hope you will find the same joy in NHSMUN this year. If you need any assistance, please feel free to reach out to any of us, and we will do our best to help you! See you in a few months!

Sincerely,

Alex Jeffords

United Nations Food and Agriculture Organization

Session II





FAO

NHSMUN 2023

**TOPIC A:  
DISEASES AND THE GLOBAL FOOD SUPPLY CHAIN**

Photo Credit: Leo Li

## Introduction

As diseases continue to evolve, the global food supply chain is becoming increasingly vulnerable. Animal diseases have spread to humans through close contact, and over the past 60 years, rates of new diseases have increased by over ten times.<sup>1</sup> Much of this can be attributed to wet markets, where disease-prone conditions can spread quickly to humans. Wet markets in many countries around the world directly serve large portions of the population and serve as a central part of the food supply chain. However, diseases like COVID-19 can halt supply chains and impact the socioeconomic status of countries around the world. Labor shutdowns, quarantine measures, and adverse health risks can cause the production and trade of food to come to a halt.<sup>2</sup> Understanding where diseases like COVID-19 originate and finding solutions to mitigate human exposure to such diseases can help save millions of lives and ensure the economic prosperity of countries. Specific regions, such as areas in China and parts of Africa, are still redeveloping how to handle the food supply chain as the pandemic continues into 2023. Despite China's strict lockdowns, their "farmland red line" program has helped keep agricultural production high and at a low cost. Similarly, some African countries have moved supply chains online to ensure the lowest costs possible for consumers.

## Wet Markets and Disease

After the height of the COVID-19 pandemic in 2020, the World Health Organization (WHO), in partnership with Animal Health (OIE) and the UN Environment Programme (UNEP), called for countries to suspend the sales of live wild mammals in wet markets. This was an effort to prevent the emergence of new deadly zoonotic diseases.<sup>3</sup> These outdoor marketplaces sell fresh food, meat, fish, and other products in close contact with each other. These marketplaces' congested and unclean conditions make them the perfect setting for spreading infectious diseases like COVID-19. Animals stacked on top of one another in cages produce waste. The excretions are then consumed by animals in the lower cages, creating a breeding ground for diseases and rapid infections. The proximity of vendors and customers to animals and raw meat increases the danger of humans coming into contact with zoonotic diseases. These opportunities for close contact

could also result in diseases spreading from the source to the customer and across the supply chain.<sup>4</sup>

Wet markets like those in Huanan, China, sell a variety of wild animals like beavers, porcupines, and crocodiles. This attracts people from all levels of economic prosperity. Scientists who have studied zoonotic diseases believe that coronavirus may have come from these wet markets. Importantly, wet markets are not exclusive to China. They can be found around the world in Asian, African, and Latin American countries.<sup>5</sup>

In light of the COVID-19 pandemic, there have been discussions within the global community about banning wet markets. Wet markets around the world have opened and closed several times from 2020–2022. In an attempt to keep them open, the Chinese government banned wildlife in markets in hopes of curbing the transmission of zoonotic diseases. However, a regulation of this magnitude has become difficult to enforce in a country with 1.4 billion people.<sup>6</sup> Due

1 Bryan Walsh, "The World is Not Ready for the Next Pandemic," *Time*, last modified May 4, 2017, <https://time.com/4766624/next-global-security/>.

2 "COVID-19 has Broken the Global Food Supply Chain," *Deloitte*, last modified February 19, 2021, <https://www2.deloitte.com/ch/en/pages/consumer-business/articles/covid19-has-broken-the-global-food-supply-chain.html>.

3 "UN Secretary-General Appoints New High-Level Climate Action Champions," United Nations News, 2021, <https://news.un.org/en/story/2021/04/1089622>.

4 Dina Fine Maron, "Coronavirus Linked to Chinese Wet Markets," *National Geographic*, February 20, 2020, [www.nationalgeographic.com/animals/article/coronavirus-linked-to-chinese-wet-markets](http://www.nationalgeographic.com/animals/article/coronavirus-linked-to-chinese-wet-markets).

5 Sigal Samuel, "Why China Won't Ban Wet Markets, Even After the Coronavirus Outbreak," *Vox*, Apr 15, 2020, [www.vox.com/future-perfect/2020/4/15/21219222/coronavirus-china-ban-wet-markets-reopening](http://www.vox.com/future-perfect/2020/4/15/21219222/coronavirus-china-ban-wet-markets-reopening).

6 "China Population (2020)," Worldometer, accessed October 29, 2022. <https://www.worldometers.info/world-population/china-population/>.



A photo of a wet market in Gapan, Philippines  
Credit: Ramon FVelasquez

to the number of people who rely on these markets for their daily livelihoods, banning them completely can be detrimental to the food supply chain in China. Currently, 30–59 percent of the country gets their food supply from these markets, which are spread evenly throughout China- from the poorest to most wealthy cities.<sup>7</sup>

In Brazil, wet markets are also a major source of food. Before the pandemic, it was estimated that 20 percent of Brazil's population purchased meat, such as fish, from wet markets. However, with the closure of these markets, many consumers lost trust in fresh meat and increased their consumption of frozen meat and fish. This trend could also be caused by increased prices surrounding fresh meat, as 40 percent of the country saw increases in the cost of purchasing these commodities. This affected the consumers and the individuals working in these industries. In the fish processing industry, 54 percent of entrepreneurs said they saw delays and difficulties in production due to the pandemic.<sup>8</sup>

The ethics of wet markets have also come into question. Aaron

Gekoski and Napat Wesshasartar are journalists commissioned by the Asia For Animals Coalition who traveled to Vietnam in June 2022 to investigate wet markets in Hanoi. They found a market that slaughtered 10–29 dogs and cats daily for human consumption.<sup>9</sup> These animals are often kept in small cages, with four or five of them sharing the same cage for much of their life before slaughter. With little room and hardly any time outside the cage, they excrete on top of each other, only increasing the likelihood of potential disease breeding grounds. Gekoski captured photos of dead rats placed on top of cages, packed in with living rats eating the carcasses. These rats are often bred *en masse* as food for other animals in the market. He also noticed many endangered wildlife species, like elongated tortoises, on display. Gekoski described the scene as a “melting pot of potential new zoonotic diseases.”<sup>10</sup> Even if these animals are properly vetted for zoonotic diseases, the WHO released a statement with FAO in April of 2021 explaining that many of these diseases will go undetected, as science has yet to fully comprehend the millions of new diseases which are possible as a function of these markets.<sup>11</sup>

7 Why China Won't Ban Wet Markets, Even After the Coronavirus Outbreak?

8 Elisangela Santos, “Pandemic changes behaviour of fish consumers in Brazil,” *Embrapa*, September 13, 2022, [https://www.embrapa.br/en/busca-de-noticias/-/noticia/73597739/pandemia-muda-comportamento-de-consumidor-de-pescado-no-brasil?p\\_auth=JLOAvdi](https://www.embrapa.br/en/busca-de-noticias/-/noticia/73597739/pandemia-muda-comportamento-de-consumidor-de-pescado-no-brasil?p_auth=JLOAvdi).

9 Chris Hershberger, “An Investigation into Wet Markets Selling Dogs, Cats, and Wildlife in Vietnam,” *Featureshoot*, November 2022, [www.featureshoot.com/2022/11/an-investigation-into-wet-markets-selling-dogs-cats-and-wildlife-in-vietnam/](http://www.featureshoot.com/2022/11/an-investigation-into-wet-markets-selling-dogs-cats-and-wildlife-in-vietnam/).

10 “An Investigation into Wet Markets Selling Dogs, Cats, and Wildlife in Vietnam.”

11 “Guidance for Traditional Food Markets,” World Health Organization, April 12, 2021, [https://cdn.who.int/media/docs/default-source/food-safety/ig--121-1-food-safety-and-covid-19-guidance-for-traditional-food-markets-2021-04-12-en.pdf?sfvrsn=921ec66d\\_1&download=true](https://cdn.who.int/media/docs/default-source/food-safety/ig--121-1-food-safety-and-covid-19-guidance-for-traditional-food-markets-2021-04-12-en.pdf?sfvrsn=921ec66d_1&download=true).

This investigation in Vietnam is one of many other investigations made in the past year. Nguyen Tam Thanh, an animal welfare manager at Animals Asia, visited a market in Long An province and came to the same conclusion as Gekoski. He adds that in light of the pandemic, it is shocking the markets are still open.<sup>12</sup> The discovery of the linkage between disease and the markets is not a new phenomenon. Researchers Patrick CY Woo, Susanna KP Lau, and Kwok-Yung Yuen discovered a strong link to zoonotic diseases from Chinese wet markets in 2006. Two independent research groups found that severe respiratory syndrome and avian influenza were being transmitted between humans and animals in these markets.<sup>13</sup>

Delegates should consider the science surrounding foodborne illnesses and their impacts on wet markets. Additional consideration should be given to how these practices are deeply rooted in culture and tradition and how individuals in certain countries are most impacted by zoonotic diseases. Keeping in mind the autonomous nature of a country, delegates should think about how solutions can ensure the prosperity and health of all people through policies and recommendations from the FAO.

## COVID-19 and the Food Supply in China and African Countries

Over three years have passed since the beginning of the COVID-19 pandemic, but COVID-19's effects on China's food supply are still being seen. Supply shortages have resulted from the pandemic's interruption of the world's food supply system.<sup>14</sup> Additionally, the pandemic has boosted food prices and shifted the supply-demand balance. This has left

Chinese consumers facing increased rates of food insecurity and higher food costs.

In April of 2022, the United Nations made a statement on the pandemic regarding severe supply chain shortages. They predicted that an additional 100 million people would need humanitarian assistance due to the impact of supply chain disruptions.<sup>15</sup> This number has only grown due to China's ongoing quarantine protocol until early December 2022. "Zero-COVID" is a policy the Chinese government has had since the beginning of the pandemic. The goal was to have zero cases through extensive quarantine measures, forcing people into makeshift isolation centers and hospitals.<sup>16</sup> However, this policy has already had a heavy economic toll on the country, leading to strong public resentment. People have grown restless when confined to their homes. Small businesses have struggled due to heavy quarantine restrictions and a lack of customers.<sup>17</sup> To curb public resentment, China has eased the current protocol after months of protests.<sup>18</sup> Travel has become freer, and people can now isolate themselves in their homes instead of state facilities. However, the country now has over 30,000 infections a day. Delegates should be wary about easing COVID-19 policies either too quickly or too slowly.

China is currently taking some precautionary measures to make sure the supply of food is constant. These include actions like raising food production, tightening market regulation, enhancing food safety quality assurance, and giving farmers, companies, and consumers financial support.<sup>19</sup> Additionally, the country supports the creation of new products and services that can improve the efficiency of the food supply chain and lower food waste. China is giving

12 Carolyn Cowan, "Probe Finds Vietnam Faltering in Bid to Curb Wildlife Trade, Animal Suffering," *Mongabay*, November 2022, <https://news.mongabay.com/2022/11/probe-finds-vietnam-faltering-in-bid-to-curb-wildlife-trade-animal-suffering/>.

13 J. A. Henderson, K. A. Miller, and J. Stewart, "Preventing and Managing Sudden Cardiac Arrest in the Acute Care Setting," *Critical Care Nurse* 40, no. 4 (2020): 55–62. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7141584/>.

14 "Food, Medical Shortages in Locked-Down Region Spur China Apology," *Bloomberg*, September 11, 2022, <https://www.bloomberg.com/news/articles/2022-09-11/food-medical-shortages-in-locked-down-region-spur-china-apology>.

15 H.E. Tijjani Muhammad Bande, "The Impact of COVID-19 on Global Food Security and Nutrition: Preventing a Health Crisis from Becoming a Food Crisis," United Nations General Assembly, April 17, 2020. <https://www.un.org/pga/74/2020/04/17/the-impact-of-covid-19-on-global-food-security-and-nutrition-preventing-a-health-crisis-from-becoming-a-food-crisis/>.

16 "What is China's Zero Covid Policy?" *Voice of America*, April 23, 2020, <https://www.voanews.com/a/what-is-china-s-zero-covid-policy-/6854291.html>.

17 Austin Ramzy, "China Eases Some Covid-19 Rules Even as Cases Pass 10,000," *The Wall Street Journal*, last modified November 11, 2022, <https://www.wsj.com/articles/china-eases-some-covid-19-rules-even-as-cases-pass-10-000-11668150369>.

18 Frances Mao, "China condemns US sanctions and expels reporters," *BBC News*, September 17, 2020, [www.bbc.com/news/world-asia-china-63855508](http://www.bbc.com/news/world-asia-china-63855508).

19 Yuan Zhang, Tengfei Xu, and Jingxin Xiao, "China's Domestic Food Stability Amid Global Food Crises," *World Economic Forum*, November 2022, <https://www.weforum.org/agenda/2022/11/china-domestic-food-stability-amid-global-food-crises/>.

farmers and companies subsidies to assist them in dealing with the disruption's economic effects. The government has implemented a "farmland red line" program since 2006, intending to preserve at least 120 million hectares of arable land for crop farming.<sup>20</sup> The policy also supports the development of 66.7 million hectares of premium agriculture, focusing on safeguarding northeast China's rich black soil. Additionally, key ministries worked together to develop a "green channel" for fresh agricultural products to improve transportation efficiency. Several regulations have been devised to fight food loss and waste, which accounts for 27 percent of the country's annual production. Land preservation for the sake of protecting agricultural production is not a new concept and has been implemented in many other parts of the world, including sub-Saharan Africa.<sup>21</sup>

Some countries in Africa are facing similar issues, like quarantine measures which have caused the cost of food to rise. In 2022, the COVID-19 pandemic was anticipated to have a variety of repercussions on food supply chains in Africa, from immediate disruptions to long-term structural

20 Zhang Zhilong, "Red-line' policy protects China's arable land," *CGTN*, 21 September 21, 2020, [news.cgtn.com/news/3d3d514d316b44f32457a6333566d54/index.html](https://news.cgtn.com/news/3d3d514d316b44f32457a6333566d54/index.html).

21 The World Bank, "47 Countries Make 67 Reforms to Help Farmers Grow Their Businesses in 2018," news release, October 21, 2019, <https://www.worldbank.org/en/news/press-release/2019/10/21/47-countries-make-67-reforms-to-help-farmers-grow-their-business>.

22 "Food Crisis Soaring Across Africa," International Committee of the Red Cross, accessed September 27, 2022. <https://www.icrc.org/en/document/food-crisis-soaring-across-africa>.

23 Ricardo Fuentes-Nieva, "Growing Hunger and High Food Prices in Africa Don't Have to Become a Worse Tragedy," *Africa Renewal*, May 20, 2022, <https://www.un.org/africarenewal/magazine/may-2022/growing-hunger-high-food-prices-africa-dont-have-become-worse-tragedy>.

alterations. As predicted, the pandemic temporarily disrupted supply chains as a result of decreased input availability, labor constraints, and transportation issues.<sup>22</sup> Food essentials have become more expensive and less readily available as a result, particularly in rural areas. Disease and the global supply chain are intricately linked. The current food cost surge is the highest recorded by the FAO since 1961. The current cost of food is 42 percent higher now than in 2016, the second highest that has ever been seen.<sup>23</sup> As a result, businesses and tech companies are looking for ways to reinvigorate the food supply and lower the overall cost of food to alleviate hunger as a result of the supply chains being hindered by diseases.

Long-term, it is anticipated that the pandemic will lead to the development of new technologies, like digital supply chains, and a rise in the use of cold chain logistics. Adapting to the digital world as a result of COVID-19 and the quarantine measures that came with it has pushed many developing countries to advance their technological capabilities. This might cause the food supply chain to become more effective and transparent. Many tech companies, like Vendeease, have



Women sell their produce at a market in Lilongwe, Malawi to generate income for their families

Credit: Stephen Morrison/Africa Practice for AusAID



helped restaurants buy food supplies, acquiring the best quality products at the best price possible.<sup>24</sup> Vendease is an online marketplace for many African food businesses, providing a transparent process for hotels and restaurants to get the best quality food. This is a direct long-term consequence of the pandemic, which has forced things to move digitally to mitigate the spread of the virus. Electronic traceability systems are also used in the African food supply chain to enable distributors and farmers to monitor the flow of their products from farm to table. Lastly, many African countries use mobile applications like m-Farm to link farmers and consumers.<sup>25</sup> This lowers the price of food distribution and increases supply chain transparency.

Delegates should consider how technology can help aid and alleviate tensions between different stakeholders in the food supply chain to ensure prices are fair and equal for all in times of crisis. Everyone must have equitable access to food and nutrition, especially in times when a global pandemic can take the lives of those most food insecure.

## Conclusion

Wet markets have been linked to the transmission of zoonotic diseases, such as COVID-19, due to their congested and unclean environments. Wet markets can be found around the world, particularly in Asia, Africa, and Latin America, and have faced debate about being banned due to the risk of disease transmission and unethical treatment of animals. Researchers have also found that wet markets have transmitted diseases, such as severe respiratory syndrome and avian influenza, between humans and animals. Potential solutions to mitigate the risk of disease transmission from wet markets include stricter regulations and enforcement, alternative food supply sources, and education about the risks of wet markets.

The COVID-19 pandemic has had significant impacts on China's food supply, including shortages, increased prices, and a shift in the supply-demand balance. This has resulted in food insecurity and higher costs for Chinese consumers. Countries in Africa are also facing food supply challenges due to quarantine measures and the pandemic's economic impacts.

<sup>24</sup> "Home," Vendease, accessed January 14, 2022, <https://www.vendease.com/home>.

<sup>25</sup> "Mfarm," Techxlab, accessed January 14, 2022, [www.techxlab.org/solutions/mfarm-m-farm/](http://www.techxlab.org/solutions/mfarm-m-farm/).

The pandemic is anticipated to have long-term structural changes on Africa's food supply chains, including greater reliance on imports and a shift towards local production. Both China and Africa have implemented measures to address their food supply challenges and ensure the economic prosperity of their countries.



FAO

NHSMUN 2023

**TOPIC B:  
REDUCING FOOD WASTE TO COMBAT HUNGER**

Photo Credit: Starr

## Introduction

As the world's population continues to grow, food waste is at an all-time high. These soaring population numbers contribute to food instability and insecurity. Food production causes heavy carbon emissions, and decomposing food only adds to the carbon footprint. In recent years, food waste has reached 1.6 billion tons across all production sectors. A report by the FAO emphasized how in developing countries, most food is lost during agricultural production. In contrast, higher-income countries tend to have higher loss rates at the distribution and consumer levels. While the issue of food waste presents a challenge, the environmental impacts that food waste brings are also damaging. An estimated 3.3 billion tons of greenhouse gas (GHG) emissions released into the atmosphere are the direct result of food wastage. 250 trillion liters of water are used yearly for food production, which is three times the volume of Lake Geneva.<sup>1</sup> Comparing this number with the rest of the world, the food waste blue water footprint is greater than any other country by a margin of about 30 cubic kilometers. This amount of water wastage can alter naturally occurring hydrological systems through water depletion and soil degradation, which can only spell trouble for hydrological ecosystems and available land.<sup>2</sup>

This isn't without effort, though. Countries around the world have formed their own policies to help reduce how much food they are wasting. For example, South Korea's Pay As You Throw policy, enacted in 2013, has South Korean residents pay KRW three hundred for each three-liter bag of food thrown out. The contents will be composted and made into fertilizers and other biofuels. This initiative has allowed South Korea to recycle nearly 100 percent of its food.<sup>3</sup> Unfortunately, these policies have had varying amounts of success across the globe, with different levels of governmental support. Delegates should find solutions to help their respective countries decrease their own food waste rates, but also to help find a solution to decrease the international waste rate.

## The Environmental Impact

As the world continues to grow and develop, so do production and manufacturing techniques. One other thing remains true—as these means of production increase, so do the carbon footprints of these sectors. The food production sector is no exception; this industry generates 3.3 gigatonnes of carbon

dioxide annually. Food waste is generated throughout the output process, but over 50 percent of waste occurs in what is known as the “upstream” phase, in which food is produced, handled, and stored. The remaining amount of waste occurs in the “downstream” phase when the food is processed, distributed, and consumed. Even though most of the waste occurs upstream, the waste generated downstream is more harmful to the environment. This is because it includes the energy and resources used in cooking, transporting, and packaging food products.<sup>4</sup>

The carbon footprint produced by food waste is astronomical. This footprint is calculated from the GHG emissions in the entire production cycle. The most destructive GHGs produced by food waste are methane and nitrous oxide. This industry is the third largest producer of GHGs, ranked behind the countries of China and the United States. Vegetables and grains make up the majority of carbon emissions from food waste. In Asia, Europe, and South and Southeast Asia, vegetable waste occurs in large volumes, which translates into a massive carbon footprint. Also in Asia, the wastage of cereals contributes to a large carbon footprint. This is especially true

1 Food Wastage Footprint, *Food wastage footprint: Impacts on natural resources - Summary Report* (Rome: Food and Agriculture Organization, 2013), <https://www.fao.org/3/i3347e/i3347e.pdf>.

2 Food Wastage Footprint, *Food wastage footprint*.

3 Max S Kim, “South Korea has almost zero food waste. Here's what the US can learn,” *The Guardian*, November 20, 2022, <https://www.theguardian.com/environment/2022/nov/20/south-korea-zero-food-waste-composting-system>.

4 “The Environmental Impact of Food Waste,” Move for Hunger, accessed December 15, 2022, <https://moveforhunger.org/the-environmental-impact-of-food-waste>.

for rice, which is very commonly wasted and also has a high methane-emission rate.<sup>5</sup> A study conducted by the Shandong University School of Environmental Science and Engineering found that, annually, China produced 37.5 megatonnes of these GHGs.<sup>6</sup>

From November 6 to November 18, the annual Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change had its 27th annual meeting in Sharm El-Sheikh, Egypt. COP27 had productive conversations about the role of agriculture and food waste in climate change. The President of COP27 this year dedicated one of its days to adaptation and agriculture, which allowed for a panel discussion on food security, nutrition, and private sector support.<sup>7</sup> At COP27, the present parties adopted decision CP.27, which strengthens and addresses the outcomes from the Koronivia Joint Work on Agriculture (KJWA) agreement from COP23.<sup>8</sup> The KJWA planned to use agriculture to tackle climate change by focusing on six main topics. These include soils, nutrient use, water, livestock, methods for assessing adaptation, and food security dimensions. The FAO has pledged to support KJWA by providing policy and legal analysis and access to finances to improve these initiatives.<sup>9</sup>

This decision also established the Sharm el-Sheikh Joint Work on Implementation of Climate Action on Agriculture and Food Security, a new four-year plan to supplement the Koronivia Joint Work on Agriculture.<sup>10</sup> The Joint Work on Implementation of Climate Action on Agriculture and Food Security has acknowledged and continued the KJWA agreement from COP23 and brought several needs to the attention of the conference. These needs include financial and technological support from more developed states so

less developed party members can utilize better agriculture techniques to improve food security in their country. In addition, the KJWA has “highlighted the need for enhanced climate action on agriculture and food security, and for enhanced coordination with and among actors outside the UNFCCC.”<sup>11</sup> This decision also had one other main goal: creating and implementing the Sharm el-Sheikh online portal. This portal is meant for party members to submit their thoughts on the decision and planned actions to help fulfill the proposed goals.

Delegates should carefully look at the COP27 decisions and the KJWA agreement from COP23 for more research and ideas for more environmentally focused solutions. Delegates should also consider these three different facets of environmental impacts that food waste produces: land usage, water wastage, and the emission of carbon dioxide-equivalent GHGs, as this poses some of the biggest threats to humanity’s livelihood when dealing with food waste.

## The Russia-Ukraine Conflict

In late February 2022, the Russian Federation launched an invasion of Ukraine. While the conflict itself has garnered much attention, an unforeseen consequence has also reared its head: a dramatic increase in global food prices. The Russian Federation and Ukraine are both major grain exporters. From 2016–2020, exports from the Russian Federation and Ukraine combined accounted for 24 percent of global wheat, 57 percent of sunflower seed oil, and 14 percent of corn.<sup>12</sup> Since the Russian Federation and Ukraine are such major exporters, the conflict between the two countries has taken its toll on food

5 United Nations Environment Programme, “Food waste harms climate, water, land and biodiversity - new FAO report,” news release, September 11, 2013, <https://www.unep.org/news-and-stories/press-release/food-waste-harms-climate-water-land-and-biodiversity-new-fao-report>.

6 Min Liu et al., “Assessment and projection of environmental impacts of food waste treatments in China from life cycle perspectives,” *Science of the Total Environment* 807, no. 1 (February 2022): 5, <https://doi.org/10.1016/j.scitotenv.2021.150751>.

7 Kelly Witkowski, “COP27: Growing Roles for Agriculture and Food Security,” *New Security Beat*, November 30, 2022, <https://www.newsecuritybeat.org/2022/11/cop27-growing-roles-agriculture-food-security/>.

8 “Issues related to agriculture and food security - Background,” United Nations Climate Change, accessed December 25, 2022, <https://unfccc.int/topics/land-use/workstreams/agriculture#COP-27-November-2022>

9 “Effective climate action through agriculture,” Food and Agriculture Organization, accessed January 5, 2023, <https://www.fao.org/koronivia/about/en/>.

10 United Nations Climate Change, “Issues related to agriculture and food security - Background”.

11 United Nations Framework Convention on Climate Change, Draft decision -/CP.27, Conference of the Parties Twenty-Seventh Session, FCCC/CP/2022/L.4, ¶ 8-9 (Nov. 18, 2022), [https://unfccc.int/sites/default/files/resource/cp2022\\_L04\\_adv\\_0.pdf](https://unfccc.int/sites/default/files/resource/cp2022_L04_adv_0.pdf).

12 Dea Bankova, Prasanta Kumar Dutta, and Michael Ovaska, “The war in Ukraine is fuelling a global food crisis,” *Reuters Graphics*, May 30, 2022, <https://www.reuters.com/graphics/UKRAINE-CRISIS/FOOD/zjvqkgomjvx/>.



A wheat field in Ukraine in 2012

© Raimond Spekking

prices. Due to the war, the costs of grains have increased by 20 percent.<sup>13</sup> Recent research from the Hungarian University of Agriculture and Life Sciences and Gadjah Mada University in Indonesia has shown that if the conflict is not resolved, global food prices could increase anywhere from 8–22 percent of their current prices, which are already heavily inflated.<sup>14</sup>

As prices around the world increase, the amount of food insecurity also increases. People are either too poor to buy food or simply cannot access it. That means that a large amount of food that sits on shelves will expire and accumulate. This is where the source of food waste truly lies in this conflict. In Ukraine, food production is concentrated in cities which are the sites of heavy fighting. This has led to significant yield losses of food production, as 20–30 percent of the winter crops this season remain unharvested. Other parts of Ukraine will also experience decreasing production levels, as farmers cannot find fertilizers, farms undergo labor shortages, and the country overall loses infrastructure, all of which only add to the amount of food waste directly resulting from this conflict.<sup>15</sup>

13 Katy Askew, “Spiking grain prices prompt fresh warning: ‘Food inflation is still going strong,’” *Food navigator.com*, November 15, 2022, <https://www.foodnavigator.com/Article/2022/11/15/spiking-grain-prices-prompt-fresh-warning-food-inflation-is-still-going-strong>.

14 Muh Amat Nasir, Agus Dwi Nugroho, and Zoltan Lakner, “Impact of the Russian-Ukrainian Conflict on Global Food Crops,” *foods* 11, no. 2979 (September 2022): 5–6, <https://doi.org/10.3390/foods11192979>.

15 Nasir, Nugroho, and Lakner, “Impact of the Russian-Ukrainian Conflict on Global Food Crops.”

16 Thomas Pinn, “Waste not, want not: Egypt’s Fight Against Food Waste,” *Scoop Empire*, October 16, 2022, <https://scoopempire.com/waste-not-want-not-egypts-fight-against-food-waste/>.

Egypt is one of the largest importers of Russian and Ukrainian wheat. As the world’s largest importer of wheat, Egypt cannot buy and consume the same amount of wheat that it normally would import due to the Russia-Ukraine conflict. Inflated prices have hurt residents of Egypt, as they are unable to buy wheat, meaning that wheat that isn’t bought must be thrown out. In 2022, the FAO estimated that 50 percent of all fruit and vegetables were wasted, along with 40 percent of fish and 30 percent of milk and wheat.<sup>16</sup> The waste of unbought food due to inflation, plus the baseline food waste rates in import countries, is why the conflict between the Russian Federation and Ukraine is so important to the topic of food waste and food insecurity.

The Food and Agriculture Organization (FAO) drafted a response to the Russia-Ukraine crisis that encourages countries to expand social protection programs. In this way, the FAO is trying to expand countries’ outreach to their impoverished and most vulnerable communities to mitigate the amount of damage that will be done by price inflation resulting from the conflict. The FAO is encouraging countries to look at the social programs enacted during the COVID-19 pandemic as a

basis for social programs needed currently, as the inflation of food prices is very similar in both events.<sup>17</sup> As food prices start to inflate, food security and waste also increase. Delegates researching the conflict should understand why and how this conflict affects food waste. Solutions addressing this issue should account for most of the countries affected by this conflict and the resulting price inflation.

## Social Business and Food Waste

The food supply chain involves production, handling and storage, processing and packaging, distribution, and consumption.<sup>18</sup> As previously stated, the food supply chain is divided into two parts: upstream production, which is made of the first three stages, and downstream production, which is made of the remaining two. The majority of food wastage, 54 percent, occurs upstream, especially at the consumption level, where 569 million tons occur as household waste. The remaining 46 percent occurs downstream.<sup>19</sup>

Some members of the food industry are trying to combat this waste through social business. Social business is a model which aims to balance business goals with social and community objectives. This sustainable type of business allows potential profits to be reinvested in the business to self-sufficiently expand its positive impact. Social business differs from regular for-profit businesses by putting social wealth as the main objective instead of its owners' wealth.<sup>20</sup> These types of businesses help create sustainable and green practices; these social businesses are also called environmental entrepreneurship or ecopreneurship. Recently, a study published by De La Salle University - Dasmariñas researched

environmental entrepreneurship in emerging Asian economies. They measured electricity production due to renewable energy sources and renewable energy production. Their results reflected that ecopreneurship increases the capability of the green economy, as well as having practices that “can effectively reduce environmental pollution.” This is due to environmental entrepreneurship’s inspiration of businesspeople to adopt social and green policies.<sup>21</sup>

These social businesses also play a role when it comes to food waste. An example is Too Good To Go (TGTG), an app that will “rescue delicious, unsold food from businesses to save it from being thrown away. In turn, the app powers...efforts to build an anti-food waste movement.”<sup>22</sup> The food is sold to app users from restaurants and businesses in “surprise bags” that cost anywhere between four to six USD. Restaurants that use TGTG actively reduce food waste and climate change. The app itself is sustainable, as purchasing through the app reduces carbon emissions. TGTG has saved 170 million meals, and within just five years, the app has saved 86,747 tons of carbon emissions. Currently, TGTG is present in 15 countries in Europe and the US. It has also proven itself sustainable since its creation in 2015.<sup>23</sup>

Recently, IHG Hotels and Resorts, which owns the Holiday Inn and Crowne Plaza hotel chains, partnered with a new ecobusiness called VietHarvest to reduce hotel food waste in Vietnam. Through this partnership, IHG Hotels, which has 15 open hotels in Vietnam with another 22 opening soon, will donate food from its properties that would normally be thrown out to VietHarvest, who will then be able to donate it to communities in Hanoi in need. The IHG company has

17 Food and Agriculture Organization, *Responding to the Ukraine Crisis: Leveraging Social Protection for Food Security and Nutrition* (Rome: Food and Agriculture Organization, 2022), <https://www.fao.org/3/cc3321en/cc3321en.pdf>.

18 “The Food Supply Chain,” Too Good to Go, accessed December 26, 2022, <https://toogoodtogo.com/en-us/movement/education/the-food-supply-chain>.

19 Dakota Sheetz, “The Underlying Causes of Food Waste,” *Zip HACCP*, July 28, 2020, <https://ziphaccp.com/en/food-waste/causes-of-food-waste.html>; Raife Meltem Yetkin Özbük, Ayşen Coşkun, “Factors affecting food waste at the downstream entities of the supply chain: A critical review,” *Journal of Cleaner Production* 244, no. 118628 (January 2020): 2, <https://doi.org/10.1016/j.jclepro.2019.118628>; Niall McCarthy, “The Enormous Scale of Global Food Waste [Infographic],” *Forbes*, March 5, 2021, <https://www.forbes.com/sites/niallmccarthy/2021/03/05/the-enormous-scale-of-global-food-waste-infographic/>.

20 “What is Social Business?,” HEC Paris, accessed December 26, 2022, <https://www.hec.edu/en/faculty-research/centers/society-organizations-institute/think/so-institute-executive-factsheets/what-social-business>.

21 Xushi Wei, Haiping Ren, Sana Ullah, and Cuma Bozkurt, “Does environmental entrepreneurship play a role in sustainable green development? Evidence from emerging Asian economies,” *Economic Research - Ekonomska Istraživanja* 36, no. 1 (May 2022): 8, <https://doi.org/10.1080/1331677X.2022.2067887>.

22 “Why It Matters,” Too Good To Go, accessed December 26, 2022, <https://toogoodtogo.com/en-us/consumer>.

23 Irina, “Too Good To Go - the social enterprise tackling global food waste,” Digital, Data, and Design Institute at Harvard, last modified October 30, 2022, <https://d3.harvard.edu/platform-digit/submission/too-good-to-go-the-social-enterprise-tackling-global-food-waste/>; Partha Ray, “Too Good To Go: A Win-Win-Win Situation,” Digital, Data, and Design Institute at Harvard, last modified March 22, 2020, <https://d3.harvard.edu/platform-digit/submission/too-good-to-go-a-win-win-win-situation/>.

also pledged to donate funds allowing VietHarvest to expand operational support in Hanoi and enable them to deliver more than 10 thousand meals to communities in need of support.<sup>24</sup> If delegates wish to take on food waste from an economic perspective, looking at environmental entrepreneurship and sustainable models is a good place to start.

## Conclusion

Food waste affects everyone. The impact of food waste on the international community is significant, costing an annual USD 2.6 trillion worldwide across environmental, economic, and social costs of food production; this is why the international community must come up with a way to create comprehensive and collaborative solutions.<sup>25</sup> Food waste has a massive impact on the environment, especially when considering that the food industry is the third largest producer of GHGs.<sup>26</sup> Additionally, disturbances in international relations which do not directly deal with food waste can also affect the amount of food waste produced. In the Russia-Ukraine conflict, countries reliant on the Russian Federation and Ukraine for goods such as wheat, soybean, and maize have been cut off, causing drastic increases in prices for those goods.<sup>27</sup> This is essential to take into account when proposing solutions to reduce food waste worldwide. Finally, sustainable social business practices are up-and-coming. Looking at some of those business models, as well as other sustainable practices, are important for coming up with comprehensive solutions.

To inform their research, delegates should look at the Food Wastage Footprint reports, both the *Impacts on natural resources - Summary Report* and the *Full-cost accounting - Final Report*, as well as *The State of Food Security and Nutrition in the World 2022*. Additionally, delegates should take inspiration from different initiatives in different countries. These include South Korea's Pay As You Throw Initiative; Japan's Second Harvest National Food Bank and their Food Recycling Law (which diverts food waste towards composting centers); and France's ban on

grocery store food waste (which dictates that any food nearing its expiration date must be donated, and those who throw food out are given hefty fines).<sup>28</sup> Overall, delegates should remain focused on food waste but try to make the solutions as multifaceted and comprehensive as possible.

24 IHG Hotel Group, "IHG Hotels & Resorts teams up with VietHarvest to cut food waste and hunger in Vietnam," *hospitalitynet*, December 1, 2022, <https://www.hospitalitynet.org/news/4113800.html>.

25 Food Wastage Footprint, *Food wastage footprint: Full-cost accounting - Final Report* (Rome: Food and Agriculture Organization, 2014), <https://www.fao.org/3/i3991e/i3991e.pdf>.

26 Food Wastage Footprint, *Impacts on natural resources - Summary Report*.

27 Nasir, Nugroho, and Lakner, "Impact of the Russian-Ukrainian Conflict on Global Food Crops," 6.

28 "5 Countries Leading the Fight to End Food Waste," FoodHero, September 2, 2019, <https://foodhero.com/blogs/countries-fighting-food-waste>.

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