

Saint Peter's University High School Model United Nations

Food & Agriculture Organization

Topic A: Adapting Agriculture to Climate Change

Introduction

The global agriculture industry is in the challenging position of being both a major contributor to the causes of climate change and seriously affected by the impacts of climate change. Overall, one recent study estimates that around 35% of global greenhouse gas (GHG) emissions is the result of food production.¹ Emissions are driven by soil tillage, crop and livestock transportation, manure management, and fertilizer use.² In addition, increases in agricultural land use often come at the cost of carbon-reducing forested acreage.³ Over half (57%) of agricultural GHG emissions result from animal production, with a further 29% from plant production.⁴ Further, agricultural production will need to increase 70% by 2050 in order to guarantee food security for a growing global population⁵ potentially exacerbating the problem and working against target GHG reductions. It is inconceivable that world can meet the climate change challenge without re-thinking agriculture.

At the same time, the impacts of climate change on agriculture are already being felt and have the potential to be much worse. As the climate changes, areas that have been agriculturally productive may become less so. In addition, food production is at risk from increased frequency of droughts, excessive rain, storms, coastal erosion, and wildfires.⁶ Increased weather events will also disrupt food supply chains, leading to a further projected decrease in food security.⁷ Increased food costs due to impacts on food production also threaten global food security.⁸ If the UN intends to meet the Sustainable Development Goal (SDG) of zero hunger by 2030, it must help the agriculture industry adapt to climate change.

Current Situation

In the push for countries to reduce their carbon emissions, many are looking to meet their targets under the Paris climate accord. Around 90% of the countries that have submitted Intended

¹ Xu, Xiaoming et al. Global greenhouse gas emissions from animal-based foods are twice those of plant-based foods. *Nature Food*. September 2021. Vol 2, pp. 724-732

² Thompson, Andrea. "Here's How Much Food Contributes to Climate Change." *Scientific American*. 13 September 2021. <https://www.scientificamerican.com/article/heres-how-much-food-contributes-to-climate-change/> Accessed 6 January 2021.

³ Ibid.

⁴ Ibid.

⁵ Xu, p. 724.

⁶ Intergovernmental Panel on Climate Change. *Climate Change and Land: Summary for Policymakers*. January 2020. IPCC, p. 17.

⁷ Ibid.

⁸ Flavelle, Christopher. "Climate Change Threatens the World's Food Supply, United Nations Warns." *New York Times*. 8 August 2019. <https://www.nytimes.com/2019/08/08/climate/climate-change-food-supply.html> Accessed 6 January 2022.

Saint Peter's University High School Model United Nations

Food & Agriculture Organization

Nationally Determined Contributions (INDCs) mentioned agriculture as a targeted area in their efforts to reduce GHGs.⁹ The FAO (in conjunction with United Nations Development Programme) supported much of this work through the *Integrating Agriculture into National Adaptation Plans Programme*, which concluded in 2020.¹⁰ The INDCs detail mitigation strategies including carbon sequestration on forest lands and in coastal ecosystems and emission reductions from managed agricultural soils, croplands, and manure management.¹¹ The main obstacles to implementing these mitigation plans is funding and technical expertise, particularly in developing economies. In order to make these plans a reality, FAO needs to serve as a conduit through which UN funds and expertise can be provided where needed.

As the FAO works to reduce agriculture's carbon footprint to mitigate climate change, it must also reckon with the extant and potential impacts of climate change on food production. Since 2010, FAO has endorsed "Climate-Smart" Agriculture (CSA).¹² CSA strategies include improving practices such as soil and nutrient management, water harvesting and retention, and pest and disease control.¹³ It also means taking an ecosystems approach that prioritizes biodiversity and its role in resiliency and pest control.¹⁴ The goal is for food production to better withstand disruptions due to fluctuating weather patterns while at the same time increasing crop yields and empowering local farmers and communities. A recent FAO study concludes that CSA is already working in some areas, but the challenge is to implement it more widely.¹⁵ By making careful investments, the FAO can help the agricultural industry adapt to climate change, reduce poverty, and increase food security.

Questions to Address

- How can FAO best help member states meet their INDC targets in the agricultural sector?
- What are the most effective strategies for helping food production adapt to climate change?
- How can the FAO raise support and awareness for Carbon-Smart Agriculture?

⁹ FAO. *FAO Strategy on Climate Change*. July 2017. FAO: Rome, p. 12

¹⁰ FAO & UNDP. *FAO-UNDP joint evaluation of the project "Integrating Agriculture into National Adaptation Plans (NAP-Ag)"*. 2021. FAO: Rome.

¹¹ Crumpler, K., et al. *2021 (Interim) Global update report – Agriculture, Forestry and Fisheries in the Nationally Determined Contributions*. 2021. Environment and Natural Resources Management Working Paper No. 91. Rome, FAO. <https://doi.org/10.4060/cb7442en>

¹² FAO. *"Climate-Smart" Agriculture Policies, Practices and Financing for Food Security, Adaptation and Mitigation*. 2010. FAO: Rome, p. iii

¹³ *Ibid*, p. 1-2

¹⁴ *Ibid*, p. 2.

¹⁵ FAO. *Climate-smart agriculture case studies 2021 – Projects from around the world*. 2021. Rome. <https://doi.org/10.4060/cb5359en>, p. 80

Topic B: Invasive Species and the Threat to Food Production

Introduction

Invasive species have always presented a significant threat to food production. The Irish potato famine of the 1840s caused by *Phytophthora infestans* and the devastating impact of coffee rust in Ceylon in the 1860s caused by *Hemileia vastatrix* are two historical examples.¹⁶ Increasing global trade and migration have allowed the introduction of many species into new areas – some of which eventually establish a foothold and become pests. In fact, the rate at which plant and animal species are introduced to new areas through human activity is accelerating.¹⁷ Not all invasive species are detrimental – most are neutral and some even beneficial. Nevertheless, a significant minority of invasive species have proven harmful – especially to farms, fisheries, and forests.¹⁸ These pests can cause local economies to lose billions of dollars in failed crops and in mitigation efforts. For example, production losses from invasive pests and pathogens have been estimated to cost the United States almost US\$ 40 billion in food production losses annually¹⁹. In worst case scenarios, they can lead to the extinction of native species, such as the American chestnut (*Castanea dentata*).²⁰

The transnational spread of invasive species occurs through several avenues. Wood-based packaging of trade goods has proven to host several viable species of insect and fungus. Global dissemination of seed and soil amendments has also help proliferate pests. Insect and animal species will often stowaway on planes and ships carrying cargo. International travelers will also bring non-native plants or animals into their home countries.²¹ Finally, some invasive species are intentionally brought in, such as non-native ornamental plants in gardens.²² Identifying and policing these forms of transmission needs to be an important part of any mitigation strategy. At the current time, researchers have identified over 1,300 invasive species in 124 different countries. Climate change also seems to be exacerbating the spread of these pests.²³ One recent study estimates that the United States and China will experience the largest absolute costs from

¹⁶ IPPC Secretariat. *Scientific review of the impact of climate change on plant pests – A global challenge to prevent and mitigate plant pest risks in agriculture, forestry and ecosystems*. 2021. Rome. FAO on behalf of the IPPC Secretariat. <https://doi.org/10.4060/cb4769en>, p. 8

¹⁷ Tobin PC. Managing invasive species. *F1000Research*. 2018; 7: F1000 Faculty Rev-1686. Published 2018 Oct 23. doi:10.12688/f1000research.15414.1

¹⁸ Ibid.

¹⁹ Dean R. Paini, et al., Global threat to agriculture from invasive species. *Proceedings of the National Academy of Sciences* July 2016, 113 (27) 7575-7579; doi: 10.1073/pnas.1602205113

²⁰ Tobin. Managing invasive species...

²¹ IPPC Secretariat. *Scientific review...*, pp. 10-13

²² Tobin. Managing invasive species...

²³ IPPC Secretariat. *Scientific review...*

Saint Peter's University High School Model United Nations

Food & Agriculture Organization

invasive species, but that Sub-Saharan African countries will be especially vulnerable since agriculture is such a significant component of their GDP.²⁴

Current Situation

Agricultural authorities throughout the world have taken individual invasive species seriously for decades, but a global strategy to combat invasive species more generally is relatively new.²⁵ Most proposed strategies prioritize preventing the transmission of pests in the first place. This includes more sanitary harvesting and processing standards, increased inspection of transport containers, and better information sharing among governments.²⁶ Yet few believe that such measures will be able to stem the flow of invasive species entirely. Therefore, targeted approaches to mitigation strategies such as quarantine, slow of spread through control measures, and elimination through pesticides, fungicides, or predation will always be needed.²⁷ It is essential to develop common standards for prevention and treatment and for governments to share information quickly about new outbreaks and measures that prove effective.

Recognizing the futility of trying to prevent or eradicate invasive species entirely, the FAO has begun to work towards promoting loss mitigation and adaptation. Increased surveillance and monitoring of invasive species are crucial to this approach and the FAO must ensure that governments have common practices for collecting data and disseminating results widely in a timely manner.²⁸ In addition, agencies need to be smart about how to allocate their limited resources – prediction of outbreaks before they occur can help identify where to focus their efforts. Finally, adapting food production to the realities of invasive pests (and climate change) is essential.²⁹ Working to develop more pest-resistant varieties and enhancing natural resistance to the spread of pests will be necessary.

Questions to Address

- How can FAO encourage more surveillance, monitoring, and dissemination of invasive pests among member states?
- What will be necessary to help better predict future invasive species outbreaks?
- What steps can FAO take to encourage new varieties of food products that are more resistant to the effects of both invasive pests and climate change.

²⁴ Dean R. Paini, et al., *Global threat to agriculture...*, p. 7575

²⁵ McNeely, J.A., H.A. Mooney, L.E. Neville, P. Schei, and J.K. Waage (eds.) 2001. *A Global Strategy on Invasive Alien Species*. IUCN Gland, Switzerland, and Cambridge, UK.

²⁶ Tobin. *Managing invasive species...*, p.4

²⁷ IPPC Secretariat. *Scientific review...*

²⁸ Ibid.

²⁹ Ibid.