

Forum: Sustainable Development Committee

Issue: *The question of increasing agricultural production despite the effects of the global climate crisis*

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Introduction

Food is an essential, but scarce, resource in many parts of the world. Global conflicts, climate change, and supply disruptions from COVID-19 have exacerbated the problem by severely affecting, among other things, our ecosystems and agricultural production.

Agriculture is very sensitive to changes in climate as it relies heavily on natural resources like soil and water, but also simply the weather and temperature. While climate change could have positive effects on agricultural production in some regions, it will also make agricultural practices more difficult in others. However, the negative consequences essentially outweigh the few positive ones by far. Even though the agricultural sector suffers under the effects of climate change, it also profoundly amplifies the issue. Around 25% to 30%¹ of our global emissions can be attributed to agriculture.

Hence, agriculture can be considered a double-edged sword, as it is both a victim and a contributor to climate change. It must adapt to the consequences of change and reduce its emissions of greenhouse gases. Although we often think of it as something that lies ahead in the future, it is an ongoing process and its impacts can already be felt by millions of people today. However, climate change impacts are felt unevenly across the globe and the country. Even within a single community, climate change impacts can differ between neighborhoods or individuals. Long-standing socioeconomic inequality can make certain individuals more vulnerable, as they often have the highest exposure to hazards and the fewest resources to respond. Essentially, the consequences of climate change are interrelated and seen throughout every aspect of the world we live in. Drought can harm

¹ : <https://ourworldindata.org/greenhouse-gas-emissions-food>

food production and human health. Flooding can lead to disease spread and damage to ecosystems and infrastructure. Human health issues can increase mortality, impact food availability, and limit worker productivity. Its effects on global agricultural production and food supply may, however, be most detrimental of all, as it is particularly affected by climate change. If one considers that 75 percent of food production depends on only twelve plants and five animal species, it becomes clear how vulnerable the world's food supply is. The extent of it and the implications and causes will be explained in the following.

Definition of Key Terms

Food insecurity

As defined by the United Nations Regional Information Centre for Western Europe (UNRIC), a person is food insecure when they lack regular access to enough safe and nutritious food for normal growth and development and an active and healthy life. Food insecurity can be experienced at different levels of severity.

Erosion

The process by which the surface of the earth is worn away by wind and water. It can occur naturally in the form of erosion caused by wind, rain, and other natural forces, or it can be caused by human activities such as logging, mining, and land development. Erosion can result in the loss of topsoil, leading to a decrease in soil fertility, an increase in sediment in rivers and streams, and a reduction in water quality. Erosion can also cause soil particles to be carried downstream, damaging habitats and impacting aquatic species.

Livestock

A term used to refer to domesticated animals, such as cattle, chickens, goats, horses, sheep, and pigs, which are kept for various purposes, including food production, dairy and egg production, and other agricultural purposes. Livestock can also be used for work and cultural or religious purposes. Livestock plays an important role in global food production, as they provide a reliable source of meat, milk, eggs, and fiber. They also provide important environmental services, such as soil fertilization and weed control, and can help to reduce soil erosion.

Background Information

Rising Sea Levels

Rising sea levels can have significant impacts on agriculture. Flooding can damage crops, contaminate soil, and erode agricultural land. Saltwater intrusion caused by rising sea levels can contaminate water supplies used for irrigation, leading to decreased crop yields. Furthermore, extreme weather events caused by climate change can damage crops and reduce agricultural productivity. Heat and humidity can also affect the health and productivity of animals raised for food supply.

The Water Crisis

The water crisis in agriculture is a grave global concern, as it affects the availability of safe and reliable water for food production. This crisis is caused by several factors, including climate change, population growth, and overconsumption of water resources. Climate change has led to increased drought, making it difficult to access enough water for agricultural needs. Population growth has put a strain on water resources, as more people require access to clean water for drinking, cooking, and other domestic needs. Additionally, the overconsumption of water resources has led to the depletion of groundwater reserves and the pollution of surface water by agricultural runoff. As the water crisis continues to worsen, it is becoming increasingly difficult to access enough water for agricultural needs, leading to a decrease in crop yields and a decrease in food security.

Air pollution may also damage crops, plants, and forests.⁹ For example, when plants absorb large amounts of ground-level ozone, they experience reduced photosynthesis, slower growth, and higher sensitivity to diseases

Agricultural workers face several climate-related health risks. These include exposure to heat and other extreme weather, more pesticide exposure due to expanded pest presence, disease-carrying pests like mosquitos and ticks, and degraded air quality

Causes

To begin with, agriculture is a major source of GHG which has a great impact on the climate problem. It currently generates 19-29% of total greenhouse gas (GHG) emissions. The use of synthetic fertilizers and the digestion of livestock during agriculture activities, emit significant amounts of greenhouse gases, specifically nitrous oxide, and methane, which are potential contributors to global warming. Furthermore, deforestation and land-use change, occur by clearing forests and other natural landscapes to expand croplands and pasturelands. This process can result in the release of large amounts of carbon dioxide from the soil and vegetation which may as well disrupt important ecosystems and their ability to sequester carbon. Besides this, intensive agriculture practices, for instance, pesticides and irrigation, may result in soil degradation, water scarcity, and the loss of biodiversity, which can further exacerbate the impacts of climate change. Additionally, the increasing population heavily impacts the demand for food, identical to leading an expansion of agriculture, which consequently increases greenhouse emissions, deforestation, and other environmental impacts. These existing climate crises due to the increasing agriculture production thus caused the UN to devise certain treaties and agreements to provide provisions to regulate and limit certain agriculture practices, intending to protect the environment from the further climate crisis and ensure sustainable food production. Several treaties and agreements are already listed underneath, such as CBD, UNFCCC, etc. However, another agreement would be the Paris Agreement, which aims to limit global warming below 2°C above pre-industrial levels and pursue efforts to omit the temperature increases to 1,5°C. By doing so, the agreement encourages countries to build resilience, such as sustainable land management, soil conservation, and climate-smart agriculture, which can impact the agriculture production.

Major Countries and Organizations Involved

Liberia

Liberia is the most agricultural-reliant country in the world. Its economy is heavily dependent on its agriculture, which considers 76.9% of the country's GDP. A large portion

of the population engaged in agriculture occupation. In addition, the increasing investment of Liberia in the agriculture sector has been continuing, particularly in large-scale commercial agriculture which led to an expansion of cash crops and food crops. E.g, palm oil, cocoa, rice and cassava.

China

Agriculture is a significant sector in China, contributing to the country's economy. China is one of the largest producers of agricultural products in the world, with a wide range of crops grown, including rice, wheat, soybeans, and various fruits and vegetables. Their agricultural products feed 22% of the world's population (23% of the world, rice is produced in china). Additionally, China's land is also highly employed for agriculture.

United States

Agriculture is an important sector of the US economy. The crops, livestock, and seafood produced in the United States contribute more than \$300 billion to the economy each year. When food service and other agriculture-related industries are included, the agricultural and food sectors contribute more than \$750 billion to the gross domestic product.

FAO (Food and Agriculture Organization)

FAO is a specialized agency of the United Nation which conducts international coordination to defeat hunger. FAO's goal is to achieve a world without hunger and poverty. In addition, urges to achieve food security and ensure the population with regular access to sufficient high-quality food. The organization consists of 195 members and works in over 130 countries worldwide.

IPPC (Intergovernmental Panel for Climate Change)

The International Panel for Climate Change (IPPC) is an international body established by the United Nations (UN) in 1988. Its main purpose is to provide scientific information and an assessment to policymakers on the issue of climate change, its causes, potential impacts, and options for adaptation and mitigation.

WBG (World Bank Group)

The World Bank Group is a specialized agency of the United Nation. The World Bank Group is associated with five development institutes (five international organizations—IBRD, IDA, IFC, MIGA, and ICSID), the organizations above provide leveraged loans to developing countries. The WBG is currently scaling up an integrated approach called CSA (Climate-smart agriculture). The CSA manages landscapes—cropland, livestock, forests, and fisheries, which address the interlinked challenges of food security and climate change. Moreover, CSA aims to simultaneously achieve the outcomes of increased productivity, enhanced resilience and reduced emission.

Timeline of Events

The impact of increased agriculture on the climate and the environment is a complex issue that has been evolving over many decades and even centuries. According to the Intergovernmental Panel for Climate Change, substantial climate change has already occurred since the 1950s, it was estimated that the surface air temperature will increase by 0.4 to 2.6°C in the second half o the century. Within the intensification of agriculture, it was estimated that the demand for livestock products will grow by +70% between 2005 and 2025. Apart from this, the organizations, particularly the World Bank Group financing Climate Change Action plan and working to achieve the aims of climate-smart agriculture. In 2020, 52% of the World Bank’s finance in agriculture also targeted climate adaptation and mitigation.

Relevant UN Treaties and Events

1.United Nations Framework Convention on Climate Change (UNFCCC)

The treaty aims to achieve greenhouse gas emissions reduction, to prevent global warming. The UNFCCC encourages countries to adopt sustainable agricultural practices that reduce emissions, such as agroforestry, so versatile agriculture, and degraded crop-livestock systems.

2. Convention on Biological Diversity (CBD)

The CBD treaty is aiming the goal to conserve biodiversity and ensure the sustainable use of natural resources. This treaty encourages UN countries to adopt sustainable agriculture practices that protect biodiversity, such as agroecology, crop rotation, and organic farming.

3. International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)

This treaty aims to conserve and sustainably use plant genetic resources for food and agriculture. ITPGRFA promotes and encourages the use of traditional and local knowledge in agriculture production and further development in plant varieties which helps the plant to adapt to the local conditions and have diverse traits, for example, resistance to pests and diseases.

4. Transforming our world: the 2030 Agenda for Sustainable Development (UN)

<https://documents-dds-ny.un.org/doc/UNDOC/GEN/N15/291/89/PDF/N1529189.pdf?OpenElement>

However, there are no certain UN treaties that particularly restricts agriculture production. Although in order to aim sustainable food production and to protect the climate. There are UN treaties and agreements which provides provision to regulate and limit certain agriculture practices.

Previous Attempts to solve the Issue

1. The **UNFCCC (United Nations Framework Convention on Climate Change)** is the body that oversees global climate change negotiations. This 1992 international agreement attempts to stop harmful human influence on the climate system. It has prompted the development of several mechanisms, including the Reducing Emissions from Deforestation and Forest Degradation (REDD+) program and the Clean Development Mechanism, which encourage sustainable land use practices, including in agriculture, and

offer incentives for lowering greenhouse gas emissions.

2. The **GACSA**, or the **Global Alliance for Climate-Smart Agriculture GACSA**, which was founded in 2014, is a voluntary coalition of enterprises, civil society organizations, governments, and farmers that works to advance sustainable agricultural practices that improve food security and climate resilience. It encourages the incorporation of climate change factors into agricultural investments, initiatives, and policies.

3. The **Sustainable Development Goals (SDGs)**: The 2015-adopted SDGs have a specific objective titled "Zero Hunger" (SDG 2) that aims to increase food security, enhance nutrition, and advance sustainable agriculture. The importance of sustainable food production systems that reduce greenhouse gas emissions, save biodiversity, and preserve natural resources is emphasized by this objective.

4. The **Food and Agriculture Organization of the United Nations (FAO)** has produced a resource called The Climate Smart Agriculture Sourcebook that offers step-by-step instructions on how to conduct climate-smart agriculture, including in the production of fisheries, forests, crops, and animals.

Possible Solutions

Crop Rotation

Crop rotation is a practice used by non-monocultural farmers to maintain soil fertility by planting different types of crops in the same area in different years. This helps to prevent the depletion of nutrient levels in the soil and reduce the need for chemical fertilizers, making it not only more sustainable but also cost-effective. It is also beneficial for pest control, as certain crop varieties are more attractive to pests than others. Crop rotation also helps to improve soil structure, reduce erosion, and improve water retention

Cloud Seeding

Cloud seeding is a technique used to modify clouds and increase rainfall. It involves the use of materials such as silver iodide, dry ice, or salt, which are released into the atmosphere to create additional condensation and cloud formation. This causes an increase in precipitation, which can be beneficial for agricultural activities such as crop irrigation, replenishing water supplies, and reducing the risk of drought. Cloud seeding can also be used to decrease hail size and reduce the risk of damage from hail storms. It is widely used in China and multiple other countries, including a few US states

Other possible solutions include more investments into agricultural research, stricter regulations of the use of biofertilisers and pesticides, promotion of greater biodiversity, *CRISPR*

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