THE RELATIONSHIP BETWEEN CLIMATE CHANGE AND FOOD SYSTEMS

Estimated read time: 5 min

ON THE GREEN AGENDA

KEY TAKEAWAYS

Climate change and food systems share an interdependent, reciprocal relationship with cascading effects on global economic, social and environmental development.

Current practices in livestock production and agriculture, as well as food waste and loss, contribute to global warming.

Systemic changes are required within the agricultural industry so that environmental efficiency remains at the forefront.

Climate change and food systems share an interdependent, reciprocal relationship that continues to produce cascading effects on global economic, social and environmental development. The United Nations has declared a target for food security - Zero Hunger - as stated in its Sustainable Development Goal (SDG) #2. However, the availability, accessibility, utilisation and stability of food resources remains in a precarious position.[1] The climate crisis continues to impact animal husbandry, land suitability, consumption patterns and the agricultural sector. Inversely, the declining health of food systems has worsened greenhouse gas (GHG) emissions.

[1]https://news.mongabay.com/2024/02/climate-change-extreme-weather-conflict-exacerbate-global-food-crisis/

LIVESTOCK PRODUCTION

When assessing the various contributions to yearly GHG emissions, livestock production plays a significant role.

ACCORDING TO THE FOOD AND AGRICULTURE ORGANISATION (FAO), "WITH EMISSIONS ESTIMATED AT 7.1 GIGATONNES CO_2 EQUIVALENT PER ANNUM, **[THE LIVESTOCK SECTOR REPRESENTED] 14.5% OF HUMAN-INDUCED GHG EMISSIONS**...[WITH] BEEF AND CATTLE MILK PRODUCTION [ACCOUNTING] FOR THE MAJORITY OF EMISSIONS, RESPECTIVELY CONTRIBUTING 41% AND 20% OF THE SECTOR'S EMISSIONS".[2]

The global consumption of meat and dairy continues to increase as societies value the nutrients and protein of animal-based diets. In rural communities especially, livestock agriculture is instrumental for local farmers as "livestock support more than 750 million of the world's poorest people."[3] As the world's population increases, so does the demand for livestock. This has compounded the effects of animal rearing on climate change, as land and machinery usage, as well as transportation and refrigeration of subsequent byproducts, have all proportionally increased.

Significant land space is required for livestock cultivation. Due to this, trees are cut down resulting in the release of carbon dioxide stored in forests and reduction of Earth's capacity for air purification.

COWS AND SHEEP ALSO CONTRIBUTE TO NON-CO_2 GAS EMISSIONS IN THE FORM OF METHANE AND NITROUS OXIDE, AS THEY DIGEST GRASS AND EXPEL WASTE.

Additionally, the deterioration of the ozone layer has allowed pests and diseases to fester as the temperature rises. This has the rippling effect of worsening animal health – the quality of animal products is negatively affected, more livestock is required to compensate for declining quality, resulting in more resources being used. The FAO notes that "healthier animals are more productive and generate lower emissions per weight of product. Improving animal health reduces emission intensity and enhances resource use efficiency by reducing mortality, and improving productivity and fertility."[4]

FISHERIES HAVE NOT BEEN EXEMPTED FROM THIS HARSH CYCLE. IT IS DOCUMENTED THAT "SHRIMP FARMS OFTEN OCCUPY COASTAL LANDS FORMERLY COVERED IN MANGROVE FORESTS WHICH ABSORB HUGE AMOUNTS OF CARBON."[5] WHEN THESE MANGROVES ARE CLEARED, THE STORED CARBON IS RELEASED, THEREBY ENLARGING THE CARBON FOOTPRINT.

---

[2]Gerber, P.J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., Falcucci, A. & Tempio, G. 2013. Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities. Food and Agriculture Organisation of the United Nations (FAO), Rome.
[3]https://openknowledge.fao.org/handle/20.500.14283/ca8946en
[4]Ibid
[5]https://www.un.org/en/climatechange/science/climate-issues/food#:~:text=Food%20needs%20to%20be%20grown,and%20contribute%20to%20climate%20change

ON THE GREEN AGENDA

AGRICULTURE

Agriculture naturally serves a critical role in the relationship between climate and food systems. Similar to cattle ranching, horticulture requires immense acreage to produce crops for global consumption. Deforestation not only directly contributes to failing GHG management, but it also makes grounds less secure, with heightened susceptibility to soil erosion, flooding and other natural effects. This thus hampers the fertility of the soil and threatens to destroy or damage crops. Aside from land use, there are various other agricultural activities that contribute to 10-12% of global emissions.

Non-CO_2 gases are emitted from "enteric fermentation, manure deposited on pasture, synthetic fertiliser, paddy rice cultivation and biomass burning."[6] Increased temperatures and rainfall fluctuations have also influenced crop yield and nutrients, with "elevated levels of atmospheric carbon dioxide (CO_2) expected to lower levels of zinc, iron, and other important nutrients in crops."[7]

DESPITE THE GLOBAL NORTH BEING RESPONSIBLE FOR 92% OF CLIMATE BREAKDOWN,[8] THE RURAL DEVELOPING WORLD CONTINUES TO FACE THE BRUNT OF ITS EFFECTS ON FOOD SECURITY.

Small-scale farmers lack the technological and technical advancements to efficiently adapt their crop cultivation to climate variability. This affects food security which in turn shapes the diet and health of labourers.

ACCORDING TO SOME RESEARCHERS, "THE MAIN CONCERN ABOUT CLIMATE CHANGE AND FOOD SECURITY IS THAT CHANGING CLIMATIC CONDITIONS CAN INITIATE A VICIOUS CIRCLE WHERE INFECTIOUS DISEASE CAUSES OR COMPOUNDS HUNGER, WHICH, IN TURN, MAKES THE AFFECTED POPULATION MORE SUSCEPTIBLE TO INFECTIOUS DISEASE."[9]

Not only the crops and animals, but the labourers themselves are at risk due to increased incidence of diseases such as malaria and cholera.

[6]https://doi.org/10.1038/nclimate2437
[7]https://foodsystemprimer.org/production/food-and-climate-change
[8]https://doi.org/10.1016/s2542-5196(20)30196-0
[9]https://doi.org/10.1073/pnas.0701976104

FOOD WASTE AND LOSS

Undoubtedly, food waste and inefficient disposal have dramatically obstructed climate change mitigation efforts. According to the 2021 UNEP Food Waste Index Report, "global food loss and waste has a carbon footprint of 4.4 gigatonnes of carbon dioxide equivalent per year, and if it were a country it would rank as the third top emitter after the United States and China."[10]

FOOD LOSS, OCCURRING IN THE UPSTREAM STAGE OF THE FOOD SUPPLY CHAIN, ALONG WITH WASTED FOOD AT THE DOWNSTREAM STAGE, RESULTS IN BILLIONS OF DOLLARS SQUANDERED GLOBALLY.

The FAO reports that "the cost of the food wastage carbon footprint in particular, based on the social cost of carbon, is estimated to total $394 billion in damages per year."[11] The volume of food discarded is especially concerning when juxtaposed against growing global hunger levels.

Food loss and waste incur automatic environmental costs, wastage of water, land wastage, and rampant GHG emissions.

THE UNEP ESTABLISHES THAT "REDUCING THE DEMAND FOR FOOD PRODUCTION BY REDUCING FOOD WASTE (TOP OF THE HIERARCHY) IS A FAR MORE EFFECTIVE STRATEGY FOR MINIMISING ENVIRONMENTAL IMPACT THAN OPTIMISING END-OF-LIFE MANAGEMENT (BOTTOM TIERS OF HIERARCHY)."[12]

WHAT IS NEEDED

It remains clear that there needs to be a stronger global collective push towards food security and climate action. Policymakers and financiers need to systemise the agricultural industry so that environmental efficiency remains at the forefront.

Alternative protein sources and plant-based diets should be encouraged to reduce the proportion of carbon emissions attributable to livestock production. By amending both production and consumption patterns at the local and societal levels, food waste can also be minimised. It is imperative that communities unite to combat global warming, ensuring a straight path towards a Zero Hunger future. ■

[10]https://www.unep.org/resources/report/unep-food-waste-index-report-2021
[11]Ibid
[12]Ibid