Medicon Agriculture & Environmental Sciences
Volume 3 Issue 6 December 2022
Conceptual Paper

Climate Change-Induced Adverse Effects of Agriculture on the Environment

Sani Umar Usman*

Department of Environmental Sciences, Federal University Dutse, Jigawa State, Nigeria

***Corresponding Author:** Sani Umar Usman, Department of Environmental Sciences, Federal University Dutse, Jigawa State, Nigeria.

Received: November 30, 2022; **Published:** December 06, 2022

Climate change has been affecting different parts of the world differently. This arises out of variations in the environmental and socio-economic conditions of people across the globe. Changes in global climate are mostly the result of human-induced changes in the global atmospheric composition. The 2021 report of the Intergovernmental Panel on Climate change (IPCC) provides strong evidence of anthropogenic influence, especially through emissions of greenhouse gases (GHGs) on the increase in global surface air temperature over the last 5 decades relative to 1850-1900 (Eyring et al., 2021). Agriculture is one of the human activities that emit significant amounts of GHGs. It contributes about 37% of total GHG emissions (Climate Analytics, 2021), which by 2018, amounts to 9.3 billion tonnesof carbon dioxide equivalent (FAO, 2020).

The human-induced global increase in surface air temperature supplies more energy to the climate system, which gives rise to changes in many elements of weather and climate. One such change is variation in rainfall intensity and patterns. As climate change often manifests as increases in temperature and rainfall variability, it significantly impacts agricultural production positively in some areas and negatively in others. These impacts generate a variety of responses from farmers, which adversely affect the environment.

Increases in global temperatures, with attendant changes in most of the other elements of weather and climate, characterise the current climate change. One such change is an increase in rainfall intensity and amount in some areas and a decrease in others. This adversely impacts crop and livestock production. High temperatures and increased rainfall variability affect agriculture through decreases in crop yields and livestock productivity. According to the latest IPCC report, Africa is the hardest-hit region in the world by these impacts, where 34% of agricultural production has been reduced by climate change over all the other regions since 1961 (Trisos et al., 2022).

In response to the climate change-related decrease in crop yield and livestock productivity, farmers often increase the amount of fertilizers (synthetic and organic) and growth-promoting hormones they use respectively. While an increase in the use of fertilizers leads to air, soil and water pollution by the chemical constituents of the fertilizers, the increase in the use of livestock manure leads to soil and water pollution by the nutrients and zoonotic pathogens found in the manure.

Climate change also leads to increases in crop and livestock disease and pest infestations, heat and water stress as well as an increase in the geographical ranges of the diseases and pests and the disease vectors. In response to the increase in crop pest and disease infestations, more agrochemicals, especially pesticides (including herbicides), bactericides and fungicides are used by farmers. These increase the rate and magnitude of air, soil and water pollution. In addition, an increase in temperature also leads to the reduction of herbicide efficacy and its resistance among weed pests (Ziska et al., 2019), which calls for an increase in the amounts being used. Furthermore, elevated levels of atmospheric carbon dioxide, which has a strong bearing on climate change, enhance the competitive abilities of weeds over most crop plants with the same photosynthetic pathways (Vila et al., 2021).

To counteract climate change-induced increases in livestock pests and diseases, in most cases, farmers increase the use of pesticides and veterinary pharmaceuticals, especially antibiotics on their livestock. As only a proportion of the antibiotics administered to the animals is absorbed or metabolised, large amounts of antibiotic residues end up in the animal manure. These residues contaminate soil and water, which leads to antimicrobial resistance in both animals and humans among other adverse effects. This became a serious

threat to human health that the World Health Oganisation had to intervene by recommending the phasing out of all sub-therapeutic antibiotics and growth-promoting hormones (WHO, 1997). High temperatures also reduce the stability or shelf life of veterinary pharmaceuticals, especially in developing countries due to inappropriate storage and quality control. This also aggravates antimicrobial resistance.

This Editorial is aimed at evoking research on promoting climate-smart agricultural practices that are also friendly to the environment. I will also use this opportunity to intimate the readers that the Review and Editorial teams of Medicon Agriculture & Environmental Sciences Journal, made up of seasoned researchers and scholars of international repute, provide the authors with fast, highly objective and constructive peer review and editorial processes. This makes the Journal to be an excellent medium for researchers to disseminate their invaluable contributions in the fields of agriculture and the environment.

References

1. Climate Analytics. "1.5°C to survive: evidence from the IPCC Special Reports". Climate Analytics (2021).
2. Eyring V., et al. "Human influence on the climate system". Climate change 2021. The physical science basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press (2021): 423-552.
3. FAO. "Emissions due to agriculture". Global, regional and country trends 1990-2018. FAOSTAT Analytical Brief Series No. 18. FAO (2020).
4. Trisos CH., et al. Africa. In: H.-O. Portner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegria, M. Craig, S. Langsdorf, S. Loschke, V. Moller, A. Okem& B. Rama (eds.). Climate change 2022: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press (2022): 1285-1455.
5. Vila M., et al. "Understanding the combined impacts of weeds and climate change on crops". Environmental Research Letters 16.3 (2021): 034043.
6. WHO The medical impact of antimicrobial use in food animals. Report of a WHO meeting, Berlin, Germany, 13-17 (1997).
7. Ziska LH, Blumenthal DM and Franks SJ. "Understanding the nexus of rising CO_2, climate change, and evolution in weed biology". Invasive Plant Science and Management 12 (2019): 79-88.

Volume 3 Issue 6 December 2022