VOL. 09 NO. 6,
AUGUST, 2025
E-ISSN 3027-1401
P-ISSN 3026-9148

African Scholar Publications & Research International
www.africanscholarpub.com

Journal of Arts and Sociological Research (JASR)

Influence of Global Warming on Food Security, Challenges and Intervention in Delta State

***Chukwuka, Florence Obiageli; & **Godwin Henry Emeka**

*Department of Home Economics Education, Federal College of Education (Technical), Asaba. **Department of Home Economics Education, Federal College of Education (Technical), Asaba

Corresponding Author: florenceobia2013@gmail.com

DOI: **https://doi.org/10.70382/ajasr.v9i6.060**

Abstract

The study examined the influence of global warming on food security, challenges and intervention in, Delta State. Two research questions guided the study. The study adopted a descriptive survey research design. The population of the study comprised 150 Home Economics Education students in 3 Colleges of Education in Delta State. The entire population was studied due to its manageable size. A researcher-developed questionnaire was used to collect data. The questionnaire items used in this study was structured using a 4-point response scale. The reliability of the instrument was determined using Cronbach Coefficient alpha and a coefficient of 0.87 was obtained suggesting a high reliability. All 150 copies of the instrument were administered and returned which was made possible through the wait and take approach. The data collected were analyzed using mean and standard deviation statistics while t-test was used to test the null hypotheses at 0.05 level of significance. Findings of the study revealed that the some of the challenges of food security in the face of global warming include flooding, loss of animals, crop scarcity and increase in pets etc. While the interventions include effective economic empowerment of the public, particularly the downtrodden, to enhance their ability to cope with the impacts of global warming among others. The study recommended among other that Government should set up temporary relief camps or settlements for flood victims or temporarily displaced people and ensure that adequate food supply is made available for the victims.

Keywords: Global Warming, Food Security, Food Insecurity, Challenges and Intervention.

Introduction

While other planets in the solar system of the Earth are either roasting hot or bitterly cold, Earth's surface has relatively mild and steady temperatures. Earth enjoys these temperatures because of its atmosphere, which is the thin layer of gases that cover and protect the planet. However, 97 % of climate scientists and researchers agree that humans have changed the Earth's atmosphere in dramatic ways over the past two centuries, resulting in global warming (Cline, 2017). To understand global warming, it is first necessary to become familiar with the greenhouse Influence. The natural greenhouse Influence normally traps some portion of heat in such a way that our planet is safe from reaching freezing temperatures while human enhanced greenhouse Influence leads to global warming. This is due to burning of fossil fuels which increase the amount of greenhouse gases (carbon dioxide, methane and oxides of nitrogen) present in the atmosphere (Marc, 2019). The greenhouse gases prevent the direct heat of the sun from heating the surface of the earth but allow sufficient heat to keep the earth warm enough for survival of life. Miko (2019), stated that the increased emission of carbon dioxide into the atmosphere results in the depletion of the ozone layer and this leads to increase in the earth's surface temperature due to direct heating of the earth's surface by the ultra-violet radiation of the sun.

Global warming refers to all changes in climate as a result of natural variations and human activities. Natural variation is due to increase in the concentration of carbon dioxide and other heat trapping gases (such as methane, ozone, nitrous oxide, carbon monoxide and water vapour) in the atmosphere. These heat trapping gases are known as Green House Gases (GHG) and occur naturally in the troposphere (Cline, 2017). Global warming according to Lal (2024), is caused by human activities such as large-scale deforestation, wide-spread use of land, overpopulation, reduced reliance on organic fuels and accelerated uptake of fossil fuels. These activities lead to increased emission of Green House Gases into the atmosphere (troposphere) which in turn increases the average surface temperature of the earth.

The obvious influence of global warming is in the agricultural sector. Agriculture is important for food security in two ways: it produces the food people eat; and (perhaps even more important) it provides the primary source of livelihood for 36 percent of the world's total workforce (Godfray, Beddington, Crute, Haddad and Lawrence, 2018). The influence of global warming are already being felt in global food markets, and are likely to be particularly significant in specific rural locations where crops fail and yields decline. As global warming progresses, Nedumaran, Jyosthnna, Singh, Bantilan and Byjesh (2015), emphasized that, it is increasingly likely that current cropping systems will no longer be viable in many locations. They stressed that the influence of global warming will be felt both in rural and urban locations where food supply chains are disrupted, market prices increase, assets and livelihood opportunities are lost, purchasing power falls, human health and school system is endangered, and affected people are unable to cope. It is therefore revealing that Nigeria as well as other developing nations of the world will be confronted with serious

shortfall in food security by 2050 (World Bank Policy Study, 2016). In other words, given the next thirty years, Nigeria may face food crisis due to influence of global warming.

According to the Food and Agriculture Organisation of the United Nations (FAO, 2019), "Food security (FS) exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". Food security is built on four pillars: food availability (i.e. sufficient quantities of food produced and supplied on a consistent basis); food access (i.e. physical access and affordability); food utilisation (i.e. proper use of food based on basic nutrition knowledge); and stability in food availability, access and utilization. The concept of food security (FS) has been central in the discussion on sustainable development. Indeed, the first Millennium Development Goal (MDG) aimed to "Eradicate extreme poverty and hunger" (United Nations, 2015). More recently, from 2016 on, the second Sustainable Development Goal (SDG) "Zero Hunger" aims to "End hunger, achieve food security and improved nutrition and promote sustainable agriculture" (United Nations, 2015).

However, despite efforts made over the last decades, food insecurity is still a pressing issue in many countries, especially developing ones. In fact, the report on the State of Food Security and Nutrition in the World 2019 (FAO et al., 2019) shows that more than 820 million people were hungry in 2018, especially in Africa, Latin America and Asia. Nevertheless, it was estimated that over 2 billion people do not have a good FS status, including 8% of the population of developed countries (e.g. North America and Europe), when also considering people affected by moderate levels of food insecurity (FAO, 2019). Food insecurity is a symptom of the dysfunction of the global food system (El Bilali, 2018), which is under the unprecedented confluence of various pressures such as global warming. Indeed, FAO (2019) puts that "through its impacts on agriculture, global warming will have negative Influences on food security in all of its dimensions. Global warming affects the natural resources (e.g. water, land) used in agricultural production (Cadro, Uzunović, Cherni-Cadro and Zurovec (2019). Beyond its influence on agriculture and food security, global warming is one of the most pressing challenges facing humanity. Against this background, this paper examined influence of global warming on food security, challenges and intervention in Delta State.

Global Warming

The United Nation Framework Convention on global warming, (UNFCGW, 2015), defined global warming as a change of climate, which is attributed directly or indirectly to human activity, that alters the composition of the global atmosphere, and in addition to natural climate variability, observed over comparable period of time. While the Intergovernmental Panel on Global warming, (IPCC, 2017) defined it as any change in climate over time whether due to natural variability or as a result of human activity.

The most general concept of global warming therefore, is a 'change in the statistical properties of the climate system when considered over a long period of time, regardless of the cause'. Accordingly, fluctuations over periods shorter than a few decades do not represent global warming. The term is, sometimes, used to refer specifically to global warming caused by

human activity, as opposed to changes in climate that may have resulted as part of the earth's natural processes. In this respect, especially in the context of environmental policy, the term global warming has become synonymous with anthropogenic global warming. However, scientifically, global warming refers to surface temperature increases while global warming includes global warming and everything else that increasing greenhouse gas levels will affect.

Food Security

Food is any nutritious substance that people or animals eat or drink and plants absorb in order to maintain life and growth. The importance of food to human existence cannot be overemphasized. Consistent and availability of food supply provides stability to individuals, families, societies, nations and the world in general. According to Kumar, Sahu, Ansari, and Kumar (2023), food is the most basic need of man. Its adequacy, availability, affordability and security have been the pursuit of every society. One of the indices of a Nations development is the level of food security that is available to its people. The disparity in national development between developed, developing and underdeveloped nations has been linked to the issue of food security. Food security may have different meanings for different people. Food security has to do with having at all times an adequate level of food and food products to meet the increasing consumption demand to mitigate fluctuation in output and price (Idrisa, in Onah, 2016).

The World Bank Policy Study in Ayantunde, Oluwatosin, Yameogo, Van Wijk (2020) defined food security as access to enough food for active healthy living by all people at all times. According to the Food and Agriculture Organization (2019), food security "exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." Food security incorporates a measure of resilience to future disruption or unavailability of critical food supply due to various risk factors including drought, shipping disruptions, fuel shortages or increase in price, economic instability, and wars. The Food and Agricultural Organization (FAO), identified availability, access, utilization, and stability as the main pillars of food security. Essentially, in order to achieve food security a country must achieve three basic aims: It must ensure adequacy of food supplies in terms of quantity, quality and variety of food; optimize stability in the flow of supplies; and secure sustainable access to available supplies by all who need food (FAO, 2019).

In a recent estimate by The Food and Agricultural Organization (FAO), the number of people suffering from chronic hunger has increased from below 828 million in 2021 to more than a billion in 2022. After remaining relatively unchanged since 2015, the proportion of people affected by hunger jumped in 2020 and continued to rise in 2021, to 9.8 percent of the world population. This compares with 8 percent in 2019 and 9.3 percent in 2020. Around 2.3 billion people in the world (29.3 percent) were moderately or severely food insecure in 2021 – 350 million more compared to before the outbreak of the COVID-19 pandemic. Nearly 924 million people (11.7 percent of the global population) faced food insecurity at severe levels, an increase of 207 million in two years. This goes to show that the world is moving backwards

in efforts to eliminate hunger and malnutrition. Most of the world's hungry are in South Asia and sub-Saharan Africa (FAO, 2022).

Factors that Impact Food Security

Food security is a complex issue that is affected by various factors. These factors can be broadly classified into four categories; economic, social, environmental, and political. According to Cline (2017), some of the key factors that impact global food security include;

i. **Poverty:** is a major factor influencing food security, particularly in developing countries. Low-income households often struggle to afford and access a balanced diet, as they lack the resources required to purchase or produce necessary foods.
ii. **Natural Resources:** Food production is critically dependent on natural resources such as land, water, and fertilizers. However, increased demand for these resources and global warming can limit their availability, thus leading to food insecurity.
iii. **International trade policies:** This can also impact global food security by affecting food availability and price. When food prices go up, poor countries are more vulnerable to food insecurity, as they may not have the resources to purchase food from global markets.
iv. **Policies:** The government and private sectors play a crucial role in addressing the factors affecting food security like poverty, resource availability, population growth, changes in land use, and other environmental factors.

Statement of the Problem

In Nigeria, food security is influenced by internal and external crises, economic factors, and global warming. The country experiences visible effects of global warming, particularly in the northern and southern regions, which impact agricultural productivity. Alterations in humidity, temperature, rainfall patterns, and heavy precipitation have led to low agricultural productivity, poverty, hunger, and conflicts. These challenges result in food scarcity, flooding of farmlands, increased pests, alteration of planting and harvesting seasons, decrease in crop yield, malnutrition, health issues, and rising food prices (Lal, 2024). Food insecurity has led to malnutrition and incessant health challenges, especially for children. Efforts are being made at international conferences and initiatives to address these issues and ensure food security in the face of global warming. The foregoing has necessitated the need for this study to examine the influence of global warming on food security, challenges and intervention in Delta State.

Purpose of the Study

The main objectives of the study is to examine the influence of global warming on food security, challenges and intervention in Delta State. The study sought to;

1. examine the challenges of food security in the face of global warming in Delta State.
2. find out the interventions mitigating against food security in the face of global warming in Delta State?

Research Questions

The following research questions were raised to guide this study.

1. What are the challenges of food security in the face of global warming in Delta State?
2. What are the interventions mitigating against food security in the face of global warming in Delta State?

Methodology

The descriptive survey design was adopted for the study. The population of the study comprised 150 Home Economics Education lecturers in three (3) Colleges of Education in Delta State. Since the population was sizeable, there was no sampling. The instrument for data collection was a structured questionnaire. The questionnaire was structured on a four-point rating scale. The numerical value for the scale points include; Strongly Agreed = SA (4 points), Agree = A (3 points), Disagree = D (2 points) and Strongly Disagree = (1 point). Any item with mean score less than or equal to 2.49 was considered as disagreed while any item with mean score equal to or more than 2.50 was considered as Agreed. The instrument was validated by two experts from Educational Foundations. The reliability of the instrument was determined using Cronbach Coefficient alpha and a coefficient of 0.87 was obtained suggesting a high reliability. The researcher with the help of two research assistants administered 150 copies of the instrument and retrieved same which were used for analysis. The data collected was analyzed using descriptive statistics of frequency distribution, mean scores and standard deviation while the t-test statistical tool was used to test the two hypotheses at 0.05 level of significance. For the research questions, the decision was based on the criterion mean of 2.50, thus, any item with mean score 2.50 or above were accepted while any item having a mean score less than 2.50 was rejected. For the hypotheses, if the calculated value of t (t-cal) is greater than the table value of t (t-crit), the hypothesis will be rejected; whereas, if the calculated value of t (t-cal) is less than the table or critical value of t (t-crit), the hypothesis will be accepted.

Presentation

The results for this study were obtained from the research questions answered through the analysis of data.

Research Question 1: What are the challenges of food security in the face of global warming in Delta State?

Table 1: ***Mean and Standard Deviation Scores of Responses on the Challenges of Food Security in the Face of Global Warming in Delta State. n = 150***

S/N	STATEMENTS	$\bar{x}$	SD	REMARK
1.	Flooding leads to the loss of species, uncultivatable farmlands, disruption of agricultural activities, and, subsequently, agricultural produce.	3.95	0.21	Agree
2.	The persistent heat wave emanating from global warming has led to the loss of animals.	3.42	0.72	Agree

3.	Global warming have impacted the planting and harvesting seasons of some food crops, subsequently leading to the scarcity or unavailability of some crops, even in periods where there should be a glut of produce on the market	4.00	0.00	Agree
4.	Global warming has affected crop planting and harvesting seasons, leading to crop scarcity and unavailability, increasing food prices, and severe food insecurity.	3.40	0.49	Agree
5.	Global warming has led to an increase in pest breeding, affecting animals and food crops, causing undernourishment and food insecurity due to the evolution of different pest species.	3.73	0.50	Agree
	Grand Mean	**3.70**		**Agree**

Analyses on Table 1 reveals that the mean scores range from 3.40 – 4.00. This indicates that the respondents agreed to all the statements in items 1-5. Data in Table 1 further shows the grand mean for the entire item which is 3.70, and falls within the response option of agree. This indicates that the perceived challenges of global warming according to the respondents are the ones indicated above.

Research Question 2: What is the perception of Home Economics students on ways of reducing the challenges of poverty in Colleges of Education in Delta State?

Table 2: ***Mean and Standard Deviation Scores of Responses on the Interventions Mitigating Against Food Security in the Face of Global Warming in Delta State. n = 150***

S/N	STATEMENTS	$\bar{x}$	SD	REMARK
1.	Legislative policies should promote environmentally friendly practices, encourage waste management and energy efficiency, and support environmental policies. Prohibiting anthropogenic activities like deforestation, gas flaring, and over-exploration of natural resources is crucial.	3.73	0.50	Agree
2.	Effective economic empowerment of the public, particularly the downtrodden, to enhance their ability to cope with the impacts of climate change. In this respect, budgetary allocation to climate change activities should be improved.	3.42	0.72	Agree
3.	Adopting agricultural methods or smart food systems that are less vulnerable and resistant to climate change is crucial for promoting food security and sustainable nutritional outcomes.	3.95	0.21	Agree
4.	The government and stakeholders should promote alternative practices like recharging shrinking water bodies and irrigation to boost agricultural productivity and reduce food prices.	3.40	0.49	Agree
5.	Agricultural methods or smart food systems less vulnerable and resistant to climate change should be adopted to promote food security and sustainable nutritional outcomes.	4.00	0.00	Agree
	Grand Mean	**3.70**		**Agree**

Analyses on Table 2 reveals that the mean scores range from 3.42 – 4.00. This indicates that the respondents agreed to all the statements in items 1-5. Data in Table 2 further shows the grand mean for the entire item which is 3.70, and falls within the response option of agree. This indicates that the perceived interventions mitigating against food security in the face of global warming in Delta State according to the respondents are the ones indicated above.

Discussion

Research Question 1 sought to find out the challenges of food security in the face of global warming in Delta State. The finding of the study reveal that the following challenges of food security in the face of global warming in Delta State exists such as flooding which leads to the loss of species, uncultivatable farmlands, disruption of agricultural activities, and, subsequently, agricultural produce; the persistent heat wave emanating from global warming which has led to the loss of animals or livestock; the impact on the planting and harvesting seasons of some food crops, subsequently leading to scarcity or unavailability of some crops, even in periods where there should be a glut of produce on the market; influence on crop planting and harvesting seasons, leading to crop scarcity and unavailability, increasing food prices, and severe food insecurity; as well as an increase in pest breeding, affecting animals and food crops, causing undernourishment and food insecurity due to the evolution of different pest species. This finding is in line with Nedumaran, Jyosthnna, Singh, Bantilan and Byjesh (2015), that as global warming progresses, it is increasingly likely that current cropping systems will no longer be viable in many locations. The authors stressed that the influence of global warming will be felt both in rural and urban locations where food supply chains are disrupted, market prices increase, assets and livelihood opportunities are lost, purchasing power falls, human health and school system is endangered, and affected people are unable to cope.

Another finding of the study revealed that the interventions mitigating against food security in the face of global warming in Delta State include the following; legislative policies should promote environmentally friendly practices, encourage waste management and energy efficiency, and support environmental policies. Prohibiting anthropogenic activities like deforestation, gas flaring, and over-exploration of natural resources is crucial; effective economic empowerment of the public, particularly the downtrodden, to enhance their ability to cope with the impacts of climate change. In this respect, budgetary allocation to climate change activities should be improved; adopting agricultural methods or smart food systems that are less vulnerable and resistant to climate change is crucial for promoting food security and sustainable nutritional outcomes; the government and stakeholders should promote alternative practices like recharging shrinking water bodies and irrigation to boost agricultural productivity and reduce food prices; and agricultural methods or smart food systems less vulnerable and resistant to global warming should be adopted to promote food security and sustainable nutritional outcomes. This finding is in consonant with the Food and Agricultural Organization (2019), that essentially, in order to achieve food security a country must achieve three basic aims: it must ensure adequacy of food supplies in terms of quantity, quality and

variety of food; optimize stability in the flow of supplies; and secure sustainable access to available supplies by all who need food.

Conclusion

This study examined the influence of global warming on food security, challenges and intervention in Delta State. This paper maintains that global warming is real and that Nigeria is highly vulnerable to global warming. Global warming is influencing negatively on food security. A large number of Nigerians and particularly Deltas are still malnourished, hungry, starving and have various health problems due to food insecurity caused by global warming. There is the need to implement some intervention strategies that will enable the State to cope with the challenges of food insecurity necessitated by global warming to ensure food security in the area.

Recommendations

The following recommendations are proffered as ways of coping with the negative influence of global warming on food security in Delta State.

- Government should set up temporary relief camps or settlements for flood victims or temporarily displaced people and ensure that adequate food supply is made available for the victims.
- Government and other private organizations should render financial support (loans) to farmers affected by disasters caused by global warming to enable them start off again. They should help farmers to secure agricultural insurance and loans in situations of disaster to enable them take off again.

References

Ayantunde, A. A., Oluwatosin, B. O., Yameogo V., Van Wijk, M. (2020). Perceived benefits, constraints and determinants of sustainable intensification of mixed crop and livestock systems in the Sahelian zone of Burkina Faso. *International Journal of Agricultural Sustainability,* 18(1), 84–98.

Cadro, S., Uzunović, M., Cherni-Cadro, S., Zurovec, J. (2019). Changes in the water balance of Bosnia and Herzegovina as a result of climate change. Agriculture and Forestry, 65 (3), 19-33

Cline, W.R. (2017). *Global warming and agriculture: Impact estimates by country*. Center for Global Development and Peterson Institute for International Economics, Washington, DC

El Bilali H. (2018). Relation between innovation and sustainability in the agro-food system. *Italian Journal of Food Science*, 30: 200-225.

FAO (2022). The State of Food and Agriculture: Climate Change, Agriculture and Food Security. Rome

Food and Agricultural Organization (FAO) (2019). World Food Summit. https://www.fao.org/news room/detail/un-report-global-hunger-SOFI-2022-FAO/en. Accessed on 4th September 2024.

Godfray, H., Beddington, J., Crute, I., Haddad, L., Lawrence, D. (2018). Food Security: The challenge of feeding 9 billion people. *Science* 327(5967), 812–818.

Inter-governmental Panel on Climate Change, (2017). Synthesis Report. Fourth Assessment Report: Climate Change 2017.

Kumar, P., Sahu, N. C., Ansari, M. A., & Kumar, S. (2023). Climate change and rice production in India: role of ecological and carbon footprint. *Journal of Agribusiness in Developing and Emerging Economies*, 13(2), 260-278.

Lal, R. (2024). Agricultural activities and the global carbon cycle. *In Nutrient cycling in acroecosystems,* 70: 103–116.

Miko, S., (2019). Food Security and the Role of Plant Science. An invited Paper at the Opening of the 19th Annual Conference of the Botanical Society of Nigeria, BOSON. Students' Centre Theatre, Umaru Musa 'Yar-adua University, Katsina.

Nedumaran, S., Jyosthnna, P., Singh, H.P., Bantilan, C., & Byjesh, C. (2015). *Climate change and food security in Asia and Africa: Agricultural futures.* Singh, N.; Bantilan, C.; Byjesh, K.; and Nedumaran, S. (eds.) 2015, *Climate change challenges and adaptation at farm level: Case studies from Asia and Africa.* United Kingdom: CABI.

Onah, O. W. (2016). An Appraisal of Poverty Reduction Strategies in Nigeria. *In Central Bank of Nigeria Economic and Financial Review*, 29(4)

United Nations Children's Fund (UNICEF) (2018). Climate Change and Environmental Education.

United Nations Framework Convention on Climate Change, (2015). Article – 1 (Definition). Full Text of the Convention.

World Bank Policy Study (2016). *Nigeria poverty in the midst of plenty. The challenge of growth without development. A World Bank Poverty Assessment*. Abuja: Will R.E & Valter.