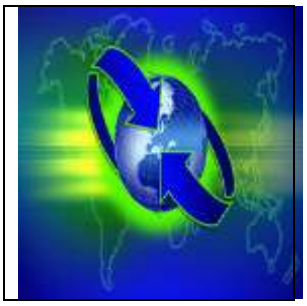

Analysis of some factors influencing food insecurity in Nigeria

[1]Obi, Joy Joseph, [2]Effiong Effiom Etim, [2]Imong, Ann Obela
[1]Department of Physical Science Education,
Faculty of Science Education, University of Calabar, Nigeria.
Obijoy643@gmail.com, Mobile: 08059945792,
orcid no. 0009-0004-3442-8619
[2]Department of Biology Education, Faculty of Science Education,
University of Calabar, Nigeria. effiome70@gmail.com. 08162580639,
Orcid no. 0009-0007-8744-9191
obelaann@gmail.com. 08107807334; Orcid no. 0009-0007-6896-5270
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Abstract

This paper is a review paper whose aim was to critically analyze factors influencing food security in Nigeria. It is no longer news that Nigeria as a country is plagued and currently facing a worrisome level of food insecurity due to certain human, environmental, economic and social factors such as climate change, inflation, weak agricultural systems, insecurity, population growth, among others. This study adopted literature review approach as the research design. It was discovered that food insecurity remains a critical challenge in Nigeria, driven by factors such as inadequate infrastructure, insecurity, climate change, and economic instability. It was observed that to address these issues and improve food supply, it is essential to invest in modern agricultural practices, strengthening infrastructure, and promoting sustainable farming systems like green agriculture. Enhancing the capacity of farmers through education, technology, and access to finance and farm inputs will empower them to increase productivity. Furthermore, fostering public-private partnerships and implementing supportive policies are key to creating a resilient and efficient agricultural system. With coordinated efforts across sectors, Nigeria can overcome its food security challenges and build a more sustainable and food-secure future for its population. The paper concluded that the country is suffering from food insecurity and concerted efforts needs to be done to ameliorate the food security crisis. Based on this, it was recommended among others that farmers should begin to practice modern agricultural practices, but not with genetically modified organisms (GMOs) which will have very minimal impacts on the environment, and human wellbeing, so green agriculture is the message.
Key words: Food insecurity, food supply, environmental factors, economic challenges

Introduction

Nigeria, the most populous country in Africa, is currently facing a severe food shortage crisis that endangers the livelihoods and well-being of millions of its citizens. According to the Food and Agriculture Organization (FAO, 2023), approximately 25.3 million Nigerians were projected to face acute food insecurity between June and August 2023 due to factors such as insecurity, climate change, and economic challenges (FAO, 2023). The issue of food shortage in

Nigeria is further exacerbated by population growth, weak agricultural systems, and inadequate infrastructure, making food security a pressing concern.

The country's agricultural sector, which accounts for a significant portion of employment and the economic mainstay of the national economy, has been underperforming due to various reasons, (Kehinde, Shittu, Adewuyi, Osunsina & Adeyonu, 2021; Obayelu, Akpan & Ojo, 2021). Insecurity, particularly in the northern regions, has disrupted farming activities. For instance, Boko Haram insurgencies and conflicts between farmers and herders have led to the displacement of farming communities and reduced agricultural output (Ogundele, 2020). Similarly, the impact of climate change, including erratic rainfall patterns and flooding, has significantly affected crop yields and animal husbandry. In 2022 through 2024, devastating floods destroyed farmlands across 34 states, contributing to an alarming spike in food prices (Obayelu, et al., 2021; Nwankwo, Eze & Adebayo, 2022).

Amolegbe, Upton, Bageant and Bloom, (2021) found in their own study that economic challenges also play a pivotal role in the food insecurity crisis. High inflation rates and the devaluation of the naira have made food importation expensive, further straining access to essential commodities (Sennuga, Baines, Conway & Naylor, 2020; Okonkwo & Ahmed, 2021). The removal of fuel subsidies in 2023 compounded transportation costs, leading to higher food prices and limited access to markets for rural farmers (Adedayo, 2023). To address these challenges, a comprehensive approach is required. This involves adopting innovative agricultural practices, leveraging modern technology, and improving policies to support farmers.

In a study carried out by Eneji, Alawa, Udumo, Essien, Unimna, Essien, Ambe and Ajigo (2022) on livelihood activities, climate change and water resources availability in the Lower Cross River State, Nigeria. Majorly, the paper looked at how human livelihoods activities like deforestation for agricultural expansion, carving, and timber, exploitation of non-timber forest products, sand mining, and faulty agricultural practices among others had influenced the removal of forest vegetation cover; how these activities also influenced the reduction and increased in

rainfall and temperature and subsequent paving of ways for climate change thereby affecting water resource availability in the Northern part of Cross River State, Nigeria. Eneji, et al, (2022) just like other previous studies carried out by Panta and Thapa, (2018); Tembo and Tadesse, (2018); Kumar, Mishra, Rao, Mondal, Hazra, Choudhary, Hans and Bhatt, (2020) found in their respective studies that these activities had contributed greatly to increasing ambient temperature thereby orchestrating carbon accumulation in the surrounding environment and reduction in the amount of rainfall within the study area.

The authors used both soft and hardware computer applications including German 12 handheld GPS, and Integrated Land and Water Information System (ILWIS), for data collection. Both quantitative and qualitative data were collected for the study. The GIS information software package was used to manipulate and perform feature identification, recognition, classification, calculation, and ground-truthing. Eneji, et al, (2022) also used a structured questionnaire to collect data on some livelihood activities, the influence of livelihoods activities on water availability, and climate change among others. The authors also gathered secondary data set using satellite imageries of Bekwarra, this was acquired from the Nigeria Center for Remote Sensing and Nigerian Meteorological Center, Jos for 1987- 2017.

After analysis, it was found that the forest vegetation cover is fast disappearing, the built-up area had increased and the forest and water bodies are shrunken. Ambient temperature and carbon accumulation had seriously increased, while rainfall has reduced seriously leading to climate change and reduced water availability. With these climatic conditions and features, the author said it affects agricultural productivity. It was recommended among others that tree planting and afforestation, alternative sources of livelihood that are feasible, sustainable, cheap, and practicable should be introduced to reduce pressure on the natural ecosystem thereby increasing fertile agricultural land for agricultural productions and sustainable environment.

Otekunrin, Mukaila and Otekunrin, (2023) investigated and quantified food insecurity in Nigeria: a systematic review, the authors given the recent increase in the number of Nigerians

estimated to be at risk of food insecurity, it is crucial to explore the array of tools used to quantify food insecurity (FI). This exploration helped to determine the prevalence and severity of FI in Nigeria. This review explored the scope of FI research carried out in Nigeria to examine how the design was quantified. A systematic review was performed to compile the accessible Nigerian studies.

Seventy-nine studies were reviewed. Eighteen used the Household Food Insecurity Access Scale module (HFIAS) to investigate FI status; thirteen used the recommended daily calorie requirement approach; twelve employed the Household Food Security Survey Module (HFSSM); ten used the food insecurity index (through household per capita food expenditure); seven used the Food Insecurity Experienced Scale (FIES); two used the Food Consumption Score (FCS); and the others employed less standardized or thorough approaches.

The authors further observed that different prevalence levels and gravities of FI in the Nigerian populations were documented. The prevalence of FI varied from 12% to 100%, based on the instrument and demography being studied. In accordance with the findings of this review, the authors propose standardization of the FI instrument and highlight the need for a measurement tool that would be appropriate for the Nigerian setting. This enabled the researchers to attain a comprehensive knowledge of the occurrence rate of FI in Nigeria, leading to improved food- and nutrition-sensitive policy development.

Authors like Renard and Tilman, (2019) and Vasco, Valdiviezo, Hernández, Tafur, Eche and Jácome, (2020) also observed in their own respective studies that the parameter for measuring food insecurity globally and in Nigeria is subjective in nature. Subjective in the sense that one study would use a different tool, like household index, others would use availability and accessibility; others would use purchasing power parity, while others may use income levels. All these variables though may present a good result, but it is important that researchers should development a standard parameter for measuring food insecurity, (Pandey, Kumar, Archie, Gupta, Joshi, Valente & Petrosillo, 2018; Busch, Henderson & Stevenson, 2019).

Understanding the Causes of Food Insecurity in Nigeria

Eneji, Onnoghen, Acho, and Diwa, (2021) observed that food insecurity in Nigeria is driven by a combination of structural, environmental, and socio-economic factors that undermine the country's agricultural productivity and food distribution systems. These causes are deeply intertwined, creating a persistent challenge from achieving food security.

Bentley, Petcovic and Cassidy, (2019) found that one of the primary causes is rapid population growth, which has outpaced food production. Nigeria's population, estimated at over 223 million as of 2023, grows at an annual rate of about 2.5%, increasing the demand for food and straining the agricultural sector (National Bureau of Statistics [NBS], 2023). This growing demand requires significant improvements in food production and distribution, yet these remain limited due to systemic inefficiencies.

Environmental factors

This, particularly through the effects of climate change also plays a crucial role. Nigeria has experienced increasing incidences of droughts, floods, and soil erosion, which have disrupted farming activities and reduced crop yields. The floods of 2022, for instance, submerged vast areas of farmland, causing significant losses in staple crops such production like rice, bean and maize (Adebisi, Fajobi & Adesina, 2022). Additionally, erratic rains and wind increases the incidence of desertification in the northern regions, which continue to encroach on arable land, making farming less viable (Francaviglia, Álvaro-Fuentes, Di, Gai, Regina and Turtola, 2019; Yusuf & Aminu, 2021).

Alan, (2019) found that insecurity is another significant contributor to food shortages. Armed conflicts, including insurgencies and banditry in the Northeast and farmer-herder clashes in the Middle Belt, have displaced farming communities and reduced agricultural output. According to Ukaoha (2020), over 60% of farmers in conflict-prone areas are unable to access their farmlands, leading to a drastic reduction in food production and supply. Furthermore, the

fear of attacks discourages farmers from cultivating large tracts of land, thereby limiting their production capacity (Armstrong, Krasny & Schuldt, 2018).

Economic Challenges

Economic challenges such as poor infrastructure and inadequate access to credit facilities also hinder agricultural productivity. The lack of rural roads and storage facilities leads to post-harvest losses, with an estimated 30-40% of food produced in Nigeria wasted annually (Akinyemi & Chukwu, 2021). Moreover, smallholder farmers, who constitute the majority of the agricultural workforce, struggle to secure financing for modern equipment and inputs, further reducing productivity.

Addressing these causes requires a multi-faceted approach that tackles insecurity, promotes climate-resilient agricultural practices, and improves infrastructure and financing for farmers.

Challenges and Barriers to Increasing Food Supply in Nigeria

Increasing food production and supply in Nigeria is hindered by several challenges and barriers that affect agricultural productivity and food distribution. These challenges are rooted in structural, environmental, economic, and social issues that continue to limit the country's ability to achieve food security.

- **Inadequate infrastructure**: Poor road networks and insufficient transportation facilities make it difficult for farmers to move their produce from rural areas to urban markets. This leads to delays, increased costs, and significant post-harvest losses. Similarly, the lack of modern storage facilities, such as silos and cold storage systems, results in the spoilage of perishable goods, further reducing the availability of food (Francaviglia, Álvaro-Fuentes, Di, Gai, Regina & Turtola, 2019).
- **Insecurity**: Insecurity also poses a severe threat to food supply in Nigeria. Armed conflicts, including insurgencies, banditry, and farmer-herder clashes, disrupt farming activities, displace communities, and create unsafe conditions for agricultural

investments. Many farmers abandon their fields due to fear of attacks, leading to a reduction in cultivated land and overall food production.

- **Climate Change:** Brinkmann, Schneider, Sahner, Ballauff, Edy and Barus, (2019) found that climate change is another critical challenge, with its effects becoming increasingly evident in Nigeria's agricultural sector. Erratic rainfall patterns, rising temperatures, desertification, and flooding have significantly affected crop yields and livestock production. These environmental challenges make it difficult for farmers to plan and adapt their practices, resulting in unpredictable harvests and food shortages (McKechnie, Turrell, Giskes & Gallegos, 2018; Otekunrin, Otekunrin, Fasina, Omotayo & Akram, 2020).
- **Economic Factors:** Salau, Olalere and Affolabi, (2022) while looking at analysis of food security among garri processors in Oyo state, Nigeria posited that economic factors also play a significant role in limiting food supply. Many smallholder farmers lack access to affordable credit, preventing them from investing in modern farming techniques and equipment. High input costs, such as fertilizers and improved seeds, further discourage productivity. Additionally, the volatility of food prices and limited access to markets reduce farmers' incomes and dis-incentivize large-scale production, (Omachi, Van Onselen & Kolanisi, 2022; Ayeni & Adewumi, 2023).
- **Policies and Governance:** Another factor considered as influencing food insecurity is policy and governance, policy and governance issues according to Bwala, Otekunrin, Adebowale, Fasina, Odetokun, and Fasina, (2023) exacerbates the situation. Inconsistent agricultural policies and inadequate government support undermine efforts to boost food supply. Farmers often face bureaucratic hurdles when trying to access subsidies or extension services. Moreover, weak enforcement of land-use policies and disputes over land ownership hinders agricultural expansion. Most at times, farm inputs given as palliatives hardly reach the peasant farmers because some top government functionaries

siphon these inputs to their business associates who sells them and these never gets to the farmers, hence it affects agricultural productivity, thereby affecting food security in the country.

- **Tackling Post-Harvest Losses:** Orjiakor, Adediran, Ugwu and Nwachukwu, (2023) found that post-harvest losses are a significant barrier to food security in Nigeria. This position was further strengthened by Oyeniran and Olajide, (2023) who posited that postharvest losses further affects the availability, accessibility, and affordability of food. These losses occur during harvesting, processing, transportation, and storage, with an estimated 30-40% of food produced in Nigeria being lost before reaching the ultimate consumers (Eze, Adesanya & Umar 2022). Addressing post-harvest losses is critical to improving food supply and reducing hunger in the country.
- **Inadequate storage infrastructure**: Yahaya, Sanusi, Eyinla and Samuel, (2021) and Adebisi, Adebisi and Odum, (2022) observed in their respective studies that inadequate storage infrastructure is one of the contributing factors of postharvest losses leading to food insecurity. Farmers in rural areas often lack access to modern storage facilities such as silos and cold storage systems, leading to spoilage of perishable crops like tomatoes, fruits, and vegetables. According to Olayemi, Alabi & Fashina (2021), approximately 50% of food crops, fruits and vegetables produced in Nigeria are wasted due to insufficient storage and poor handling practices. In addition, pest infestations and mold growth are common in traditional storage methods, further exacerbating losses(Adeomi, Fatusi, Klipstein-Grobusch, 2022; Adeoye, Afolahanmi, Ofili, Chirdan, Agbo, Adeoye & Su, 2022).
- **Transportation inefficiencies**: Ashagidigbi, Orilua, Olagunju and Omotayo, (2022) found that inadequate transportation facilities also contribute significantly to post-harvest losses. Nigeria's poor road network and lack of reliable transportation systems make it challenging to move produce from farms to markets in a timely manner. As highlighted

by Adebayo and Yusuf (2023), long delays in transit lead to the deterioration of fresh produce, especially in regions with extreme temperatures. This issue is compounded by the absence of value-added processing facilities near farming communities, which could reduce perishability (Nnaji, Ratna & Renwick, 2022; Chiemela, Chiemela, Apeh & Ileka, 2022).

- **Policy and market challenges**: Omotayo, Omotoso, Daud, Omoayo and Adeniyi, (2022) found that the issues of policy and market challenges further hinder efforts to tackle post-harvest losses. Farmers often face limited access to credit, preventing them from investing in better storage and processing technologies. Additionally, weak agricultural extension services mean that many farmers are unaware of best practices for post-harvest management (Nwankwo, Okafor & Adeola, 2020). Addressing these issues requires government intervention to provide subsidies for modern storage systems and improve rural infrastructure (Onyenekwe, Okpara, Opata, Egyir, Sarpong, 2022).

To mitigate post-harvest losses, several strategies can be employed. Investments in cold chain systems, such as refrigerated trucks and warehouses, can preserve the quality of perishable crops. Furthermore, the promotion of cooperative societies can enable smallholder farmers to pool resources for shared storage and processing facilities. Encouraging private sector participation in developing agro-processing zones will also create opportunities for value addition and reduce waste (Shapu, Ismail, Ahmad, Lim & Njodi, 2020).

By addressing post-harvest losses, Nigeria can significantly improve food availability and affordability while boosting farmers' income and reducing pressure on the agricultural sector to increase production. This is essential for achieving sustainable food security in the country.

Potential Strategies to Increase Food Supply: According to Ezeama, Ibeh, Adinma, Epundu and Chiejine, (2021) to address the challenges of food insecurity and boost food supply, Nigerians needs to adopt a range of effective strategies. These approaches should be tailored to the country's unique agricultural to the country's unique agricultural and socio-economic context:

Adoption of Modern Agricultural Practices: these authors further posited that embracing precision agriculture, mechanization, and climate-smart techniques can significantly enhance productivity. Technologies like drones, soil sensors, and improved irrigation systems ensure optimal resource utilization and minimize waste. However, Kehinde, Shittu, Adeyonu and Ogunnaike, (2021) advanced some strategies that can be used to mitigate the challenges militating against effective food security guarantee, some of these strategies according to these authors include:

1. **Strengthening Agricultural Infrastructure**: Investing in rural infrastructure, such as roads, storage facilities, and processing plants, will reduce post-harvest losses and improve market access. Cold chain systems and value-added processing can also extend the shelf life of perishable goods.
2. **Expanding Access to Finance and Inputs**: Providing affordable credit, subsidies, and quality inputs like improved seeds and fertilizers will empower smallholder farmers to increase production. Establishing farmer cooperatives can help pool resources and ensure equitable access to these benefits.
3. **Promoting Climate-Resilient Agriculture**: Encouraging the cultivation of drought-resistant and high-yield crop varieties can help farmers adapt to climate change. Agroforestry, conservation agriculture, and water management practices can also enhance resilience and sustainability.
4. **Improving Policy and Governance**: Developing consistent and farmer-friendly agricultural policies is essential. Simplifying access to government programs, ensuring land tenure security, and strengthening agricultural extension services will support farmers in scaling their operations.
5. **Leveraging Technology and Innovation**: Digital tools, such as mobile platforms for market information and weather forecasts, can help farmers make informed decisions.

Artificial intelligence and data analytics can further optimize crop planning and supply chain management.

6. **Encouraging Youth and Private Sector Participation**: Attracting young people to agriculture through training, incentives, and entrepreneurial opportunities can rejuvenate the sector. Private sector investments in agribusiness and public-private partnerships can also drive innovation and scalability. By implementing these strategies, Nigeria can sustainably increase food production, ensure equitable distribution, and build resilience against future food security challenges.

Conclusion

After a thorough review of relevant literature on this topic, the authors concluded that food insecurity remains a critical challenge in Nigeria, driven by factors such as inadequate infrastructure, insecurity, climate change, and economic instability. To address these issues and improve food supply, it is essential to invest in modern agricultural practices, strengthen infrastructure, and promote sustainable farming methods. Enhancing the capacity of farmers through education, technology, and access to finance will empower them to increase productivity. Furthermore, fostering public-private partnerships and implementing supportive policies are key to creating a resilient and efficient agricultural system. With coordinated efforts across sectors, Nigeria can overcome its food security challenges and build a more sustainable and food-secure future for its population.

Recommendations

Based on the findings from this review, the following recommendations were suggested to mitigate food insecurity in Nigeria:

a) Enhance Agricultural Education and Training: Investing in education programs that integrate modern agricultural practices, sustainable farming techniques, and the role of science in food production will equip farmers with the necessary skills to increase

productivity. This includes expanding agricultural extension services to provide continuous learning and support, particularly for smallholder farmers.

b) Promote Public-Private Partnerships in Agriculture: Collaborations between the government, private sector, and non-governmental organizations can lead to increased investments in agriculture. These partnerships can improve infrastructure, develop food processing industries, and facilitate access to markets for local farmers. Public-private initiatives could also support the development of climate-resilient technologies and innovative farming solutions.

c) Invest in Rural Infrastructure and Technology: Upgrading rural infrastructure such as roads, storage facilities, and transportation systems is essential for reducing post-harvest losses and ensuring efficient food distribution. Additionally, investing in technology such as mobile applications for farmers to access market prices, weather forecasts, and technical advice will help improve productivity and reduce inefficiencies in food supply chains.

d) Strengthen Policy and Regulatory Frameworks for Agriculture: The government should implement consistent and farmer-friendly policies that support food production and enhance food security. This includes strengthening land tenure security, offering subsidies for agricultural inputs, and ensuring better access to credit for farmers. Additionally, policies should promote sustainability and resilience in farming by supporting climate-smart agriculture and addressing the challenges posed by insecurity.

e) Encourage the practice and adoption of green agriculture, not using genetically modified species, but going back to adopt indigenous crops and animal species which have high nutritional value without any health challenges. The use of organic manure should also be encouraged, lets abandon the use of agrochemicals that have deleterious effects on the health of humans and the environment.

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