



African Journal of Food Science and Technology (ISSN: 2141-5455) Vol. 13(6) pp. 01-04, June, 2022  
DOI: <http://dx.doi.org/10.14303//ajfst.2022.030>  
Available online @<https://www.interestjournals.org/food-science-technology.html>  
Copyright ©2022 International Research Journals

*Mini Review*

## The impact of high technology storage facilities on food security in Nigeria-Nigeria case study: Mini review

Afolabi Ayomide, Victor Ajimati, Timileyin Oladayo, Goshen David Miteu\*, Juliet Anyanwu Nkiruka, Damilola Ilupeju, James Falope, Oluwatobiloba Agboola, Olayemi Christiana Ojeokun, Temidayo Olayinka, and Elohozino Oghale Benneth

Department of Food and Technology, Pan African Research Group, FAT-PARG, Nigeria

E-mail: [goshendavids@gmail.com](mailto:goshendavids@gmail.com)

### Abstract

Food insecurity has increased exponentially over the years in Nigeria, which has led to a concomitant increase in malnutrition and the death of citizens. The inconsistency in policies, conflicts, and a lack of storage technology are all factors that contribute to food insecurity in Nigeria. Post-harvest food loss is still high in Nigeria with this growing food insecurity and the available traditional food storage and processing are insufficient and ineffective at curbing food losses. Previous studies have estimated Nigerian food losses to be 40% of total output each year and consume 31% of the entire land. This article, therefore, discussed the effects of High Technology Storage facilities and techniques on food security in Nigeria. Since most crops are seasonal and not available throughout the year, the ability to store excess produce during harvest season will help make them available during the off-season and reduce losses. High technology storage like strategic grain reserve, buffer stock, silos, etcetera helps store grains on a large scale and increase food security.

**Keywords:** Food Security, High Technology Storage, Food loss, Food Insecurity, Nigeria

### INTRODUCTION

Food is the most basic of all human survival needs. Although so many efforts have been sunk into improving the quality and production of world food supplies, food insecurity remains predominant, especially in the global southern nations of Asia and Africa. In Nigeria, malnutrition has resulted in the death of many of its citizens. Approximately one out of every three persons in sub-Saharan Africa is undernourished as assessed by African Food Security Briefs (AFSB) (Akerle et al., 2013).

According to the State of Food Security and Nutrition in the (WHO, 2020), the number of people suffering from hunger has steadily risen since 2014, growing by 10 million people every year and 60 million in five years. Food security can be described as a situation in which everybody, at all

times, has economic, social, and physical access to safe, stable, nutritious, and abundant food that meets their daily dietary needs and ensures a healthy lifestyle. Food insecurity is when a household or a country lacks access to a sufficiently nutritious diet (Fasoyiro & Taiwo, 2012). Policy inconsistency and corruption, poverty and hunger, conflicts, natural disasters, and a lack of storage technology are all factors that contribute to food insecurity in Nigeria (Otaha, 2013); (Matemilola & Elegbede, 2017). Population growth is another critical factor affecting food security; the United Nations estimates that the world's population will rise by 2 billion people in the next 30 years from 7.7 billion today to 9.7 billion in 2050, increasing food demands and putting pressure on land.

According to the food supplies must keep up with population growth and urbanization for a country to have long-term

---

**Received:** 14-May-2022, Manuscript No. AJFST-22-63880; **Editor assigned:** 16-May-2022, Pre QC No. AJFST-22-63880 (PQ); **Reviewed:** 30-May-2022, QC No. AJFST-22-63880; **Revised:** 08-Jun-2022, Manuscript No. AJFST-22-63880 (R); **Published:** 15-June-2022

---

**Citation:** Miteu GD et al., (2022). The impact of high technology storage facilities on food security in Nigeria-Nigeria case study: Mini review. AJFST. 13: 030.

food security. As a result, the FAO considers agriculture and population development crucial to achieving food security. Nigeria's population growth rate is currently outpacing agricultural production, resulting in a food crisis (Fasoyiro & Taiwo, 2012). Despite Nigeria's high levels of malnutrition and poverty, Chief Audu Ogbe, Nigeria's former Minister of Agriculture and Rural Development, said 30 percent to 40 percent of the food produced in the country is wasted or lost when launching the Nigerian Yam Export program on Thursday, June 29, 2017. Food loss is characterized as a qualitative and quantitative decrease in the value and quantity of food (Jagadeesan, 2011). From the point of origin to consumption, food waste/spoilage occurs. The amount of food lost or wasted varies and is dependent on the form of food (Parfitt et al., 2010). Perishable foods lose one-third of their value before hitting final consumers (Kader, 2004), whereas non-perishable foods like cereals are projected to account for 15% of losses after harvest (Jagadeesan, 2011), 40% of roots and tubers are lost before they reach the market, while half of fruits and vegetables are lost (Njagi & Wainaina, 2018). Dilapidated infrastructure, both in production and storage, is a significant cause of high food wastage and loss in developing countries (Jagadeesan, 2011).

The productivity of agriculture is affected by infrastructures such as electricity, mechanized farming, storage facilities, and a proper transportation system, according to a study. As a result, this article examines the effect of high-tech storage facilities on food security in Nigeria.

## GENERAL REVIEW

### Food security in Nigeria

In a broad sense, food security refers to always having enough food and food items on hand to meet rising consumer demand while reducing production and price variations (Idrisa et al., 2008). According to the food security is a scenario in which all people have physical and economic access to sufficient, safe, and nutritious food for a healthy and active life always. Food security entails generating adequate quantities and food quality to feed everyone (Oriola, 2009). Food availability, access, usage and stability are the four fundamental components of food security. Nigeria is placed 100<sup>th</sup> out of 113 countries (2020). Food demand in Nigeria has outstripped food production. Nigeria's domestic food output is increasing, but it is still not enough to meet its food needs. Food wastage is a critical cause of food insecurity in Nigeria, according to (Igberaese & Okojie-Okoedo, 2010).

Improved farm storage and handling practices and transportation systems would aid the country's food security. Food insecurity affects almost 240 million people in Sub-Saharan Africa (SSA), or one out of every four

people. Rising food prices and drought force more people into poverty and famine. In SSA, where 70 percent of the population lives in rural regions, crop and animal agriculture, fishery, and forestry operations are direct sources of food and income. Increased and diverse food production for family consumption or as a source of revenue is a core necessity for better household food security. Better home and community food production, preservation, storage and access to marketing facilities can improve family food security by reducing seasonal food shortages and stabilizing market prices (Adeyeye, 2017).

### Food losses in Nigeria

In the supply chain section, food losses are declines in edible food mass that contribute to human-edible food. Food losses occur at the development, post-harvest and processing stages of the food supply chain (Parfitt et al., 2010). As a result of insufficient food processing and storage, food losses increase. Post-harvest facilities and proper storage technologies have long been a severe challenge in Nigerian agriculture. Nigeria loses and wastes 40% of total output each year, consumes 31% of total land, and contributes 5% of the country's greenhouse gas emissions. In Africa, food losses after harvest are critical to food insecurity. According to pre- and post-harvest food crop loss in African countries is expected to be around 10%, higher than the world average. According to a World Bank analysis, food grains worth USD 4 billion are lost each year in Sub-Saharan Africa (SSA). Food rotting is one of the most critical concerns affecting food security in many African countries. Food spoils are due to various factors, the most common of which is a lack of storage space

### Conventional storage techniques in Nigeria

The term "food preservation" encompasses various techniques for preventing food from rotting (Lund, 1989). Most African preservation techniques remain traditional and primitive, discouraging large-scale development from suiting the continent's rising needs. The procedure includes curing, pickling, drying, smoking, and adding chemical additions like salting. There are several problems in the preservation methods that must be addressed if African countries are to overcome the problem of food insecurity. Low efficiency, poor and non-uniform product consistency, and low shelf-life of items produced by processes are all examples of defects. For Nigerian farmers, insufficient storage facilities and handling procedures are an issue, compromising the quality and protection of their crop and resulting in higher losses. In metropolitan regions, modern silos and warehouses are utilized for storage.

In contrast, most farmers in rural regions still use traditional and improvised structures for storage, such as baskets, sacks, platforms, cribs, and sheds. In Nigeria, traditional

grain storage buildings are made of various locally accessible materials. Moisture infiltration, rusting, mold, rodent infestation, roof leaks, and theft are serious issues with traditional storage. Traditional grain storage buildings expose grain to rodent and insect attacks and offer optimal climatic conditions for rodent and insect growth and microbe proliferation, resulting in significant post-harvest losses.

### High tech storage facilities and techniques

It is becoming increasingly evident that agricultural technical investment is vital in ensuring that food is available globally, thereby serving as a critical source of income that enhances households' purchasing power to buy high-nutrition food. Most Nigerian farmers are under-informed, lack an adequate supply of agricultural inputs, equipment, and extension services, and are illiterate. They also lack a proper understanding of contemporary farming practices that might enhance productivity and increase yields to satisfy Nigeria's ever-increasing food demand. Due to a lack of competence in storage techniques and turning fruits and vegetables, farmers are obliged to sell products at exorbitant rates during harvest to avoid post-harvest losses. As a result, their income, purchasing power and interest in crop production are reduced (Babatunde & Oyatoye, 2005). Adopting new technologies and techniques in Nigerian agriculture is sometimes a major stumbling barrier. Farmers must have access to suitable storage as well as high-quality equipment. Food preservation ability is inextricably tied to technological advancement, and many African countries' slow progress in updating traditional food processing and preservation techniques contributes to food and nutritional insecurity. As fewer people eat foods grown on their land and as customers expect to be able to buy and eat foods that are "out of season," modern food preservation has become an increasingly important part of the food industry (Adeyeye, 2017). Small-scale farmers can minimize losses by having access to better storage and handling techniques through farmer cooperatives. Storage is crucial for agriculture's contribution to food and life survival. Since agricultural goods are not distributed throughout the year, storage is especially important in agriculture. In this situation, excess supply must be stored during the harvesting season and gradually released to the market during the off-season to meet average demand. Seasonal prices are stabilized due to this operation (Adejumo & Raji, 2007). The Nigerian food security program is based on three levels of grain storage: Strategic grain reserve buffer stock and on-farm storage with farmers being expected to store 85% of the grain needed for food security.

## DISCUSSION

Food security has gained serious attention on the list of Millennium Development Goals (MDGs) to eradicate

poverty and hunger. More than 60 countries are already making notable progress toward achieving the MDG hunger target, reducing by half the number of people suffering from hunger. Achieving food security in Sub-Saharan Africa, however, remains a great challenge. Despite some advances recorded, most of the region is not on track to reach the MDG hunger target, and rapid population growth makes tackling hunger even more challenging.

From the literature, it has been revealed that small farmers, herders and fishers produce about 70 percent of the global food supply in a country like Nigeria. Yet, these sets of active players in the food system suffer heavily from post-harvest losses due to the lack of high-tech storage facilities. These losses and wastages translate into food insecurity in Nigeria. Farmers in Sub-Saharan Africa generally lack access to improved storage technologies to store bumper harvests, and Nigeria is no exception (Costa, 2015). The Nigerian government needs to focus more on storage to curb food shortages. Annually Nigeria loses a significant percentage of its harvests due to poor storage, including half of its fruits and vegetables one-fifth of its grains, and a quarter of its tuber. The result of these losses is a shortage of supply to the ever-increasing demand for these food products because they are unavailable and inaccessible and therefore cannot be utilized by the body, which is the core focus of food insecurity. These problems can easily be addressed by deploying and using high-tech storage facilities because wastage would be massively cut down.

In Nigeria, a greater portion of the food supply is from poor farmers who cannot afford high-tech storage facilities and do not possess the technical knowledge to handle such facilities; therefore, they remain limited to the traditional preservation methods, which are not efficient in storing excess supply in a wholesome manner for availability all year round identified that some of the storage methods used by rural farmers include barns, baskets, bags, bare floors and pots for storing their produce. There is an urgent need to upgrade traditional preservation methods and adopt modern preservation methods to generate a more efficient result. Farmers regularly use chemical insecticides on maize stored in conventional technologies to prevent on-farm storage pest attacks, but these chemicals could become toxic when not properly used (Zorya et al., 2011).

However, various storage problems ranging from the high cost of storage, loss of products during storage disease and insect attacks, mishandling, and poor containers result in severe post-harvest losses (Malgwi et al., 2008).

## CONCLUSION AND RECOMMENDATION

This study extrapolates that focus should be driven to ensure zero food wastage during pre and post-planting. Zero food wastage can only be attained by cutting-edge

storage facilities readily available for use. Only with this consciousness will farmers resist the urge to inflate the cost of products by factoring in respective storage losses. Thus, high storage facilities will gear food security by balancing the food demand and supply curve as farmers would be able to produce goods in large quantities with an assurance of product longevity or increased shelf life, which will make these goods readily available for the consumers at fair prices.

Conclusively, high-tech storage facilities are needed as a springboard to increase food security in Nigeria.

## ACKNOWLEDGEMENT

The authors would like to acknowledge “The Pan African Research Group” PARG, its founder and director-Hampo Chima Cyril, as well as the Food and Agricultural Technology Unit of PARG for providing the platform for the conduct of this research. And to our team leader, Elohozino Oghale Benneth, we acknowledge your instrumental efforts in ensuring that this research had a successful outcome.

## REFERENCES

- Adejumo BA & Raji AO (2007). Technical appraisal of grain storage systems in the Nigerian Sudan Savanna.
- Adeyeye SAO (2017). The role of food processing and appropriate storage technologies in ensuring food security and food availability in Africa. *Food Sci Nutr*. 47: 122-139.
- Akerele D, Momoh S, Aromolaran AB, Oguntona CR, Shittu AM (2013). Food insecurity and coping strategies in South-West Nigeria. *Food security*. 5: 407-414.
- Babatunde R & Oyatoye E (2005). Food security and marketing problems in Nigeria: the case of maize marketing in Kwara State. *World Sci Res*.
- Costa SJ (2015). Taking It to Scale: Post-Harvest Loss Eradication in Uganda 2014–2015. UN World Food Programme, Kampala, Uganda.
- Fasoyiro SB & Taiwo KA (2012). Strategies for increasing food production and food security in Nigeria. *J Agric Food Inf*. 13: 338-355.
- Idrisa YI, Gwary MM, Shehu H (2008). Analysis of food security status among farming households in Jere Local Government of Borno State, Nigeria. *Agro-Science*. 7.
- Igberaese FI & Okojie-Okoedo D (2010). Food and hunger everywhere: A Nigeria Paradox of poverty. *Int Rev Bus Res Pap*. 6: 90-100.
- Jagadeesan P (2011). Factors affecting food security and contribution of modern technologies in food sustainability. *J Sci Food Agric*. 91: 2707-2714.
- Kader AA (2004). Increasing food availability by reducing postharvest losses of fresh produce. In *V International Postharvest Symposium*. 682: 2169-2176.
- Lund D (1989). Food processing: From art to engineering. *Food tech*. 43: 242-247.
- Malgwi G, Kadri S, Nwosun E, Esekhangbe R (2008). Problems and Prospects of ginger production, processing and marketing in kaduna State. *J Sustain Trop Agric Res*. 26: 54-58.
- Matemilola S & Elegbede I (2017). The Challenges of Food Security in Nigeria. *OALib*. 4: e4185.
- Njagi TN & Wainaina P (2018). Key challenges for Kenya in big push to reduce postharvest losses-harvest losses.
- Oriola EO (2009). Irrigation agriculture: An option for achieving the millennium development goals in Nigeria. *JGRP*. 2: 176.
- Otaha IJ (2013). Food insecurity in Nigeria: Way forward. *Afr Res Rev*. 7: 26-35.
- Parfitt J, Barthel M, Macnaughton S (2010). Food waste within food supply chains: quantification and potential for change to 2050. *Philos Trans R Soc Lond B Biol Sci PHILOS T R SOC B*. 365: 3065-3081.
- World Health Organization (2020). The state of food security and nutrition in the world 2020: transforming food systems for affordable healthy diets. *Food & Agriculture Org*.
- Zorya S, Morgan N, Diaz Rios L, Hodges R, Bennett B et al., (2011). Missing food: the case of postharvest grain losses in sub-Saharan Africa.