The State of Food Loss And Waste in Nigeria: Causes, Impacts, Efforts to Reduce The Menace And Way Forward

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ABSTRACT

***Background:** Nigeria, the giant of Africa is faced with food insecurity, and the amount of food lost and wasted is a huge contributor to the ravaging hunger faced by the populace. Reducing Food Loss and Waste (FLW) in Nigeria has become a global concern.*

***Objective**: To review the current state of FLW in Nigeria, the likely causes, the economic social, and environmental impact, and the efforts to reduce the menace.*

***Methods**: Over Fifty relevant scientific published articles relating to FLW that are within ten years of publication and current news (not more than five years) on FLW from reputable newspapers were sourced online through Elsevier, google scholar, and research gate among others.*

***Results**: Increased insecurity, poor quality inputs, poor road networks, and transportation coupled with poor packaging have been identified as some of the causes of FLW in Nigeria, the entire food system is found to be affected by FLW as well as the nation's economy. Among several strategies employed to mitigate FLW, transiting to a circular economy seems to be succeeding as evidenced in some parts of the country.*

***Conclusions:** continuity of programs that could reduce FLW in Nigeria is not encouraging and should be encouraged by the government at all levels.*

Keywords: Food Loss and Waste, Food Security, Hunger

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INTRODUCTION

Food loss refers to commodities as well as livestock and crops that are completely discarded, burnt, or spoilt and hence are not reused. This definition includes losses encountered during transportation, food storage, and processing (1). While food waste occurs when edible food that is fit for human consumption is discarded at the end of the food chain within distribution and consumption (2).

More people are getting hungry worldwide, yet globally, 1/3 of food produced is either wasted or lost (3). About 931 million tonnes of food are wasted as distributed: in households (61%), food service (26%), and retail outlets (13%). This indicates that out of the 5.3 billion foods that were globally available, 17% was wasted (4). In developed and middle-income countries, food is lost or wasted mostly at the level of distribution and consumption, while in low-income countries like Nigeria, food loss occurs at production and post-harvest levels.

Nigeria is the most populous country in West Africa and Africa in general with about 206 million people, of which this population is

projected to rise to 264 million by the year 2030. The country is endowed with abundant human and material resources. Despite these huge endowments, her populace is still living below the poverty line. The country is faced with multiple burdens of malnutrition, the number of undernourished persons stood at 24.6 million in the years, 2017-2019 (5). This could be due to food insecurity as the Global Food Security Index ranking in 2019 placed Nigeria in the 96th position out of 113 countries (6). In Nigeria, the number of people that faces severe food insecurity rose from 11.8 million in 2014 to 17.8 million in 2019. This situation is predicted to get worse by 2050 because of an expected rise in population (5).

Food insecurity and the burden of malnutrition in Nigeria can partly be attributed to FLW as about 40% of food produced is lost and wasted. No stage in the value chain of tomatoes, onions, and chillis is spared as about 32 million tonnes of waste is generated yearly (7). About 45 to 60 % of the total tomatoes produced, 50% of onions and 30 % of chili are wasted or lost. Some 20 – 30% of total grain and 30 – 50% of root and tuber produced in Nigeria is lost to post-harvest handling (7). Among the farming households in Uyo State Nigeria, it was discovered that about Eight thousand Naira worth of food is wasted.

The major causes of FLW are improper handling, and lack of proper storage and packaging. The problem of food insecurity in Nigeria does not lie in production but rather in storage, preservation, improper planning and quantification, family size, and access to credit facilities (8).

Sustainable Development Goals target that by the year 2030 food lost during harvest and food supply can be reduced (9), but the data on FLW in Nigeria is spatial for ready access and reference, this review therefore aims to equip relevant stakeholders with ready information which will help them manage their human and material resources directed toward FLW mitigation .

MATERIALS AND METHODS

An in-depth literature review of the state of FLW in the food system provided the informational basis for this paper. Desktop research was used to source data. Different search engines, online databases, Journal articles, Newspapers, and other published articles were used to get current and detailed literature. Sources that did not directly reference Food loss/food waste were excluded. Combinations of the thematically analyzed information found in these sources created the conclusions drawn by this paper.

CAUSES OF FLW IN NIGERIA

The causes of FLW varied from the food value chain to produce, market, and other physical, biological, psychological, social, technological, environmental, and biochemical reasons. In Nigeria like most low-income countries, most of the FLW occur at production and post-harvest level (10). There are so many reasons why food is wasted or lost in Nigeria, but the most prominent are as follows.

Nigeria like many African countries is plagued with poor packaging. When food is well packaged, it is protected from adverse weather conditions that could lead to the loss of its sensory properties (11) and hence reaches the final consumer in good shape (12). Good packaging can also help improve food value and enhance ventilation thereby controlling the temperature (13) but in Nigeria, improvised packaging materials are usually used. In the case of garri (a popular cassava product), an old hessian bag mainly meant for packaging granulated sugar and flours amongst others is used (14,15). The "Garri" packaged with the use of hessian bags does not have any nutritional information, production date, expiry date, or storage information thereby promoting spoilage as buyers are less aware of what to expect in the following days. The processing and packaging of palm oil are not left out as the current methods in Nigeria are below the international standard for quality and safety (16,17). Several studies in Nigeria have investigated the use of different packaging materials for fruits and vegetables. Storing oranges in baskets has been shown to minimize loss although some nutritional qualities like vitamin C levels are diminished, the recommended use of perforated and non-perforated polyethylene films can hardly be met

by the poor majority (18,19). Inadequate training of personal and technical support saddled with inadequate knowledge of the food material remains a challenge to the industry.

The food transport system in Nigeria is poor (20). Most vehicles used for transporting perishable foods in Nigeria are not road worthy therefore breakdown easily leading to food loose (21). Delivery of perishable goods like tomatoes and chillis from one location to another is further impeded by the incessant stoppage of the conveying trucks and monetary extortions (8). Prominent among the causes of food loss in Nigeria is inadequate cold storage evidenced by the fact that about 45 percent of food spoilage is attributed to cold storage inadequacy (22).

Adverse weather conditions and climate change are one of the leading causes of food loss in Nigeria. Nigeria is known to be the 55th most vulnerable country to adverse climate change in the world and ranks 22nd in unpreparedness to tackle it. As a result, it is projected that this will lead the economy to lose about 6-30% of its GDP in 2050. The six vegetative zones in Nigeria are unique in the way the climatic changes affect them (23), like reduced rainfall, increased dissertation and drought experienced in Sahel Savanah (24), Contrarily, some of these vegetative zones are prone to flooding leading to food loss (25).

The surge in insecurity and insurgency in Nigeria coupled with the Covid-19 pandemic has accelerated the incidence of food loss. Most often, peasant farmers are scared away by herdsmen and their crops damaged. Robbers invade farms, disrupting vehicular movements, fruits, and vegetables rot in transit because of the delays (26,27,28). Insecurity in Nigeria has an indirect impact on the processing industry as many industries especially those processing perishables like tomatoes have closed (29).

Low-quality inputs in terms of seeds and fertilizers contribute to FLW. This is evidenced in the short post-harvest shelf life seen in generic varieties of tomatoes. About 80% of farmers in Nigeria use these low-quality tomatoes with limited post-harvest shelf-life leading to high losses (30). The same is applicable to farmers in Sokoto who use a landrace variety of onions with limited shelf life (31).

IMPACTS OF FLW IN NIGERIA

The impact of FLW is both direct and, indirect. Economically, both the producers (farmers) and the consumer's incomes are affected (32). The United Nations report on global annual food lost on the farm or closer to the farm amount to 400 billion USD, this loss invariably is borne directly by the farmers and indirectly by society at large. Nigeria is the second-largest producer of tomatoes in Africa and the fourteenth-largest producer in the world but ironically, she is the 3rd largest importer of the paste of this same product (33), this can be attributed directly to the number of tomatoes lost and wasted as 46 to 60% of the tomatoes produced is said to be wasted (34,8). While in Africa, the value of food loss is estimated to exceed the value of money spent on the importation of grain. This can lead to a serious economic setback for all sectors of the economy including the consumers on a household level.

Environmentally, the climate is affected by FLW, an estimated 8% of global Green House Gas (GHG) emissions are attributed to FLW (35, 36). Unconsumed food contributes greatly to global warming. When food decomposes, it affects the freshness of the air especially when not properly incinerated and emits methane gas which can be harmful as these account for about 7 percent of the total amount of GHG emissions. In losing food, water is also lost. The global report on the blue water footprint of food wastage is about 250 km^3 which is about three times the volume of Lake Geneva (37). Globally, scarce land is further limited by wasted foods which occupy about 1.4 billion hectares representing nearly 30% of the world's agricultural land area. A write-in 2018 by the Food Connection Challenge stated that such wasted foods were cultivated in a cropland area that is large as the size of China. About 8% of annual greenhouse emission is attributed to the menace caused by FLW.

The social impact of FLW in Nigeria cannot be neglected. More people are likely to go below the poverty line as the wages of farmers are reduced because of FL (37). and this is supported by the report by The Guardian newspaper on January

22, 2022, that annually in Nigeria, about 25% of the income of peasant farmers is lost to food loss. In the end, there will be lack of produce because there will be little or no money to purchase farm inputs which will result in low yield, and the vicious cycle continues. Consumers with lower incomes are also affected because when the demand for a commodity is high with a limited supply, the prices for such a commodity tend to be higher (38,39). It has been established that foods with high nutritional content tend to generate the highest waste as they spoil easily because they are mainly fresh produce like meats, and milk (42). This invariably means that the nutritional status of the populace will be affected as a high percentage of micro-nutrients are found in these foods. On the food chain, there will be low labour productivity as most of the produced foods are lost, thereby making labour productivity low as food wasted or lost is productivity lost (Global Agricultural Productivity (41). Furthermore, FLW will make it difficult for companies to plan.

STRATEGIES TO REDUCE FOOD LOSS AND WASTE.

Awareness was created by the United Nations on making people know that the year 2021 was the international year of fruit and vegetables. With this awareness, the populace not only knows that the money paid for these items is worth less than their benefits to health but also knows that they ought not to be wasted by assuring their safety across the supply chain (42). Aside from this, in 2019, the 74th UN general assembly set aside September 27th internationally as a day for awareness of the reduction of FLW. Champions 12.3 mobilizes actions geared towards reducing half of the foods wasted globally by half on or before the year 2030 (43). The "Europa 2020 Strategy" calls for innovative ways by which food loss can be reduced. United State Environmental Protection Agency (USEPA) Food Recovery Hierarchy can be used to utilize surplus food and reduce food waste and its impact on the economy. From the most prioritized to the least, the strategy includes reducing surplus food generated, feeding hungry people by donating these foods to those who need them most, using these foods as animal feeds, using them in industries for energy generation among others, the excess foods can go back to the farms and be used as compost, thereby making soil nutrient-dense, the last resort, if food must be wasted, is to at least incinerate it or use it for landfilling (44). The North American Commission on Environmental Protection (CEC) launched food matters action kit mainly to enable youths to minimize food waste in their homes and communities (45).

The Nigerian Government adopted the Malabo declaration in 2014 with a priority of reducing post-harvest losses of food by half by the year 2025 (46). Building a food system that allows natural capital and nature to flourish (transiting to circular economy) have been proposed as another strategy (47). In the context of FLW, this can be applied in the use of improved crop varieties like in the case of tomatoes and onions recently given to farmers in Kano state Nigeria (48). In the year 1990, the Zero-energy cooling chamber was developed by the Nigerian Stored Products Research Institute (49) to help improve the shelf life of highly perishable fruits and vegetables. This has been a step in the right direction as FLW can be reduced to a reasonable level, but it is not substantial as the amount of FLW abounds (50). Nigeria Digital Agriculture Strategy was introduced in 2020, to use digital innovations and technologies to reduce FLW by 50% (51)

CONCLUSION

The major stage of food loss in Nigeria has been the production and post-harvest stages in the food value chain, so the solution should be to mitigate losses at this stage. Nigerians should revive the old effective methods of reducing food loss on the farm. The Zero-energy cooling method is faced with the problem of low awareness by farmers. More smart modern technologies like the use of digital smart tools like drones, and artificial intelligence among others is not well utilized. Utilization and revitalization of earlier strategies by various government and non-governmental organizations will go a long way to reduce FLW in Nigeria.

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