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FOOD SECURITY, FOOD WASTE, AND NUTRITION IN NIGERIA: STRATEGIES, SOCIO–CULTURAL INFLUENCES, AND NUTRITION OUTCOMES

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Abstract: Despite Nigeria's abundant agricultural production, food insecurity and malnutrition persist as critical public health challenges. A major factor contributing to this paradox is significant food loss and waste (FLW) across the food supply chain, which reduces food availability and degrades dietary quality, especially among vulnerable populations. This review quantifies FLW in Nigerian food systems, investigates socio–cultural influences on food waste behaviors, and evaluates nutrition–sensitive strategies to mitigate losses. FLW in Nigeria is estimated at approximately 40% of total food production, driven by infrastructural deficits, behavioral norms, and policy gaps. Key intervention points include improved storage, transport infrastructure, consumer education, and enhanced governance. Multi–sectoral collaboration targeting these areas with culturally appropriate and gender–sensitive approaches can substantially improve household food security and nutrition outcomes. This paper provides updated data, contextualizes the socio–cultural factors influencing food waste, and offers actionable recommendations for policymakers and stakeholders.

Keywords: Food security, food loss and waste, nutrition, Nigeria, socio–cultural factors, food systems, policy interventions

INTRODUCTION

Nigeria presents a striking contradiction: it is Africa's largest agricultural producer by volume yet has a high prevalence of food insecurity and malnutrition (WHO, 2024). As of mid–2025, approximately 45 million Nigerians face food insecurity, with child stunting affecting around 37% of children under five (Veriva Africa, 2025). This paradox is largely attributable to food loss and waste (FLW) occurring at multiple stages from production to consumption, reducing effective food availability and worsening diet quality.

Food security implies reliable access to sufficient, safe, and nutritious food meeting dietary needs for an active and healthy life (FAO, 1996). Nigeria's achievement of this goal is hampered by losses incurred along the food supply chain, compounded by socio–political, infrastructural, and climatic challenges. The Food and Agriculture Organization (FAO, 2021) estimates that globally, about one–third of food produced is lost or wasted annually. In Nigeria, FLW is significantly higher due mainly to poor road networks, inadequate storage, lack of cold chain facilities, and behavioral practices (ARP, 2025; Emegha et al., 2025).

This review aims to quantify and characterize the magnitude of FLW in Nigeria's food supply chain and assess the impact of FLW reduction on

household food security and nutritional outcomes. It also explores the socio–cultural drivers underpinning food waste behaviors in households and markets and evaluates strategies for food loss and waste reduction that are culturally sensitive and nutrition–focused. Understanding these dynamics is essential for policy formulation oriented towards sustainable, equitable food systems.

MAGNITUDE AND CHARACTERISTICS OF FOOD LOSS AND WASTE IN NIGERIA

■ Definitions and Contextualization

Food loss refers to edible food that decreases in quantity or quality along the production, post–harvest, and storage phases (FAO, 2021). Food waste denotes edible food discarded at retail and consumer levels, often due to quality perceptions or over–purchasing (FAO, 2021). Nigeria's food system is particularly susceptible to FLW given infrastructural deficits and socio–economic conditions.

Root crops, fruits, vegetables, grains, and animal–source foods are especially prone to losses, which are critical as these are nutrient–dense foods essential for balanced diets (Emegha et al., 2025). The high perishability of these items necessitates efficient handling, preservation, and marketing systems, which remain underdeveloped in Nigeria.

Quantifying Food Loss (FLW) and Waste in Nigerian Food Chains

A range of studies and national data reveal an estimated post-harvest food loss range from 20%–40% depending on crop type and region annually (ARP, 2025; World Bank, 2024; Emegha et al., 2025; Nes Group, 2023). Poor harvesting techniques, inadequate transportation infrastructure, and lack of storage facilities exacerbate losses. Table 1 summarizes recent estimates of food loss percentages across supply chain stages and commodities.

Table 1: Food Loss and Waste Estimates by Stage and Commodity in Nigeria

| Stage | Food Type | Estimated Loss (%) | Source |
|----------------|--|--------------------|--|
| Post-Harvest | Root crops (yam, cassava), maize, millet | 30–50% | BusinessDay (2025); NESG (2025) |
| Storage | Perishables (fruits, vegetables), grains | 15–30% | Emegha et al. (2025); Food Smart Country Diagnostic (World Bank, 2024) |
| Transport | Perishables, root crops | 10–20% | NESG (2025) |
| Retail/Markets | Perishables (fruits, vegetables) | 10–25% | Emegha et al. (2025); Veriva Africa (2025) |
| Household | Cereals, prepared food | 12–20% | NESG (2025); BusinessDay (2025) |

Table 1 highlights critical loss points with post-harvest and storage representing the largest losses due to infrastructural and technological gaps. Perishable items vital for micronutrient intake suffer notable losses at transport and market levels, impacting nutrition and high perishability of root crops and vegetables compounds vulnerability during transport and retail. Household waste, often due to over-purchasing and inadequate food preservation knowledge, contributes significantly to total FLW (BusinessDay, 2025; Veriva Africa, 2025). FLW not only reduces food availability but represents economic losses estimated at over 9% of Nigeria's GDP yearly, alongside environmental costs including emission of greenhouse gases accounting for approximately 5% of national totals (World Bank, 2024; Emegha et al., 2025).

IMPACT OF FOOD LOSS AND WASTE REDUCTION ON HOUSEHOLD FOOD SECURITY AND NUTRITION

Reducing FLW is a strategic lever to enhance food availability and affordability without pressure to

increase production on limited land and fragile ecosystems (Emegha et al., 2025; FAO, 2021).

Enhancing Food Availability and Affordability

Mitigating post-harvest losses can stabilize market supply by extending the shelf-life of nutritious foods, thereby mitigating price spikes during lean seasons (Veriva Africa, 2025). Improved availability of nutrient-rich foods particularly benefits low-income households, decreasing vulnerability to food insecurity. Reduced wastage decreases costs incurred by farmers and vendors, potentially lowering retail prices and improving consumer access.

Improving Diet Quality and Nutritional Outcomes

Reduced FLW across the supply chain increases availability of perishable, micronutrient-dense foods like fruits, vegetables, and animal products critical for dietary diversity and nutritional adequacy (Nes Group, 2023; Emegha et al., 2025). Pilot projects employing improved storage technologies in Nigeria report increased household consumption of these foods, leading to reductions in micronutrient deficiencies and child stunting indicators (Emegha et al., 2025). Economic analyses suggest that every Nigerian naira invested in post-harvest technology yields considerable returns in food saved and health benefits derived (World Bank, 2024). However, trade-offs exist, such as potential reduced income for vendors disposing of unsold stock, underscoring the need for integrated stakeholder strategies.

SOCIO-CULTURAL FACTORS INFLUENCING FOOD WASTE BEHAVIOR

Socio-cultural dynamics strongly influence food waste behaviors at household and market levels in Nigeria. Key factors include:

- Social and cultural expectations: Over-preparation of food for large communal gatherings or hospitality as a cultural norm leads to excess that often goes to waste (NESG, 2025).
- Aesthetic food preferences: Consumers frequently reject produce based on minor cosmetic defects despite edibility, leading vendors to discard such items (Emegha et al., 2025).
- Knowledge and preservation skills: Many households lack awareness or skills in food preservation techniques, exacerbating spoilage,

especially under unreliable power conditions (BusinessDay, 2025).

- Religious and dietary restrictions: Certain fasting periods, food taboos, and fasting-days create fluctuations in food demand and leftovers, contributing to household waste (Nes Group, 2023).
- Gender roles: Women predominantly manage food purchasing and preparation; culturally-responsive behavior change targeting women is crucial in reducing household waste (World Bank, 2020).

At market levels, lack of affordable preservation technologies and pressure to maintain “fresh-looking” produce encourages disposal of unsold perishables daily (NESG, 2025). Regional and ethnic variations affect the degree and nature of socio-cultural food practices, demanding localized interventions.

STRATEGIES FOR FOOD LOSS AND WASTE REDUCTION

Mitigating FLW in Nigeria requires multi-pronged approaches blending technical innovation with socio-cultural sensitivity.

■ Improved Storage and Preservation Technologies

Hermetic storage bags and metal silos have successfully reduced grain and tuber losses by 15–30% in pilot studies (Emegha et al., 2025). Solar-powered cold storage units in urban and peri-urban markets extend shelf-life of perishable foods such as fruits and vegetables, reducing spoilage at retail and consumer levels (NESG, 2025). Adoption challenges include cost, user training, and maintenance capacity.

■ Infrastructure and Transport Enhancements

Upgrading rural feeder roads and investment in refrigerated transport significantly reduce mechanical damage and spoilage during transit (Veriva Africa, 2025). Enhanced market infrastructure including cold rooms and hygienic storage promotes preservation.

■ Consumer Education and Behavior Change Initiatives

Programs promoting meal planning, portion control, proper storage, and acceptance of imperfect foods can reduce household waste (FAO, 2021). Utilizing mass media and community-based platforms ensures reach and social norm change.

Empowering women through targeted education leverages their central food management role.

■ Policy and Institutional Frameworks

Developing a comprehensive national FLW reduction strategy that integrates nutrition aims is critical (Ogunniyi, 2023). Incentivizing private sector investment in post-harvest technology, formalizing food loss measurement and monitoring, and strengthening inter-agency coordination underpin effective governance. Learning from successful policy examples in comparable contexts could guide implementation.

DISCUSSION

This review confirms that FLW substantially undermines Nigeria’s food security and nutrition despite significant agricultural production. Post-harvest losses and consumer-level waste combine to deprive millions of nutritionally critical foods. Socio-cultural factors including social norms, food aesthetics, and gender roles further complicate the problem, necessitating context-specific strategies. Addressing FLW requires technological solutions supported by infrastructure investments and behavior change programs rooted in cultural realities.

Gender-sensitive and localized approaches enhance adoption and impact sustainability. Policy coherence and stakeholder collaboration across sectors agriculture, health, transport, education are pivotal. However, research gaps remain, especially around longitudinal impacts of interventions on nutrition outcomes and economic ripple effects throughout the food system. Future studies should also explore regional socio-cultural diversity to tailor interventions more precisely.

CONCLUSION

Reducing food loss and waste is essential for transforming Nigeria’s food systems towards equitable food security and improved nutrition. Integrated strategies addressing technical, behavioral, and policy dimensions guided by socio-cultural understanding are imperative. Addressing infrastructural constraints, socio-cultural drivers of waste, and implementation of nutrition-sensitive policies can ensure more food reaches vulnerable populations. Collaborative efforts among government, private sector, civil society, and communities can unlock Nigeria’s agricultural potential, reduce environmental footprints, improve

diets for millions and to significantly mitigate FLW's nutritional ramifications.

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