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Innovations in Nigeria's Food System: Transformative Approaches to Hunger and Malnutrition.

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Abstract

Nigeria continues to face high levels of hunger and malnutrition despite ongoing efforts to strengthen food systems and public nutrition programs. This review explores the role of innovation in transforming Nigeria's food system to improve food and nutrition security. Using a qualitative, desk-based approach, the study synthesizes recent peer-reviewed literature, government reports, and program evaluations from 2018 to 2024 to examine the design, implementation, and impact of various innovations. These include food fortification, biofortification, school feeding programs, digital nutrition platforms, urban agriculture, cash transfers, and behavior change communication strategies. A thematic analysis and comparative evaluation framework were applied to assess each innovation's effectiveness, implementation reach, scalability, and contextual challenges. Findings reveal that food fortification stands out as the most effective and scalable intervention, reaching large population segments with measurable reductions in micronutrient deficiencies. Biofortified crops show strong potential but require expanded farmer education, seed access, and cultural adaptation. School feeding and digital platforms contribute to dietary improvement and awareness, though their impact is constrained by limited coverage, digital access, and funding reliability. Urban agriculture and social protection programs offer localized solutions but face scalability barriers. The review concludes that no single innovation is sufficient to address Nigeria's nutrition challenges. Rather, a multi-pronged, context-specific, and cross-sectoral approach is required. The study emphasizes the need for policy coherence, decentralized implementation, inclusive communication models, and sustainable financing to enhance impact. It offers strategic recommendations to align agriculture, health, education,

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and ICT policies in building a resilient and nutrition-sensitive food system that supports progress toward Sustainable Development Goal 2.

Keywords: Food system transformation, Malnutrition, Hunger reduction, Nutrition-sensitive innovation, Biofortification, Nigeria

1.0 Introduction

Despite decades of progress in global agricultural output and food policy reform, hunger and malnutrition remain among the most pressing challenges facing humanity. Globally, approximately 735 million people faced chronic hunger in 2023, with over 3.1 billion lacking access to a healthy diet (Food and Agriculture Organization [FAO], 2023). Sub-Saharan Africa, and Nigeria in particular, continues to experience a disproportionately high burden of food insecurity, driven by complex and interrelated factors such as poverty, conflict, economic shocks, and climate change (World Food Programme [WFP], 2023; United Nations Children's Fund [UNICEF], 2023).

Nigeria, the most populous country in Africa, stands at a critical juncture in its food and nutrition landscape. According to the Cadre Harmonisé report, an estimated 26.5 million Nigerians are projected to face acute food insecurity between June and August 2024, with over 4.3 million individuals already in crisis-level hunger in the northeastern states of Borno, Adamawa, and Yobe (Famine Early Warning Systems Network [FEWS NET], 2024). Malnutrition rates are similarly alarming: 37% of Nigerian children under five are stunted, 22% are underweight, and 7% suffer from wasting, while micronutrient deficiencies, particularly iron and vitamin A deficiencies, are widespread among women and children (National Population Commission [NPC] & ICF, 2019; World Health Organization [WHO], 2023).

These statistics persist despite significant investments in food production and nutrition interventions. The paradox of increasing food output alongside persistent hunger and malnutrition underscores the need for a fundamental transformation in the structure and function of Nigeria's food system. A food system is broadly defined as the interconnected network of processes and actors involved in food production, processing, distribution, consumption, and waste management (FAO, 2018; High Level Panel of Experts [HLPE], 2020). However, food systems are not neutral they are shaped by political, technological, and environmental forces, and they influence health, equity, and sustainability outcomes.

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In Nigeria, the food system is undergoing pressure from rapid population growth, urbanisation, environmental degradation, insecurity, and economic instability. Food inflation reached 33.93% in December 2023, significantly reducing household purchasing power and dietary diversity (National Bureau of Statistics [NBS], 2023). Conflict and displacement have further undermined food availability, especially in the northern regions, where insecurity has drastically reduced arable land and disrupted local markets (FAO, 2023; International Organization for Migration [IOM], 2023). Climate-related challenges such as drought, floods, and erratic rainfall continue to exacerbate crop failure and post-harvest losses (World Bank, 2022).

To confront these challenges, a transformation in Nigeria's food system is urgently needed one that is not only productive but also inclusive, resilient, and nutrition-sensitive. Central to this transformation is the role of innovation. Technological advancements such as biofortification, remote sensing, geographic information systems (GIS), mobile data collection, and artificial intelligence are reshaping the ways hunger and malnutrition are assessed and addressed (HarvestPlus, 2023; WFP & Nigerian Meteorological Agency [NiMet], 2023). At the same time, institutional reforms, behavioral change communication, and community-based interventions are proving vital in translating innovation into impact (Scaling Up Nutrition [SUN] Movement, 2023).

This paper explores how innovation broadly conceived to include technological, institutional, and social dimensions is driving the transformation of Nigeria's food system in the fight against hunger and malnutrition. Drawing on recent literature, programmatic reports, and national policy frameworks, the study synthesizes current innovations, highlights scalable practices, and identifies strategic gaps in the national response to food insecurity and malnutrition. The paper contributes to the ongoing discourse on Sustainable Development Goal 2 (Zero Hunger) and supports the development of context-specific, evidence-based strategies for strengthening Nigeria's food and nutrition security in a rapidly changing world.

2.0 Literature Review

2.1. Conceptualizing Food Systems

Food systems encompass all the processes and actors involved in the production, aggregation, processing, distribution, consumption, and disposal of food products (FAO, 2018). These systems operate within a broader context of environmental, economic, and sociopolitical conditions that influence how food is produced, accessed, and consumed (HLPE, 2020). A modern understanding of food systems emphasizes their role in supporting health, equity, livelihoods, and

sustainability. In recent years, systems thinking has gained prominence in global development discourse, recognizing the interconnectedness of food, nutrition, climate, and public health (Willett et al., 2019).

In Nigeria, the food system is undergoing transition due to rapid urbanization, climate variability, insecurity, and technological advancements. These drivers interact in complex ways to shape outcomes related to food availability, affordability, and nutritional quality (World Bank, 2022). As a result, there is a growing need to move from linear agricultural models to integrated food system frameworks that address multiple development goals, including hunger, malnutrition, and climate resilience.

2.2. The Burden of Hunger and Malnutrition in Nigeria

Despite being a major agricultural producer, Nigeria faces high levels of food insecurity and malnutrition. The prevalence of undernourishment stood at 14.6% between 2018 and 2020, translating to over 30 million Nigerians with insufficient caloric intake (FAO, 2023). According to the 2018 Nigeria Demographic and Health Survey (NDHS), 37% of children under five are stunted, 22% are underweight, and 7% are wasted—indicating chronic and acute malnutrition (NPC & ICF, 2019). Furthermore, micronutrient deficiencies are widespread; over 30% of children under five suffer from vitamin A deficiency, while 68% of children aged 6–59 months are anaemic (WHO, 2023).

Multiple factors contribute to this nutrition crisis. These include conflict-induced displacement, poor infant and young child feeding practices, limited access to diverse diets, and inadequate health and water infrastructure (UNICEF, 2023). Climate change also plays a growing role by disrupting planting and harvesting seasons, increasing post-harvest losses, and intensifying food price volatility (World Bank, 2022).

2.3. Drivers of Food System Transformation

Food systems are not static; they evolve in response to a range of internal and external drivers. Internal drivers include consumer preferences, income levels, agricultural productivity, and dietary transitions, while external drivers encompass climate change, market globalization, public policy, and health crises (HLPE, 2020). In Nigeria, key drivers of food system transformation include:

i **Demographics and Urbanization:** Nigeria's population is projected to exceed 400 million by 2050, with over 60% residing in urban areas (UN DESA, 2022). This demographic shift alters food demand patterns and increases pressure on food supply chains.

ii **Climate Change:** Flooding, droughts, and rising temperatures threaten agricultural productivity and food security. Arable land has decreased in many northern states due to desertification and conflict (FAO, 2023).

iii **Insecurity and Conflict:** Ongoing insurgencies and communal violence have disrupted farming, displaced millions, and hampered distribution networks, especially in northeastern Nigeria (FEWS NET, 2024).

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These challenges necessitate the adoption of innovative, adaptive strategies that enhance the resilience and equity of Nigeria's food system.

2.4. Technological Innovations in Assessing Hunger and Malnutrition

Advances in digital technology have significantly enhanced the ability to assess food insecurity and malnutrition. In Nigeria, several tools are being used:

i **Remote Sensing and GIS:** Satellite imagery and geographic information systems are used to track crop health, land use, and food insecurity hotspots (NiMet & WFP, 2023).

ii **Mobile Data Collection:** Smartphone apps and SMS-based platforms enable real-time nutrition surveillance, especially during emergencies. The National Bureau of Statistics and the World Bank used phone surveys during the COVID-19 pandemic to monitor food access and market conditions (NBS & World Bank, 2022).

iii **Big Data Analytics:** Machine learning models are employed to analyze diverse datasets—from market prices to meteorological trends—to anticipate food crises and support early warning systems (FEWS NET, 2023).

iv **Biomarker Testing:** Innovations in field-based diagnostic tools now allow for faster, cost-effective assessments of micronutrient deficiencies. The 2021 National Food Consumption and Micronutrient Survey used such technologies to evaluate the nutritional status of Nigerians (Federal Ministry of Health, 2022).

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2.5. Innovations in Addressing Hunger and Malnutrition

Efforts to transform Nigeria's food system include both technological and institutional innovations:

i **Biofortification:** Crops genetically enriched with vitamins and minerals, such as vitamin A cassava, iron-rich beans, and orange-fleshed sweet potatoes, have been promoted by programs like HarvestPlus to combat micronutrient deficiencies (HarvestPlus, 2023).

ii **School Feeding Programs:** The National Home-Grown School Feeding Programme links nutrition to local agriculture, providing children with meals while supporting smallholder farmers (NSIO, 2023).

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iii **Digital Nutrition Services:** Platforms such as U-Report by UNICEF disseminate tailored nutrition messages via SMS and mobile apps, especially to pregnant women and caregivers (UNICEF Nigeria, 2023).

iv **Urban Agriculture and Food Innovation Hubs:** In cities like Lagos and Kano, hydroponics and rooftop gardens are being promoted to improve urban food access (RUAF Foundation, 2022).

v **Food Fortification and Testing:** Nigeria mandates the fortification of flour, sugar, and oil with essential micronutrients. Recent innovations have improved testing and compliance monitoring (GAIN, 2023).

vi **Behavior Change Communication:** Social marketing, peer education, and community theatre are used to promote better dietary practices and maternal-child nutrition, particularly under the Scaling Up Nutrition (SUN) Movement (SUN Movement, 2023).

2.6 Overview of Innovations and the Need for Comparative Evaluation

The literature reviewed highlights a diverse array of innovations aimed at addressing hunger and malnutrition in Nigeria, ranging from biofortification and food fortification to digital nutrition platforms, school feeding programs, and urban agriculture. Each of these approaches reflects different strategies some technological, others institutional or behavioral. While these interventions have been independently studied and piloted across various regions, there is limited consolidated insight on how they compare in terms of effectiveness, implementation reach, and scalability.

This observation underscores the need for a structured comparative evaluation of these innovations. Accordingly, a more detailed analysis of their performance, strengths, and limitations is presented in Section 4.0, drawing on synthesized literature and analytical tools including tabular and graphical representations.

2.7. Barriers and Gaps in Implementation

Despite progress, Nigeria's food system transformation faces several limitations:

i **Policy Fragmentation:** Coordination across ministries and sectors remains weak, resulting in overlapping or inconsistent interventions (Olomola & Nwafor, 2018).

ii **Limited Coverage and Targeting:** Many interventions, including cash transfers and nutrition programs, lack reach and are poorly targeted (World Bank, 2023).

iii **Cultural and Behavioral Constraints:** Deeply rooted cultural beliefs continue to hinder exclusive breastfeeding, dietary diversity, and the acceptance of fortified or biofortified foods (Ogbo, Agho, & Page, 2017).

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iv **Funding and Research Gaps:** There is a need for increased investment in research, infrastructure, and capacity building to scale successful innovations sustainably (SUN Movement, 2023).

2.8. Summary of Key Insights

The literature reveals that while Nigeria has made strides in deploying innovations to address food insecurity and malnutrition, these efforts remain fragmented and under-scaled. Technological solutions alone are insufficient. A truly transformative approach requires integration with institutional reform, behavior change strategies, and multisectoral collaboration. Innovations must be context-specific, equity-focused, and guided by robust data systems and inclusive governance.

3.0 Methodology

3.1 Research Design

This study employed a qualitative descriptive research design, utilizing a desk-based review of secondary sources to explore innovative approaches in transforming Nigeria's food system with a focus on addressing hunger and malnutrition. The design was chosen for its suitability in synthesizing complex, multi-sectoral data across health, agriculture, and food policy domains. The study aims to provide a systematic and integrative overview of innovations in food systems without the introduction of experimental or survey-based primary data collection.

3.2 Data Sources

The research was based entirely on secondary data collected from credible and authoritative sources. These included:

i Peer-reviewed journal articles
ii National and international policy documents
iii Reports from organizations such as the Food and Agriculture Organization (FAO), World Health Organization (WHO), World Food Programme (WFP), World Bank, UNICEF, and the Federal Government of Nigeria
iv Evaluation reports from development partners such as HarvestPlus, GAIN, and the International Institute of Tropical Agriculture (IITA)
v National-level data sets such as the Nigeria Demographic and Health Survey (NDHS) and the National Bureau of Statistics (NBS) reports

Documents were selected based on their relevance, credibility, publication date (priority to sources from 2018 to 2024), and contribution to the understanding of innovations in food system transformation.

3.3 Data Collection Procedure

Data collection was carried out through a systematic literature review process, comprising three main steps:

i **Search and Retrieval**: Online databases such as Google Scholar, PubMed, Scopus, and institutional repositories were searched using keywords such as "food system innovation in Nigeria," "hunger and malnutrition," "biofortification," "digital nutrition," "school feeding," and "nutrition-sensitive agriculture."

ii **Screening and Selection**: Retrieved documents were screened for relevance to the research questions. Only publications in English and focused on Nigeria (or with clear implications for Nigeria) were included. Preference was given to recent publications (2018–2024) to ensure currency of data and perspectives.

iii **Content Extraction**: Key themes, findings, and indicators relevant to innovation types, implementation reach, effectiveness, and challenges were extracted. A thematic matrix was developed to allow for comparative analysis across interventions.

3.4 Data Analysis

The study applied a qualitative content analysis approach. Data from various sources were synthesized to identify recurring themes, implementation models, outcomes, and contextual factors influencing the success of each innovation. This thematic analysis was complemented by a comparative framework to rate and compare innovations based on their effectiveness and implementation reach using an ordinal scoring system (1 to 5 scale).

The comparative analysis was visualized through tabular summaries and graphical charts, including a grouped bar chart (Figure 1) to illustrate the relative performance of innovations. This analytical strategy facilitated an evidence-informed comparison and drew attention to scalable solutions with policy relevance.

3.5 Ethical Considerations

As a desk-based review relying solely on publicly available documents and data sets, this study did not involve human subjects or sensitive data. Nonetheless, ethical research standards were upheld by ensuring proper citation of all sources, maintaining academic integrity, and acknowledging intellectual contributions through full referencing in APA 7th edition style.

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3.6 Limitations of the Methodology

While the study provides a comprehensive review of innovations in Nigeria's food system, it is limited by its reliance on secondary data. As such, it may not fully capture the latest implementation dynamics, informal innovations, or community-specific practices that are not yet documented in formal literature. Additionally, the lack of quantitative data limits statistical inference. Future research is encouraged to incorporate mixed-methods approaches, including field-based data collection and stakeholder interviews, to validate and expand upon the findings presented.

4.0 Results and Discussion

This section presents an integrated discussion of the key findings derived from the desk-based review of innovations addressing hunger and malnutrition within Nigeria's food system. The analysis highlights the scope, effectiveness, and limitations of these innovations, drawing on multiple dimensions technological, institutional, behavioral, and environmental.

4.1 Emerging Innovations and Their Impact

The findings confirm that Nigeria has made substantial progress in deploying innovation to confront widespread malnutrition and food insecurity. Notable initiatives include biofortified crops, food fortification policies, school-based feeding programs, and digital nutrition platforms.

Biofortification—the genetic enhancement of staple crops to improve their micronutrient content—has shown positive outcomes in combating vitamin A and iron deficiencies. Crops such as orange-fleshed sweet potatoes and vitamin A cassava have been introduced and distributed to smallholder farmers through collaborative programs led by HarvestPlus and the International Institute of Tropical Agriculture. While biofortification has demonstrated proven health benefits, its adoption is still limited by farmer awareness, taste preferences, and seed accessibility in some rural areas (HarvestPlus, 2023).

Food fortification, particularly of staple foods like flour, oil, and sugar, remains the most scalable and impactful innovation. According to the Global Alliance for Improved Nutrition (GAIN, 2023), national-level mandates have significantly improved iron and iodine intake, especially among low-income populations. Despite this, monitoring compliance among producers remains a challenge, requiring improved testing technologies and regulatory oversight.

The National Home-Grown School Feeding Programme has become a crucial intervention that simultaneously addresses child nutrition and supports local

agriculture. It provides millions of children with one nutritious meal daily while creating market opportunities for smallholder farmers. However, its effectiveness varies by region due to inconsistent funding and weak logistical infrastructure (Food and Agriculture Organization [FAO], 2023).

Digital nutrition services, such as UNICEF's U-Report platform, have gained traction in providing tailored health and dietary guidance to mothers and caregivers. These platforms enhance knowledge of infant and young child feeding practices (IYCF) and empower users to make informed decisions (UNICEF Nigeria, 2023). Their success depends heavily on mobile phone penetration and literacy rates, posing a barrier to reach in underserved communities.

Urban agriculture, although still nascent, presents promising models for localized food access. Cities like Lagos and Kano have witnessed growth in hydroponic and rooftop farming, reducing dependence on long-distance food supply chains (RUAF Foundation, 2022). However, high initial costs and limited technical knowledge constrain expansion.

Social protection programs, such as the National Social Safety Nets Project (NASSP), deliver cash transfers to vulnerable households to improve food access and reduce economic vulnerability. These transfers have short-term impacts on dietary adequacy, but challenges in targeting efficiency and inflation responsiveness limit their long-term nutritional value (World Bank, 2023).

Finally, behavior change communication (BCC) strategies—implemented through social marketing, community outreach, and mass media—play a key role in shifting dietary norms. Campaigns under the Scaling Up Nutrition (SUN) Movement have promoted exclusive breastfeeding and diversified feeding practices (Scaling Up Nutrition Movement, 2023).

4.2 Comparative Insights

To better understand the relative strengths, implementation potential, and limitations of various innovations addressing hunger and malnutrition in Nigeria, a comparative evaluation was conducted and presented in Table 1 and Figure 1. These visuals summarize key innovations based on their primary focus, level of implementation, effectiveness in achieving nutritional outcomes, scalability, and operational limitations.

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Table 1: Comparative Analysis of Key Innovations Addressing Hunger and Malnutrition in Nigeria

Innovation	Focus Area	Implementation Level	Effectiveness	Scalability	Limitations
Biofortified Crops (e.g., Vitamin A Cassava)	Micronutrient Enhancement	National (HarvestPlus, IITA)	Reduces vitamin A, iron, and zinc deficiencies	High – seed distribution systems exist	Low adoption in some regions due to taste, awareness
School Feeding Programme	Child Nutrition, Local Agriculture	National (NHGSFP)	Improved enrolment, mild nutrition improvement	Medium – depends on state-level buy-in	Funding inconsistency, logistical delays
Food Fortification (e.g., flour, oil)	Population-wide Micronutrients	Mandatory nationwide	Significant reduction in iron, iodine deficiencies	High – through major industries	Monitoring & enforcement challenges
Digital Nutrition Services (e.g., U-Report)	Behaviour Change, Information	Urban + Rural (via mobile)	Enhances knowledge on IYCF & maternal nutrition	High – with mobile penetration	Limited reach in low-literacy populations
Urban Agriculture (Hydroponics, Rooftop)	Local Food Access	Urban centers (e.g., Lagos)	Supplements household food needs, reduces cost	Medium – requires infrastructure	Cost of setup, knowledge gap
Social Protection (Cash Transfers)	Household Food Security	National (NASSCO/WB)	Temporary improvement in diet and consumption	Medium – expanding digital platforms	Targeting inefficiency, inflation
Nutrition Education & BCC Campaigns	Behaviour Change	NGO + Government collaboration	Promotes breastfeeding, complementary feeding	High – adaptable delivery models	Cultural resistance, funding

Food fortification emerges as the most impactful and scalable innovation. It has achieved nationwide coverage through legally mandated fortification of staple foods such as flour, sugar, and cooking oil with essential micronutrients. As shown in Table 1, food fortification scored the highest in both effectiveness and reach (rated 5 out of 5 in Figure 1), reflecting its ability to deliver population-wide benefits with relatively low behavioral compliance demands. Nonetheless, challenges in regulatory monitoring and industry-level compliance remain and must be addressed through improved enforcement and quality assurance systems (GAIN, 2023).

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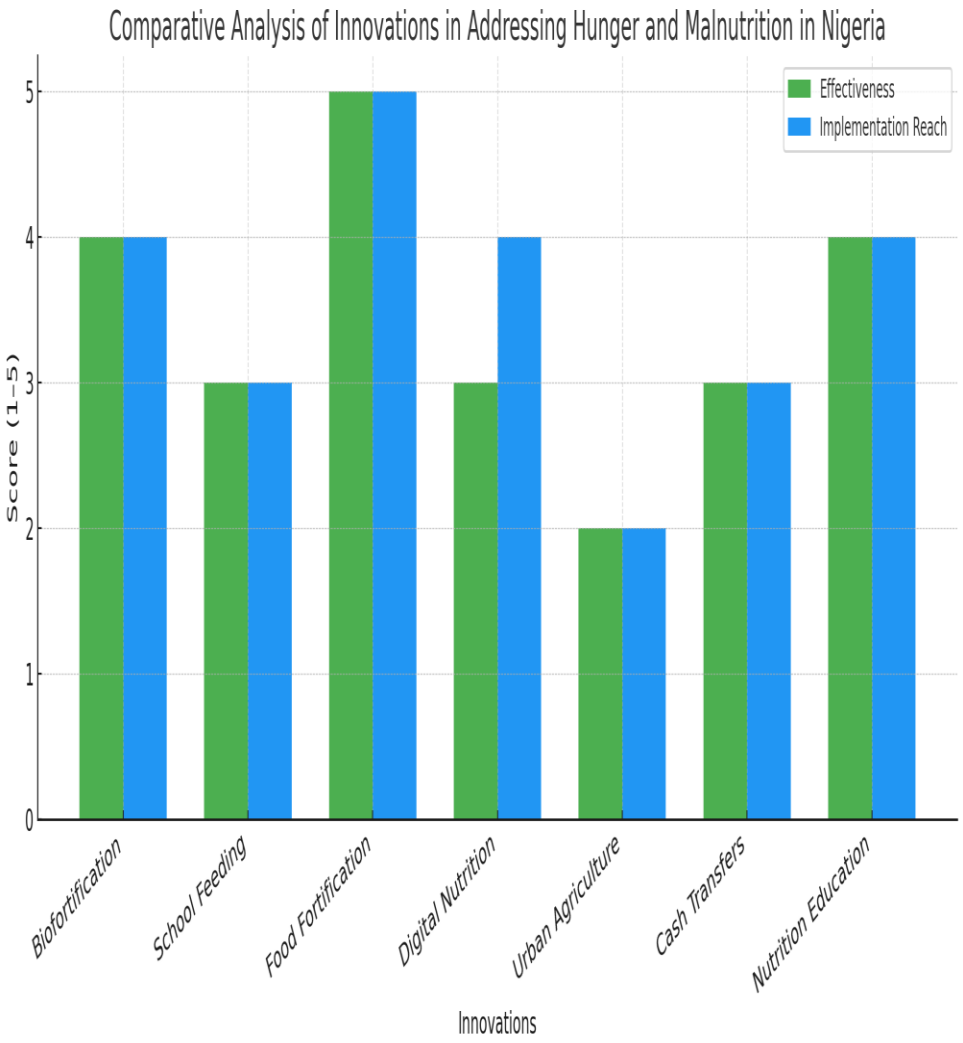

Figure 1: Comparative Analysis of Innovations in Addressing Hunger and Malnutrition in Nigeria

Biofortification, implemented through organizations like HarvestPlus and IITA, offers an agricultural solution to micronutrient deficiencies by breeding crops with higher levels of essential vitamins and minerals. This method is especially relevant for rural and subsistence farming communities. While its effectiveness is strong, its implementation reach is currently moderate, as adoption is influenced by farmers' awareness, cultural food preferences, and access to biofortified seed varieties (HarvestPlus, 2023).

School feeding programs, notably the National Home-Grown School Feeding Programme, demonstrate moderate-to-high effectiveness, particularly in

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improving child nutrition and school attendance. However, their reach is uneven across regions and dependent on state-level funding, logistics, and coordination. These programs also create opportunities for local agricultural markets, reinforcing the food system's resilience (FAO, 2023).

Digital nutrition platforms, including UNICEF's U-Report and mobile-based advisory tools, offer a promising avenue for expanding awareness of infant and young child feeding practices and dietary diversity. Their implementation reach is growing, especially in urban areas and among younger populations. As illustrated in Figure 1, they score moderately on both effectiveness and reach due to constraints related to digital literacy, rural connectivity, and user engagement (UNICEF Nigeria, 2023).

Cash transfer programs, under the National Social Safety Nets Project (NASSP), provide immediate support for household food security. These interventions temporarily improve food access and consumption, especially during crises. However, the nutritional impact is often limited by inflation, poor targeting mechanisms, and a lack of complementary nutrition education (World Bank, 2023).
Urban agriculture, including rooftop gardens and hydroponics in cities like Lagos and Kano, contributes to localized food access and dietary diversity. While innovative and environmentally friendly, these systems currently have low reach and moderate effectiveness due to high setup costs and limited technical capacity (RUAF Foundation, 2022).

Behavior change communication (BCC) strategies, such as social marketing campaigns and peer-led nutrition education, are essential in shifting cultural norms around breastfeeding, complementary feeding, and dietary choices. These approaches score well in terms of long-term effectiveness but require consistent messaging, funding, and grassroots engagement to maintain momentum (SUN Movement, 2023).

As the bar chart in Figure 1 demonstrates, a few interventions—particularly food fortification, biofortification, and nutrition education—show consistently high scores across both criteria. Meanwhile, newer or context-specific innovations like urban agriculture and digital nutrition services reveal potential but require more investment, scale-up, and integration into broader food system strategies.

In summary, this comparative analysis reinforces the need for a multi-pronged and context-sensitive approach to food system transformation in Nigeria. No single innovation provides a silver bullet. A synergistic combination of

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population-wide interventions (like fortification), targeted agricultural solutions (like biofortification), and community-driven behavior change strategies offers the best path forward to effectively reduce hunger and malnutrition in a sustainable manner.

4.3 Policy and Programmatic Implications

The findings of this review point to several critical policy and programmatic considerations that must be addressed to accelerate progress in combating hunger and malnutrition in Nigeria. Despite the broad implementation of food fortification strategies, their sustained impact depends on stronger enforcement mechanisms and consistent quality assurance systems. Evidence from recent monitoring reports reveals that regulatory lapses and inconsistent industry compliance undermine the potential benefits of mandatory food fortification, particularly in rural and informal markets (GAIN, 2023).

Similarly, biofortification has proven effective in reducing micronutrient deficiencies, but its success hinges on improved farmer education, seed accessibility, and cultural integration. Adoption rates remain uneven across regions, partly due to limited awareness, preference for traditional varieties, and logistical barriers in seed distribution (HarvestPlus, 2023). Without targeted efforts to mainstream biofortified crops through national extension services and subsidy programs, their potential will remain underutilized.

School feeding programs, especially the National Home-Grown School Feeding Programme, provide a valuable platform for delivering nutrition to children while linking smallholder agriculture to institutional markets. However, these programs often suffer from funding delays, centralized management bottlenecks, and weak local ownership. Decentralized implementation models, supported by predictable financing and community-level coordination, have been shown to enhance coverage, efficiency, and accountability (FAO, 2023).

Furthermore, the expansion of digital nutrition tools, such as SMS-based counseling and real-time monitoring platforms, has enhanced the reach of nutrition messaging, particularly during emergencies like the COVID-19 pandemic. However, gaps in mobile network coverage, low digital literacy, and gender-based access disparities remain significant barriers (UNICEF Nigeria, 2023). Integrating digital tools with analog alternatives—such as community radio, town hall meetings, and peer-to-peer counseling—offers a more inclusive communication model capable of reaching the most vulnerable populations.

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Finally, the review affirms that isolated interventions cannot effectively address the systemic drivers of food insecurity and malnutrition. A unified, multisectoral policy approach is required—one that aligns agricultural policy with public health, education, and information and communication technology (ICT) frameworks. Strengthening cross-sectoral governance through national coordination platforms and data-sharing mechanisms is essential for avoiding program duplication, harmonizing goals, and tracking progress toward nutrition targets (SUN Movement, 2023; World Bank, 2023). Only through integrated action and institutional synergy can Nigeria achieve a resilient, equitable, and nutrition-sensitive food system.

5.0 Conclusion and Recommendations

5.1 Conclusion

Hunger and malnutrition remain deeply entrenched challenges in Nigeria despite the country's abundant natural resources and policy initiatives. The literature reviewed in this study demonstrates that a range of innovative approaches spanning technological, institutional, and behavioral domains are currently being deployed to transform the national food system. These include the biofortification of staple crops, nationwide food fortification policies, digital platforms for nutrition communication, school feeding programs, urban agriculture, social protection mechanisms, and behavior change communication strategies.

Among these, food fortification stands out as the most impactful in terms of population reach and measurable reductions in micronutrient deficiencies. Biofortification is gaining traction among farming communities and holds promise for sustainable nutrition-sensitive agriculture. **School** feeding programs serve as an essential safety net for school-aged children and offer a critical linkage between education, nutrition, and local agriculture. Meanwhile, digital nutrition **tools** and BCC strategies are expanding the scope of community nutrition outreach, especially in urban and peri-urban areas. However, several challenges persist, including fragmented coordination, poor enforcement of food policies, cultural resistance to dietary changes, and unequal access to innovations among rural populations.

The comparative insights derived from this review highlight the need for an integrated, multisectoral response to hunger and malnutrition. Isolated interventions, while valuable, cannot achieve sustainable impact on their own. Therefore, coordinated efforts involving government ministries, non-governmental organizations, research institutions, the private sector, and local communities are crucial.

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In addition, emerging threats such as climate change, economic instability, and protracted conflicts underscore the urgency of building a resilient, equitable, and nutrition-sensitive food system in Nigeria. Transformative change must be guided by evidence, adapted to local contexts, and inclusive of vulnerable populations.

5.2 Recommendations

Based on the evidence reviewed and comparative analysis conducted, the following recommendations are proposed to strengthen Nigeria's response to hunger and malnutrition:

i Scale-Up and Strengthen Food Fortification Enforcement**:** Strengthen regulatory monitoring, compliance testing, and incentives for producers to adhere to national fortification standards. Collaboration with agencies such as NAFDAC and SON should be intensified to ensure nationwide impact (GAIN, 2023).

ii Enhance Adoption of Biofortified Crops: Expand farmer training and awareness campaigns, improve access to biofortified seeds, and integrate biofortification into national agricultural extension services. Partnerships with organizations such as HarvestPlus and IITA should be scaled up (HarvestPlus, 2023).

iii Sustain and Decentralize School Feeding Programs: Ensure consistent funding and decentralized program management to improve efficiency and coverage. Link school feeding with smallholder agriculture and community nutrition education (FAO, 2023).

iv Invest in Digital Nutrition and Low-Tech Alternatives: Expand mobile-based nutrition tools and complement them with radio, community dialogue, and interpersonal communication to reach populations with limited digital access (UNICEF Nigeria, 2023).

v Integrate Urban Agriculture into City Planning: Provide technical and financial support for urban farming initiatives, and include food security components in urban development policies (RUAF Foundation, 2022).

vi Strengthen Behavior Change Communication (BCC): Institutionalize BCC within national nutrition programs. Use evidence-based messaging tailored to regional dietary practices and cultural contexts (SUN Movement, 2023).

vii Establish a National Food Systems Innovation Platform: Create a multi-stakeholder coordination body to align food, nutrition, agriculture, health, and technology sectors. This platform should guide innovation, monitor impact, and scale successful models.

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viii Prioritize Equity and Inclusion: Target the most vulnerable populations—rural communities, women, and children with focused interventions that are culturally appropriate and accessible.

By implementing these recommendations through a cohesive national strategy, Nigeria can accelerate progress toward Sustainable Development Goal 2 (Zero Hunger), while building a resilient and inclusive food system that supports long-term health, productivity, and national development.

References

Cadre Harmonisé. (2024). *Nigeria food security and nutrition analysis: June–August projection*. National Programme for Food Security (NPFS). https://reliefweb.int/organization/npfs

Federal Ministry of Health. (2022). *National food consumption and micronutrient survey 2021: Summary findings*. https://fmoh.gov.ng

Famine Early Warning Systems Network (FEWS NET). (2023). *Nigeria food security outlook: February to September 2023*. https://fews.net/west-africa/nigeria

Famine Early Warning Systems Network (FEWS NET). (2024). *Nigeria food security outlook: February to September 2024*. https://fews.net/west-africa/nigeria

Food and Agriculture Organization. (2018). *The future of food and agriculture: Alternative pathways to 2050*. https://www.fao.org

Food and Agriculture Organization. (2023). *The state of food security and nutrition in the world 2023: Urbanization, agrifood systems transformation and healthy diets across the rural–urban continuum*. https://doi.org/10.4060/cc3017en

Global Alliance for Improved Nutrition (GAIN). (2023). *Food fortification in Nigeria: Progress report 2022*. https://www.gainhealth.org

HarvestPlus. (2023). *Biofortification progress briefs: Nigeria*. https://www.harvestplus.org/nigeria

High Level Panel of Experts (HLPE). (2020). *Food security and nutrition: Building a global narrative towards 2030 (HLPE Report No. 15)*. Committee on World Food Security. https://www.fao.org/cfs/cfs-hlpe

International Organization for Migration (IOM). (2023). *Displacement tracking matrix: Nigeria – Round 45*. https://dtm.iom.int

National Bureau of Statistics (NBS). (2023). *Consumer price index report: December 2023*. https://www.nigerianstat.gov.ng

National Bureau of Statistics (NBS) & World Bank. (2022). *COVID-19 national longitudinal phone survey 2022: Monitoring household food security in Nigeria*. https://www.worldbank.org

National Population Commission (NPC) [Nigeria] & ICF. (2019). *Nigeria demographic and health survey 2018*. https://dhsprogram.com/pubs/pdf/FR359/FR359.pdf

© 2025 Innovative Academia Hub International

National Social Investment Office (NSIO). (2023). *Home-grown school feeding programme implementation status report*. http://www.nsip.gov.ng

Ogbo, F. A., Agho, K. E., & Page, A. (2017). Determinants of suboptimal breastfeeding practices in Nigeria: Evidence from the 2008 demographic and health survey. *BMC Public Health, 15*(259). https://doi.org/10.1186/s12889-015-1595-7

Olomola, A. S., & Nwafor, M. (2018). *Strengthening intersectoral coordination in Nigeria's food and nutrition policies*. International Food Policy Research Institute. https://www.ifpri.org/publication/nigeria-nutrition-policy

RUAF Foundation. (2022). *Urban agriculture in Nigerian cities: Opportunities and challenges*. https://ruaf.org

Scaling Up Nutrition (SUN) Movement. (2023). *Nigeria: Annual progress report 2022*. https://scalingupnutrition.org/nigeria

United Nations Children's Fund (UNICEF). (2023). *Child nutrition report: Nigeria*. https://www.unicef.org/nigeria

UNICEF Nigeria. (2023). *U-Report Nigeria: Nutrition and health*. https://nigeria.ureport.in

United Nations Department of Economic and Social Affairs (UN DESA). (2022). *World population prospects 2022*. https://population.un.org/wpp

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., ... & Murray, C. J. L. (2019). Food in the Anthropocene: The EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet, 393*(10170), 447–492. https://doi.org/10.1016/S0140-6736(18)31788-4

World Bank. (2022). *Nigeria climate risk country profile*. https://climateknowledgeportal.worldbank.org

World Bank. (2023). *Nigeria national social safety nets project: Implementation status and results*. https://projects.worldbank.org

World Food Programme (WFP) & Nigerian Meteorological Agency (NiMet). (2023). *Climate outlook for agricultural planning in Nigeria*. https://www.wfp.org

World Food Programme (WFP). (2023). *Nigeria country brief – March 2023*. https://www.wfp.org

World Health Organization (WHO). (2023). *Vitamin and mineral nutrition information system: Micronutrient deficiencies in Nigeria*. https://www.who.int/data/nutrition/vmnis

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