

# Evaluation of the school feeding scheme in Nigeria: a scoping review of its impacts, challenges, successes, implications, and solutions to achieving Sustainable Development Goals

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## Abstract

The National Home-Grown School Feeding Programme (NHGSFP) is Nigeria's flagship school feeding intervention designed to reduce child hunger, improve school participation, and stimulate local agricultural production. This systematic review synthesizes evidence on its impacts, implementation challenges, successes, and contributions to Sustainable Development Goals (SDGs), particularly SDG 2 (Zero Hunger) and SDG 4 (Quality Education). A systematic search of PubMed, AJOL, Scopus, ScienceDirect, BMC, Frontiers, and grey literature was conducted for studies published between January 2010 and March 2026, following PRISMA 2020 guidelines. Eligible studies included quantitative, qualitative, and mixed-methods research reporting primary data on NHGSFP outcomes in Nigeria. Risk of bias was assessed using the Joanna Briggs Institute tools. Out of 312 records, 8 studies met the inclusion criteria.

Evidence from the included studies indicates that NHGSFP is associated with improved school enrollment (11-42% relative gains), increased attendance, and enhanced household food security among participating smallholder farmers (40% food security among beneficiary farmers; 20% non-beneficiaries). Successes included local economic multipliers via smallholder procurement. However, nutritional outcomes remain inconsistent due to variability in meal quality, funding constraints, and limited integration of complementary health services such as deworming and water, sanitation, and hygiene. Implementation challenges include inadequate financing, weak monitoring systems, regional disparities, and governance inefficiencies. Despite these constraints, the program demonstrates economic benefits through local procurement and employment generation, particularly for smallholder farmers and women. Overall, NHGSFP contributes to multiple SDGs, but its impact is constrained by systemic and contextual challenges. Strengthening financing, governance, and integrated service delivery is essential to improve effectiveness. Further longitudinal and experimental studies are needed to establish causal impacts on health and education outcomes.

**Key words:** national home-grown school feeding programme, school feeding, child nutrition, educational outcomes, Sustainable Development Goals, Nigeria.

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## Introduction

School feeding programs globally represent a multifaceted intervention linking education, nutrition, agriculture, and social protection.<sup>1-3</sup> Originating in high-income contexts like the United States in the early 20<sup>th</sup> century, these initiatives have expanded to low- and middle-income countries (LMICs) as evidence-based tools for human capital development.<sup>1</sup> By 2024, over 117 countries operated national school feeding programs, reaching approximately 388 million children annually, with home-grown models emphasizing local procurement to support smallholder farmers and sustainable food systems.<sup>2,3</sup> Global evidence demonstrates consistent impacts across the Sustainable Development Goals (SDGs). Meta-analyses show school feeding increases enrolment by 5-15% and attendance by 4-10%, with stronger effects for girls

and the poorest quintiles.<sup>4,5</sup> Nutritional benefits include reduced stunting and improved micronutrient status, contributing to SDG 2 (Zero Hunger) and SDG 3 (Good Health and Well-being).<sup>6</sup> Economically, home-grown school feeding (HGSF) models generate multipliers: each dollar invested can yield 1.5-3 times in local agricultural income while creating jobs for cooks and vendors, often women.<sup>3,7</sup> These programs also advance SDG 4 (Quality Education) by enhancing cognitive function and learning outcomes, particularly when meals meet 30-50% of recommended nutrient intake.<sup>8</sup> Challenges persist globally, including funding volatility, supply chain disruptions, and equity gaps in conflict-affected or rural areas.<sup>9</sup>

In sub-Saharan Africa, HGSF has gained traction as a dual-purpose strategy addressing both immediate hunger and structural agricultural underdevelopment.<sup>10</sup> Programs in Ghana, Kenya, and Mali demonstrate improved dietary diversity and reduced gender dispari-

ties in enrolment when locally sourced.<sup>10</sup> However, implementation varies, with sustainability hinging on government ownership, community engagement, and integration with complementary services like deworming and water, sanitation, and hygiene (WASH).<sup>11</sup> Nigeria's context amplifies these global patterns while introducing unique complexities. With over 10 million out-of-school children, predominantly in northern states, and high stunting rates (32% nationally per Nigeria Demographic and Health Survey 2023/24), child malnutrition and educational exclusion undermine SDG progress.<sup>12</sup> The National Home-Grown School Feeding Programme (NHGSFP), piloted in 2005 and relaunched in 2016 under the National Social Investment Programme, targets public primary school pupils (initially grades 1-3, later expanded) with one hot, locally sourced meal daily at approximately ₦70-100 per child.<sup>13</sup> The program procures from over 150,000 smallholder farmers, employs approximately 107,000 cooks (mostly women), and operates in 56,000 schools across 33 states, reaching nearly 9.9 million children by 2021.<sup>14,15</sup> Locally, the scheme aligns with broader "Food Dudes"-style nutritional education efforts in some states, emphasizing fresh, culturally appropriate meals (e.g., beans, yam, vegetables) to build healthy eating habits alongside calorie provision. Yet, coverage remains uneven: southern states report higher fidelity, while northern insecurity and funding shortfalls constrain reach.<sup>16</sup> Early evaluations noted enrolment gains (e.g., 78% in Niger State post-implementation), but persistent issues include meal quality variability, corruption in vendor payments, and inadequate monitoring.<sup>17,18</sup> This review synthesizes evidence on NHGSFP's performance against its objectives, increasing enrolment/retention, improving nutrition/health, and boosting local economies, while assessing SDG contributions. By integrating global benchmarks with Nigeria-specific data, it identifies scalable solutions for program optimization amid economic pressures (inflation, post-COVID recovery) and demographic growth. Robust evaluation is critical: Nigeria's NHGSFP represents Africa's largest HGSF by scale, yet evidence gaps on long-term learning outcomes and equity limit policy refinement.<sup>19</sup>

## Objectives of the study

This systematic review synthesizes evidence on its impacts, implementation challenges, successes, and contributions to SDGs, particularly SDG 2 (Zero Hunger) and SDG 4 (Quality Education). Specific objectives include: i) to systematically review empirical evidence on the impacts of Nigeria's NHGSFP on pupil nutrition, enrolment, attendance, academic performance, and smallholder farmer livelihoods; ii) to identify key challenges and successes in

program implementation across Nigerian contexts; iii) to evaluate the program's contributions to SDGs 2, 4, and related goals, with implications for public health, education, and agriculture; iv) to propose evidence-based solutions and future directions for enhancing effectiveness and sustainability.

## Methods

### Study design

This study was conducted as a systematic review rather than a scoping review because it aimed not only to map available evidence but also to critically appraise study quality and synthesize findings in relation to defined outcomes. The review followed PRISMA 2020 guidelines for systematic reviews.<sup>20</sup>

### Search strategy

Searches were conducted in PubMed, AJOL, Scopus, Frontiers, BMC, ScienceDirect, and grey literature repositories from January 2010 to March 2026. A comprehensive search strategy was developed and adapted for each database. An example of the full PubMed search string is as follows: "National Home-Grown School Feeding Programme" OR "NHGSFP" OR "home grown school feeding" AND "Nigeria" AND "impact" OR "evaluation" OR "nutrition" OR "enrolment" OR "attendance" OR "smallholder farmers" OR "SDG". Database-specific adaptations included the use of Medical Subject Headings in PubMed and keyword truncation in Scopus and ScienceDirect. Grey literature searches included government reports and institutional publications. No prior protocol was registered (e.g., PROSPERO); however, the review followed established methodological guidance to ensure transparency and reproducibility.

### Eligibility criteria

- Inclusion: cross-sectional studies, case-control studies, cohort studies, qualitative, mixed-methods or evaluations reporting primary data on NHGSFP implementation/outcomes in Nigerian primary schools or linked farmer communities; English language; peer-reviewed or official reports.
- Exclusion: opinion pieces, non-Nigerian data, pre-2010 studies, or those without a clear NHGSFP focus.

The inclusion and exclusion criteria are further described in Table 1.

**Table 1.** Inclusion and exclusion criteria for the review.

Items	Inclusion criteria	Exclusion criteria
Population	Primary school children in Nigeria	Primary school children outside Nigeria
Exposure	School feeding programme	Other exposure different from school feeding program
Outcome	Nutritional, educational, and economic outcomes	Other outcomes different from nutritional, educational, and economic outcomes
Study design	Cohort, cross-sectional, qualitative, mixed-methods or evaluations, and case-control studies	All other study designs
Language	English	All other languages
Time/year	Article published from January 2010 – March 2026	Articles published before January 2010
Articles	Full-text peer reviewed articles	Not full-text peer-reviewed (e.g., Abstracts only, unpublished reports)
Geographical location/settings	Nigeria	Location different from Nigeria

### Study selection

Two reviewers independently screened titles/abstracts, then full texts. Disagreements were resolved by consensus.

### Data extraction

A standardized form captured author/year, objectives, design, sample/setting, key findings, and conclusions.

### Data synthesis approach

Thematic synthesis grouped findings into impacts (nutrition/education/economic), challenges, successes, and SDG alignment. Narrative integration supplemented quantitative pooling where feasible.

### Risk of bias assessment

Joanna Briggs Institute critical appraisal tools were applied according to study design (cross-sectional, case-control). Overall, the methodological quality of the included studies was moderate. Most studies demonstrated clarity in objectives and appropriate

sampling strategies; however, common limitations included reliance on self-reported data, lack of control groups, and limited adjustment for confounding variables. Cross-sectional designs predominated, increasing susceptibility to selection bias and limiting temporal inference, consistent with challenges reported in similar program evaluations. Only a minority of studies employed quasi-experimental approaches such as propensity score matching. These limitations were considered in the interpretation of findings.

### Screening procedure and PRISMA flow chart

Initial records: 312. After duplicates removal: 245. The title/abstract screening excluded 198. Full-text review: of the 47 full-text articles assessed for eligibility, 35 were excluded for the following reasons: absence of primary data (n=5), lack of specific focus on NHGSFP (n=10), non-Nigerian context (n=15), and insufficient outcome reporting (n=5). Final included: 8 studies. The relatively small number of included studies reflects the limited availability of empirical evaluations of NHGSFP rather than overly restrictive inclusion criteria. The screening procedure and PRISMA flow chart are shown in Figure 1.

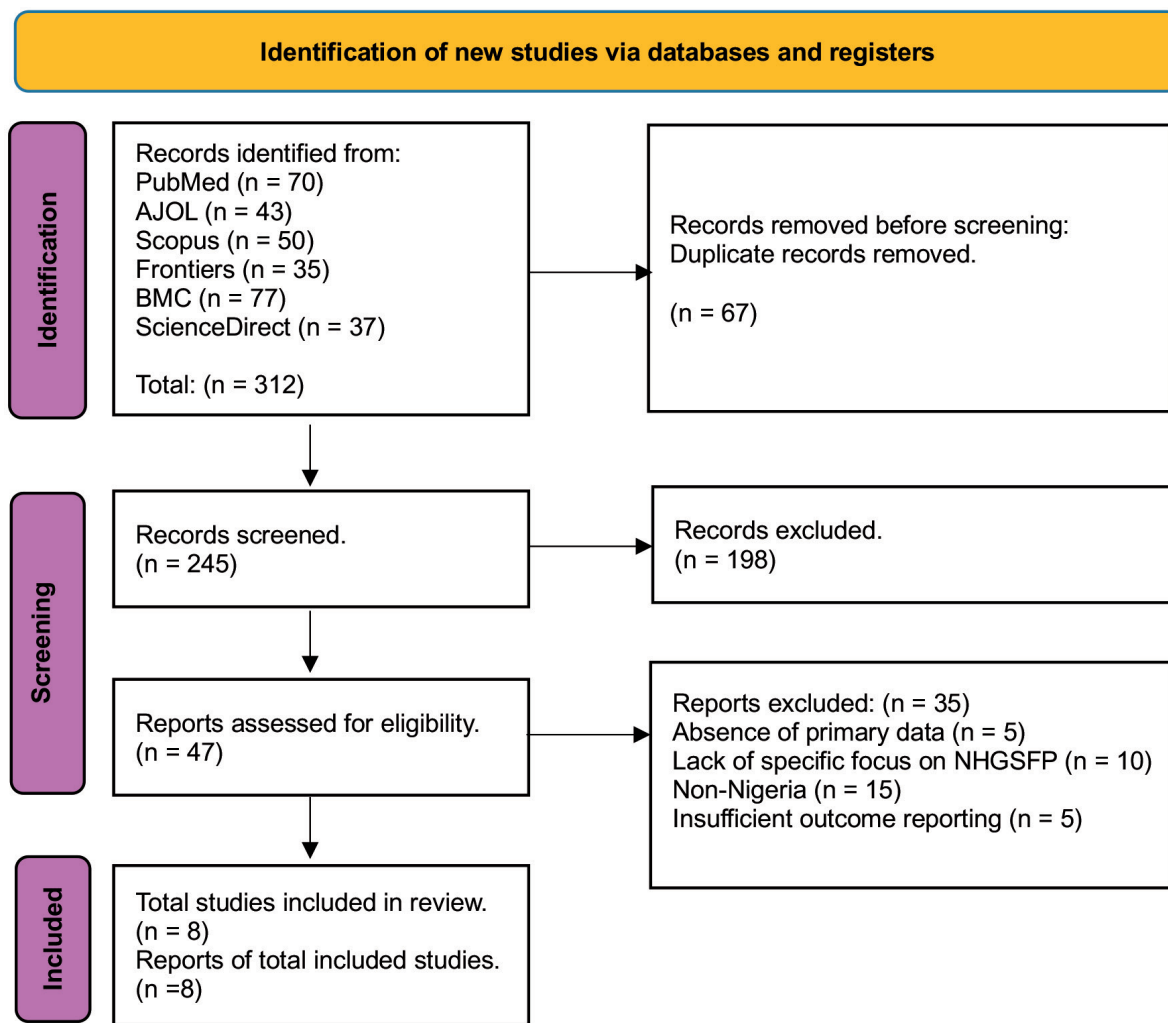


Figure 1. Diagram of the PRISMA 2020 process for systematic reviews and meta-analyses.

## Results

### Characteristics of the included studies

A total of 8 studies met the inclusion criteria, comprising cross-sectional surveys, quasi-experimental evaluations, mixed-methods studies, and grey literature reports.<sup>10,15-18,21-23</sup> Study settings spanned multiple geopolitical zones in Nigeria, including the southwest, southeast, northeast, and the federal capital territory (FCT). Sample sizes ranged from approximately 240 to 2400 participants, including pupils, households, and smallholder farmers. The studies assessed outcomes related to enrolment, attendance, nutritional status, household food security, and economic impacts

of the NHGSFP. However, heterogeneity in study design, outcome definitions, and measurement approaches limited direct comparability and precluded meta-analysis. Due to heterogeneity in study designs, populations, and outcome measures, quantitative meta-analysis was not feasible. Instead, a structured narrative synthesis was employed, with tabulation of key outcomes and comparison of effect directions and magnitudes across studies. Table 2 presents in detail the summary of the included studies.

### Narrative effect size synthesis

Across the included studies,<sup>10,15-18,21-23</sup> NHGSFP demonstrated consistently positive but heterogeneous effect sizes across outcome domains. School enrolment outcomes showed the widest variation,

**Table 2.** Summary of included studies.

S/N	Authors (year)	Objectives of the study	Study design	Sample size and study setting	Key findings	Conclusions
1	Olutola <i>et al.</i> (2023) <sup>10</sup>	Holistic review of HGSF challenges in Africa (Nigeria focus)	Qualitative review	Literature on Nigeria, Ghana, Kenya, Mali	Corruption, underfunding, poor storage; low nutritional quality in some implementations	Training and monitoring essential for SDG alignment
2	Barnabas <i>et al.</i> (2023) <sup>15</sup>	Analyze impact on smallholder farmers' household food security	Cross-sectional survey with propensity score matching	240 smallholder farmers (beneficiary/non-beneficiary), northeast Nigeria	40% beneficiaries' food secure vs. 20% non-beneficiaries; positive effects across models; credit/extension services significant predictors	HGSF improves farmer food security; supports local value chains
3	Okolo-Obasi and Uduji (2022) <sup>16</sup>	Examine impact on rural communities (enrolment, health, economy)	National household survey with propensity score matching + logit	2,400 households (1,200 treatment/1,200 control), 6 geopolitical zones	Significant gains: enrolment +11.05%, nutrition/health +7.99%, reduced child labour/trafficking; rural economic boost	NHGSFP contributes to education, health, and rural economy; scalable with better targeting
4	Agu <i>et al.</i> (2023) <sup>17</sup>	Appraise implementation and effects on enrolment/attendance (head teachers' perceptions)	Qualitative cross-sectional (interviews/questionnaires)	Heads of schools and education secretaries, Enugu metropolis, southeast Nigeria	Objectives (reduced hunger, increased enrolment/attendance) largely met; concerns over funding, meal quality, no routine deworming	Programme effective but requires funding boost and deworming integration
5	Obembe <i>et al.</i> (2024) <sup>18</sup>	Assess nutritional status of school children in Ondo State post-NHGSFP implementation (>5 years)	Cross-sectional anthropometric survey	500 school children (public/private), Ondo State, southwest Nigeria	Majority normal growth; stunting 20.7%, wasting 19.4% (higher in public schools: 30.3% stunting, 23.9% wasting); significant association with school type ( $p < 0.005$ )	NHGSFP associated with better status in private vs. public schools; calls for enhanced programme fidelity to reduce extremes of malnutrition
6	Nwaobi (2023) <sup>21</sup>	Assess impact on child education and nutrition	Mixed-methods (administrative data + surveys)	Primary school pupils and households, selected states	Positive effects on enrolment, attendance, and nutritional indicators	Supports continued investment for human capital
7	Ajayi <i>et al.</i> (2023) <sup>22</sup>	Blood pressure and nutritional status of beneficiaries	Cross-sectional	Pupils in southwest Nigeria	Improved anthropometrics but variable blood pressure profiles linked to meal consistency	Programme AIDS nutrition but needs quality standardization
8	Solomon <i>et al.</i> (2022) <sup>23</sup>	Impact on enrolment, attendance, performance in FCT Abuja	Mixed-methods evaluation	Public primary schools, Federal Capital Territory	Significant improvements in enrolment/attendance; positive nutritional and academic effects	Demonstrates multi-domain benefits in urban settings

FCT, federal capital territory; HGSF, home-grown school feeding; NHGSFP, National Home-Grown School Feeding Programme; SDG, Sustainable Development Goal.

ranging from modest gains of approximately 11% (quasi-experimental estimates) to substantially larger increases of up to 78% in state-level program evaluations, reflecting strong contextual dependence and variation in implementation intensity.<sup>16</sup> Attendance outcomes were consistently reported as improving, although most studies did not provide precise quantitative estimates, limiting effect size standardization.<sup>17</sup>

In terms of nutritional outcomes, evidence suggests a small to moderate positive effect on child growth indicators, with improved proportions of children in normal nutritional status in program areas compared to pre-implementation or non-beneficiary comparisons.<sup>18</sup> However, these findings remain sensitive to meal quality and complementary health service availability. Economic outcomes demonstrated the most stable effect pattern. Household food security among beneficiary farmers was approximately twice that of non-beneficiaries (40% vs. 20%), indicating a relative risk of ~2.0, suggestive of a strong positive economic impact.<sup>15</sup>

Overall, the direction of effect across studies was uniformly positive, but the magnitude of impact varied substantially due to differences in study design, geographical context, and implementation fidelity. This heterogeneity precluded meta-analysis and supports the use of structured narrative effect synthesis.

### Thematic review/key themes

Thematic synthesis of the included studies<sup>10,15-18,21-23</sup> followed a three-stage approach: i) line-by-line coding of extracted findings; ii) grouping of codes into descriptive themes (nutritional, educational, economic, and implementation domains); and iii) development of analytical themes aligned with SDG frameworks. Coding was conducted iteratively, with discrepancies resolved through discussion between reviewers to enhance analytical consistency, in line with established systematic review guidance.

### Nutritional and health impacts

The evidence indicates that the NHGSFP is associated with improvements in dietary intake and selected nutritional indicators among beneficiary pupils. Program meals, designed to provide approximately 30-50% of the recommended nutrient intake, align with global standards for school feeding interventions.<sup>8</sup> Empirical studies report improved dietary diversity and a higher proportion of children within normal growth parameters in program areas compared to pre-implementation trends.<sup>18</sup> Additionally, indirect nutritional benefits extend to participating smallholder households, with improved food security observed among beneficiary farmers (40%) relative to non-beneficiaries (20%).<sup>15</sup> However, these outcomes are not uniformly consistent. Persistent levels of stunting and wasting have been documented in some settings, particularly where meal quality, portion adequacy, and menu diversity are sub-optimal.<sup>17,18,22</sup> The limited integration of complementary health interventions, such as routine deworming and micronutrient supplementation, further constrains the program's capacity to achieve sustained improvements in child health. These findings suggest that while NHGSFP contributes to food access, its nutritional impact is highly dependent on implementation quality and broader health system linkages.

### Educational outcomes (enrolment, attendance, performance)

Across the included studies, NHGSFP is consistently linked to increases in school enrolment and attendance, reinforcing its

role as a demand-side intervention that reduces barriers to education. Reported enrolment gains vary widely, ranging from approximately 11.05% in quasi-experimental analyses to as high as 78% in localized program evaluations.<sup>16,23</sup> Improved attendance is commonly attributed to reduced short-term hunger and increased household incentives to enroll and retain children in school.<sup>17</sup> Some studies also suggest modest improvements in classroom engagement and attention, likely mediated by improved nutritional status.<sup>21</sup> Despite these gains, evidence on learning outcomes remains limited and inconclusive. Few studies employ standardized measures of academic achievement, and most rely on proxy indicators such as perceived concentration or attendance rates. Consequently, while NHGSFP contributes to improved access to education, its impact on educational quality and learning achievement (SDG 4) remains insufficiently established.<sup>4,5</sup> Emerging evidence suggests that the program may have positive implications for gender equity, particularly in improving retention among girls in resource-constrained settings, although this dimension remains underexplored in the Nigerian context.<sup>10</sup>

### Economic and agricultural impacts

The NHGSFP demonstrates significant potential for stimulating local economies through its home-grown procurement model. By sourcing food locally, the program supports over 150,000 smallholder farmers and provides employment for approximately 107,000 cooks, the majority of whom are women.<sup>15</sup> Participation in the program is associated with improved household food security among farmers and increased income stability.<sup>15</sup> Quasi-experimental evidence further suggests broader socio-economic benefits, including reduced child labor and enhanced economic activity within participating communities.<sup>16</sup> These findings are consistent with global evidence indicating that the HGSP program can generate substantial economic multipliers and strengthen local food systems.<sup>3,7</sup> However, the magnitude of these benefits is influenced by the efficiency of procurement systems, the timeliness of payments, and the degree of integration with agricultural value chains.

### Implementation challenges and enabling factors

Despite its large scale and policy relevance, NHGSFP faces persistent implementation challenges that limit its overall effectiveness. Key constraints identified across studies include: inadequate and inconsistent funding, particularly in the context of inflation, which reduces the real value of per-child allocations; weak monitoring and accountability mechanisms, contributing to inefficiencies and potential leakages; logistical and infrastructural limitations, including poor storage facilities and supply chain inefficiencies; regional disparities, with insecurity and administrative constraints affecting program delivery in northern Nigeria; variability in meal quality and portion sizes, undermining nutritional objectives.<sup>10,17,21</sup> At the same time, several enabling factors support program performance. These include sustained political commitment, community-level participation in implementation, and the integration of local agricultural systems. The engagement of women as cooks also contributes to social and economic empowerment.<sup>10,17,21</sup> Overall, the evidence suggests that program outcomes are highly context-dependent, shaped by governance quality, resource allocation, and local implementation capacity.

## Discussion

This review provides a comprehensive synthesis of empirical evidence on the NHGSFP in Nigeria, highlighting its contributions to nutrition, education, and economic development, while identifying critical gaps in implementation and evidence.

### Principal findings and interpretation

The findings indicate that NHGSFP is consistently associated with increased school enrolment and attendance, supporting its role as an effective social protection mechanism and a driver of human capital development. These outcomes align with global evidence demonstrating the effectiveness of school feeding programs in improving school participation, particularly among disadvantaged populations.<sup>4,5</sup> Nutritional outcomes, while generally positive, remain heterogeneous and context-specific. Although the program improves access to food and dietary diversity, its impact on anthropometric indicators is inconsistent. This variability is largely attributable to differences in meal quality, implementation fidelity, and the absence of complementary health interventions. These findings are consistent with broader evidence from LMICs, where nutritional gains from school feeding programs are contingent on integrated service delivery.<sup>6</sup> The review also underscores the program's economic significance, particularly in supporting smallholder farmers and generating employment opportunities. The home-grown model represents a strategic approach to linking social protection with agricultural development, reinforcing its relevance for SDGs related to poverty reduction and economic growth.<sup>3,7</sup>

### Comparison with global evidence and Sustainable Development Goal contributions

The findings of this review indicate that the NHGSFP is broadly aligned with global evidence on HGSF programs, particularly in relation to improvements in school enrolment, attendance, and local economic stimulation.<sup>1,3</sup> Consistent with international meta-analyses, the program demonstrates measurable gains in access to education and short-term nutritional support, especially among vulnerable populations.<sup>4,5</sup> However, while these outcomes are encouraging, the Nigerian program exhibits important gaps in depth of impact, particularly in relation to sustained nutritional improvements and learning outcomes. Unlike more integrated models such as those implemented in Latin America, NHGSFP shows relatively weaker coordination across sectors, particularly between education, health, and agriculture systems.<sup>2</sup> Furthermore, the limited evidence on long-term learning outcomes reflects a broader gap in the global literature, where robust evaluations of cognitive and educational impacts remain scarce.<sup>8</sup>

In terms of SDGs, the program contributes directly to SDG 2 (Zero Hunger) and SDG 4 (Quality Education) by improving food access and school participation. It also indirectly supports SDG 1 (No Poverty) and SDG 8 (Decent Work and Economic Growth) through its engagement with smallholder farmers and local labor markets.<sup>3,7</sup> Nevertheless, the contribution to SDG 4 remains partial, as improvements in access have not been matched by robust evidence of enhanced learning outcomes, reflecting a critical gap in both program implementation and evaluation.<sup>4,8</sup>

While evidence suggests improvements in enrolment and attendance, there remains a critical gap in rigorous evaluation of long-term learning and cognitive outcomes. This limits the ability to fully assess the program's contribution to SDG 4 (Quality Education),

which emphasizes not only access but also learning achievement.<sup>4,8</sup> The absence of longitudinal and experimental studies examining educational attainment, standardized test performance, and cognitive development represents a significant limitation in the current evidence base, consistent with broader gaps identified in global school feeding research.<sup>5</sup>

### Challenges and contextual barriers

Despite its scale and policy relevance, NHGSFP faces persistent structural and contextual challenges that constrain its effectiveness. Funding inadequacy remains a central issue, particularly in the context of inflation, which has significantly eroded the real value of per-child allocations and, consequently, meal quality and consistency.<sup>10,17</sup> Governance and accountability challenges, including delays in disbursement and risks of financial leakages, further undermine program fidelity.<sup>17</sup> Weak monitoring systems limit the ability to ensure compliance with nutritional standards and operational guidelines, thereby contributing to variability in implementation across states.

Regional disparities are particularly pronounced, with northern Nigeria experiencing greater implementation constraints due to insecurity, displacement, and weaker administrative capacity.<sup>6,12</sup> These factors disrupt school attendance, supply chains, and program continuity, resulting in uneven outcomes across the country. In addition, infrastructural limitations such as inadequate storage facilities, transportation challenges, and limited access to safe water affect food quality and safety. These barriers are consistent with challenges observed in other LMIC contexts, where program effectiveness is closely tied to broader systemic capacity.<sup>6</sup>

### Successes and enabling factors

NHGSFP demonstrates several notable strengths and enabling factors that support its continued relevance and scalability. The program's large-scale reach, serving millions of children across multiple states, reflects a strong political commitment and positions it as one of the largest school feeding programs in Africa.<sup>14,16</sup> The adoption of a home-grown procurement model is a key strength, facilitating linkages between schools and local agricultural systems. This approach not only improves food access for pupils but also generates income opportunities for smallholder farmers and local vendors.<sup>15</sup> Community involvement in program implementation, including the engagement of local cooks (predominantly women), enhances ownership and contributes to social and economic empowerment at the grassroots level. These features align with global best practices, which emphasize the importance of local participation and decentralized implementation in improving program sustainability.<sup>3,10</sup> However, the sustainability of these successes depends on addressing existing inefficiencies and ensuring that enabling factors are supported by robust institutional frameworks.

### Comparative analysis and policy implications

When compared with similar programs in countries such as Ghana and Kenya, Nigeria's NHGSFP demonstrates strength in scale but relative weakness in system integration and monitoring. While the program reaches a large number of beneficiaries, its effectiveness is limited by gaps in coordination, quality assurance, and evaluation systems.<sup>10</sup> From a policy perspective, these findings underscore the need for strengthened monitoring and evaluation frameworks, including the adoption of digital tracking systems to improve real-time oversight and accountability.<sup>9</sup> Additionally, insti-

tutionalizing independent audit mechanisms could help mitigate financial inefficiencies and enhance transparency. There is also a need to deepen integration with complementary sectors, particularly health and agriculture. Linking school feeding with routine deworming, micronutrient supplementation, and WASH interventions would enhance nutritional outcomes, while stronger collaboration with agricultural extension services could improve supply chain efficiency and sustainability.<sup>6,10</sup>

Furthermore, addressing regional disparities will require context-specific policy adaptations, including targeted resource allocation and flexible implementation models tailored to high-risk and underserved areas.

### Strength of evidence and remaining gaps

The evidence base for NHGSFP remains limited in both scope and methodological rigor, with only a small number of eligible studies identified and a predominance of cross-sectional designs.<sup>5</sup> This constrains the ability to establish causal relationships between program participation and observed outcomes. Moreover, variability in outcome measures and study designs limits comparability across studies, while the potential for publication bias cannot be excluded. The lack of longitudinal and experimental research further restricts understanding of the program's long-term impacts, particularly in relation to learning outcomes and sustained nutritional improvements.<sup>4,8</sup> Importantly, regional and equity dimensions such as gender disparities, disability inclusion, and differences across geopolitical zones remain insufficiently explored. Addressing these gaps will be critical for informing more inclusive and effective program design.

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## Conclusions

The NHGSFP represents a strategically important intervention at the intersection of nutrition, education, and economic development in Nigeria. This review demonstrates that the program is associated with meaningful improvements in school enrolment, attendance, and local economic activity, while also contributing to enhanced food access among beneficiary populations. However, the evidence indicates that these gains are uneven and context-dependent, with persistent challenges related to funding adequacy, implementation fidelity, and monitoring systems limiting overall effectiveness. In particular, the program's impact on nutritional status and learning outcomes remains inconsistent, reflecting gaps in service integration and evidence generation. To realize its full potential as a driver of SDGs, the NHGSFP requires strengthened governance, increased and inflation-adjusted funding, and closer integration with health, education, and agricultural systems. Addressing regional disparities and improving accountability mechanisms will be critical to ensuring equitable and sustainable impact. With targeted reforms and evidence-informed implementation, the NHGSFP has the potential to serve as a scalable model for HGSF programs across sub-Saharan Africa and other low- and middle-income settings.

Although this review followed a comprehensive search strategy, only 8 studies met the inclusion criteria. This relatively small evidence base reflects the limited availability of rigorous empirical evaluations of the NHGSFP despite its national scale. Similar constraints have been reported in evaluations of large-scale school feeding programs in LMICs, where implementation often outpaces rigorous research.<sup>3,9</sup> Consequently, caution is required in interpreting the findings, particularly with respect to generalizability across

Nigeria's diverse geopolitical and socio-economic contexts. Furthermore, the predominance of cross-sectional study designs limits its causal inference, as observed associations between program participation and outcomes such as enrolment, nutrition, and household food security cannot be definitively attributed to the intervention.<sup>5</sup> These methodological constraints underscore the need for longitudinal and experimental studies to strengthen the evidence base.<sup>4,8</sup>

### Recommendations

Based on the findings of this study, the following actionable recommendations are provided.

1. Implement digital monitoring systems leveraging real-time data capture through mobile platforms (e.g., school-level reporting dashboards and attendance tracking), as demonstrated in large-scale school feeding and social protection programs in countries such as India and Brazil.
2. Institutionalize independent third-party audits through partnerships with civil society organizations and academic institutions to improve transparency and reduce leakages in program implementation, a strategy shown to enhance accountability in public sector interventions.
3. Agricultural linkages should be deepened by strengthening procurement through farmer cooperatives, supporting input access, and promoting climate-resilient crops to stabilize supply chains and enhance rural livelihoods.
4. Program financing should be reviewed and indexed to inflation to ensure that per-child allocations reflect current food prices and preserve meal quality. Sustained underfunding risks undermining both nutritional adequacy and program credibility.
5. Integration with complementary school health services should be prioritized. Coordinating school feeding with deworming, micronutrient supplementation, and WASH interventions would improve nutritional outcomes and strengthen the program's contribution to child health.
6. Meal quality and dietary standards should be standardized nationally through structured menu planning frameworks and dietician-led oversight to reduce variability across states and ensure nutritional consistency.
7. Regional disparities in implementation should be addressed through context-sensitive strategies, particularly in insecurity-affected and resource-limited areas, to ensure equitable program coverage.
8. Future research should prioritize longitudinal, quasi-experimental, and cost-effectiveness studies, with stronger attention to equity dimensions such as gender, disability, and regional differences, to strengthen the evidence base for policy decision-making.

### Implications of the study

This review provides important insights into the multi-sectoral relevance of the NHGSFP, with implications spanning public health, education, economic development, and policy systems in Nigeria and comparable LMIC settings.

### Public health implications

The findings suggest that NHGSFP has the potential to contribute meaningfully to reductions in child undernutrition and food insecurity through improved dietary access. However, the observed inconsistencies in nutritional outcomes linked to meal quality variability and limited integration of complementary health interven-

tions indicate that school feeding alone is insufficient to achieve sustained improvements in child health. Integrating deworming, micronutrient supplementation, and WASH interventions is therefore critical to maximizing health gains and advancing SDG 2 and SDG 3 targets.

### *Educational implications*

The program is consistently associated with increased school enrolment and attendance, reinforcing its role as a social protection instrument that improves access to basic education. However, the limited evidence on learning outcomes highlights a critical gap in assessing its full contribution to SDG 4 (Quality Education). This suggests that complementary investments in teaching quality, school infrastructure, and learning resources are necessary to translate improved attendance into measurable educational achievement.

### *Economic and social implications*

By linking school feeding to local agricultural procurement, NHGSFP demonstrates a viable pathway for stimulating rural economies and enhancing smallholder farmer livelihoods. The program's employment of local cooks, predominantly women, also contributes to gender empowerment and household income generation. However, maximizing these benefits requires more structured integration with agricultural value chains, including support for farmer cooperatives, input access, and market stability mechanisms.

### *Policy and governance implications*

The findings underscore the importance of strong governance systems in determining program effectiveness. Persistent challenges related to funding inadequacy, weak monitoring, and administrative inefficiencies highlight the need for reforms in program financing, accountability mechanisms, and inter-ministerial coordination. Evidence from similar large-scale programs suggests that digital monitoring systems and independent oversight structures can enhance transparency and implementation fidelity. Context-sensitive policy design is also essential to address regional disparities driven by insecurity, infrastructure gaps, and varying state-level capacities.

### *Research implications*

The limited number of rigorous studies identified in this review points to a significant evidence gap in the evaluation of NHGSFP. Future research should prioritize longitudinal and experimental designs to establish causal relationships between program participation and outcomes, particularly in relation to learning achievement and nutritional status. There is also a need for more disaggregated analyses examining equity dimensions, including gender, disability, and regional differences, to inform more inclusive program design.

Overall, the NHGSFP represents a strategically important intervention at the intersection of nutrition, education, and economic policy; however, its long-term impact will depend on the extent to which implementation challenges are addressed through evidence-informed, context-sensitive, and system-oriented reforms.

### *Future directions*

Future research priorities should include longitudinal and randomized controlled studies assessing causal impacts on learning and nutrition; cost-effectiveness and return-on-investment analyses; equity-focused studies examining gender, disability, and regional

disparities; evaluations of digital monitoring and governance innovations; and studies on climate-resilient and sustainable procurement models within HGSF systems.

### **Limitations of the study and review of existing gaps in the literature**

This review has several limitations. First, the small number of included studies limits the breadth of available evidence and may introduce selection bias. Second, the predominance of cross-sectional designs constrains causal inference and increases susceptibility to confounding and selection bias. Third, potential publication bias cannot be ruled out, as studies with positive findings are more likely to be published. Fourth, substantial regional heterogeneity within Nigeria, including differences in security conditions, infrastructure, and governance capacity, limits the generalizability of findings across all settings. Finally, variability in outcome measurement and reporting across studies restricted the ability to conduct quantitative synthesis.

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Received: 15 April 2026; Accepted: 27 April 2026.

Contributions: Adeyemi Ogedengbe Omoge: source for articles, literature review, conceptualising, overall project supervision, manuscript writing, corresponding, submission, proofreading. Modupe Oluwatimileyin Omoge, Oluwabanmi Bridget Erinsakin, Oluwafemi Olumide Oyetunji, Bright Mafolabomi Ogeh: source for articles, literature review, proofreading.

Conflict of interest: the authors declare that they have no competing interests, and all authors confirm accuracy.

Ethics approval and consent to participate: ethical approval was not required for this study because it is secondary research.

Informed consent: not applicable. Informed consent was not applicable because of its secondary research nature.

Participant consent for publication: not applicable.

Availability of data and materials: no new data are generated or analyzed in this study.

AI/LLM use statement: AI/LLM tools were used for reference formatting, language editing, and grammar improvement. (Tool: [ChatGPT version 1.2 & Quillbot version 1.0]). The authors reviewed and took full responsibility for the content.

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