



SUSTAINABLE FOOD SYSTEMS EDUCATION: INTEGRATING URBAN FARMING INTO HOME ECONOMICS CURRICULA

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Abstract

As global urbanization accelerates, sustainable food systems education is vital for fostering environmental stewardship and food security. This study examines the integration of urban farming into the Home Economics curricula to enhance students' knowledge and practical skills in sustainable food production. Conducted at three secondary schools in Enugu State, Nigeria, the intervention involved 200 students participating in a 12-week program combining theoretical lessons on urban agriculture with hands-on activities, including vertical gardening, hydroponics, and organic composting. A quasi-experimental design assessed outcomes, comparing the intervention group to a control group following a standard Home Economics curriculum. Quantitative results showed a 45% increase in students' understanding of sustainable food systems and a 38% improvement in practical farming skills. Qualitative feedback from students and teachers highlighted heightened environmental awareness and enthusiasm for local food production. Challenges included limited access to farming materials, initial resistance to curriculum changes, and the need for teacher training. This study underscores the potential of embedding urban farming in Home Economics education to empower students as agents of sustainable change, while emphasizing the need for resource support and scalable curriculum frameworks.

Keywords: Sustainable Food Systems, Urban Farming, Food Security, Practical Skills, Curriculum Integration.

Introduction

The global surge in urbanization has reshaped food systems, creating a pressing need for sustainable practices that ensure food security, environmental health, and community resilience. Urbanization in Nigeria, particularly in Enugu State, has intensified challenges such as land scarcity, food insecurity, and environmental degradation. Sustainable food systems education offers a pathway to equip young people with the knowledge and skills to address these challenges. Integrating urban farming into school curricula, specifically Home Economics, provides an innovative approach to fostering environmental stewardship and practical food production skills among students.

Home Economics, traditionally focused on nutrition, household management, and consumer sciences, is well-positioned to incorporate sustainable agriculture, particularly in urban contexts where traditional farming is constrained. Urban farming, encompassing techniques like vertical gardening, hydroponics, and organic composting, aligns with global sustainability goals, including the United Nations' Sustainable Development Goals (SDGs), particularly SDG 2 (Zero Hunger) and SDG 11 (Sustainable Cities and Communities). By embedding urban farming in Home Economics, students can develop practical competencies and an ethos of sustainability, enabling them to contribute to local food systems and environmental conservation.



The literature underscores the importance of experiential learning in agricultural education. Kolb's (1984) experiential learning theory posits that hands-on activities enhance knowledge retention and skill development, making it a suitable framework for integrating urban farming into curricula. Recent studies, such as those by FAO (2020), highlight that urban agriculture education promotes food security and environmental awareness among youth. In Nigeria, research by Adebo and Sekumade (2019) emphasizes the potential of school-based agricultural programs to address food insecurity in urban areas. However, gaps remain in curriculum integration, teacher training, and resource availability, particularly in resource-constrained settings like Enugu State.

Globally, urban farming education has gained traction. For instance, programs in the United States (Cohen & Ilieva, 2021) and Kenya (Onyango et al., 2023) demonstrate that school-based urban agriculture fosters environmental consciousness and practical skills. Yet, in Nigeria, Home Economics curricula remain largely theoretical, with limited focus on sustainable practices. This study addresses this gap by evaluating the integration of urban farming into Home Economics curricula in Enugu State, assessing its impact on students' knowledge, skills, and attitudes toward sustainable food systems.

Literature Review

The integration of urban farming into education aligns with global efforts to promote sustainable food systems. Urban agriculture, defined as food production within or around urban areas, includes practices like hydroponics, vertical gardening, and organic composting (FAO, 2020). These methods are resource-efficient, making them ideal for urban settings with limited land and water. Research by Goldstein et al. (2016) highlights that urban farming enhances food security, reduces carbon footprints, and promotes community resilience.

In educational contexts, urban farming fosters experiential learning, aligning with Kolb's (1984) cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation. Studies in sub-Saharan Africa, such as those by Mwendwa and Giliba (2022), show that school-based agricultural programs improve students' understanding of sustainable practices and their ability to apply them. In Nigeria, Adebo and Sekumade (2019) found that agricultural education in secondary schools increased students' interest in farming as a career, though challenges like inadequate resources and teacher preparedness persist.

Globally, successful models of urban farming in education provide valuable insights. In the United States, the Edible Schoolyard Project integrates gardening into school curricula, resulting in improved student engagement and environmental awareness (Cohen & Ilieva, 2021). In Kenya, urban farming programs in schools have empowered students to address local food insecurity (Onyango et al., 2023). These examples underscore the potential of curriculum-based urban agriculture but highlight the need for context-specific adaptations in resource-constrained settings like Nigeria.

In Enugu State, Home Economics education focuses on nutrition, textile management, and consumer education, with minimal emphasis on sustainable agriculture (Nigerian Educational Research and Development Council, 2020). This gap limits students' exposure to practical food production skills. Recent studies (Okeke & Eze, 2024) suggest that integrating urban farming into



Home Economics could bridge this gap, fostering skills relevant to Nigeria's urbanizing population. However, challenges such as limited funding, lack of teacher training, and resistance to curriculum changes must be addressed to ensure successful implementation.

Methodology

Study Design

This study employed a quasi-experimental design to evaluate the integration of urban farming into the Home Economics curriculum. The intervention group received a 12-week program combining theoretical lessons and hands-on urban farming activities, while the control group followed the standard Home Economics curriculum without urban farming components.

Study Setting and Participants

The study was conducted at three secondary schools in Enugu State, Nigeria: Government Secondary School, Enugu; Community Secondary School, Nsukka; and Urban Girls' Secondary School, Enugu. Enugu State was selected due to its rapid urbanization and increasing food security challenges. A total of 200 Junior Secondary School (JSS) 2 students participated, with 100 students in the intervention group and 100 in the control group. Participants were selected using stratified random sampling to ensure representation across gender, socioeconomic status, and school type.

Table 1

Demographic Characteristics of Participants

Variable	Intervention Group (n=100)	Control Group (n=100)
Gender		
Male	48 (48%)	50 (50%)
Female	52 (52%)	50 (50%)
Age (Years)		
12-14	70 (70%)	68 (68%)
15-16	30 (30%)	32 (32%)
Socioeconomic Status		
Low	60 (60%)	58 (58%)
Middle	35 (35%)	37 (37%)
High	5 (5%)	5 (5%)
School Type		
Urban	70 (70%)	70 (70%)
Peri-urban	30 (30%)	30 (30%)

Intervention

The 12-week intervention included weekly 2-hour sessions combining theoretical lessons and practical activities. Theoretical lessons covered urban agriculture concepts, sustainable food systems, and environmental stewardship. Practical activities included:



- Vertical gardening: Students constructed vertical planters using recycled materials.
- Hydroponics: Students set up small-scale hydroponic systems to grow leafy vegetables.
- Organic composting: Students learned to produce compost from kitchen waste.

The control group followed the standard Home Economics curriculum, focusing on nutrition, clothing, and household management, without urban farming components.

Data Collection

Data were collected using both quantitative and qualitative methods. The primary method was a pre- and post-intervention questionnaire assessing students' knowledge of sustainable food systems and practical farming skills. The questionnaire included 20 multiple-choice questions on sustainable agriculture and 10 practical tasks scored on a 5-point rubric. Knowledge scores ranged from 0 to 100, and practical skills were assessed based on task completion (e.g., setting up a hydroponic system).

Qualitative data were collected through focus group discussions (FGDs) with 30 students (10 per school) and semi-structured interviews with 6 Home Economics teachers. FGDs explored students' attitudes toward urban farming, while interviews assessed teachers' perceptions of curriculum integration and implementation challenges.

Data Analysis

Quantitative data were analyzed using paired t-tests to compare pre- and post-intervention scores within groups and independent t-tests to compare intervention and control groups. Qualitative data were analyzed thematically, with codes developed for environmental awareness, enthusiasm, and implementation challenges. Data triangulation ensured the validity of findings.

Results

Quantitative Findings

The intervention group showed significant improvements in knowledge and skills compared to the control group. Pre-intervention knowledge scores were similar (Intervention: $M=52.3$, $SD=8.7$; Control: $M=51.8$, $SD=9.1$; $p=0.78$). Post-intervention, the intervention group's knowledge scores increased by 45% ($M=75.8$, $SD=7.4$), while the control group's scores remained stable ($M=53.2$, $SD=8.9$; $p<0.001$). Practical skills scores for the intervention group improved by 38% ($M=80.4$, $SD=6.5$) compared to the control group ($M=55.6$, $SD=9.3$; $p<0.001$).

Table 2

Pre- and Post-Intervention Scores

Group	Knowledge (Pre)	Knowledge (Post)	Skills (Pre)	Skills (Post)
Intervention (n=100)	52.3 ± 8.7	75.8 ± 7.4	50.1 ± 9.2	80.4 ± 6.5
Control (n=100)	51.8 ± 9.1	53.2 ± 8.9	49.8 ± 8.8	55.6 ± 9.3
p-value (t-test)	0.78	<0.001	0.82	<0.001

Qualitative Findings



Thematic analysis revealed three key themes:

- **Heightened Environmental Awareness:** Students expressed greater understanding of sustainable practices, with comments like, “I now know how to grow food without harming the environment.”
- **Enthusiasm for Local Food Production:** Students reported increased interest in urban farming, with one stating, “I want to start a small garden at home.”
- **Implementation Challenges:** Teachers noted limited access to farming materials, initial resistance to curriculum changes, and the need for professional development. One teacher remarked, “We need training to teach these new methods effectively.”

Discussion

The findings demonstrate that integrating urban farming into Home Economics curricula significantly enhances students’ knowledge and practical skills in sustainable food systems. The 45% increase in knowledge and 38% improvement in skills align with Kolb’s (1984) experiential learning theory, which emphasizes the role of hands-on activities in skill development. These results are consistent with global studies, such as Cohen and Ilieva (2021), which found that school-based urban farming fosters environmental stewardship.

Qualitative feedback highlights the intervention’s role in cultivating enthusiasm and agency among students, positioning them as potential change agents in their communities. However, challenges like limited resources and teacher training needs echo findings from Adebo and Sekumade (2019), underscoring the importance of institutional support for curriculum innovation.

The study’s implications are twofold. First, it validates the potential of Home Economics as a platform for sustainable food systems education. Second, it highlights the need for scalable frameworks to address resource and training gaps, particularly in urbanizing regions like Enugu State.

Conclusion

Integrating urban farming into Home Economics curricula in Enugu State offers a promising approach to fostering sustainable food systems education. The intervention significantly improved students’ knowledge, skills, and attitudes toward sustainable agriculture, aligning with global sustainability goals. However, challenges such as resource constraints and teacher preparedness must be addressed to ensure scalability and long-term impact.

Recommendations

- **Resource Support:** Policymakers should allocate funding for urban farming materials, such as hydroponic kits and composting bins, to support curriculum implementation.
- **Teacher Training:** Professional development programs should be introduced to equip Home Economics teachers with urban farming expertise.



- Curriculum Scalability: The Nigerian Educational Research and Development Council should develop a standardized framework for integrating urban farming into Home Economics curricula nationwide.
 - Community Engagement: Schools should partner with local communities to create urban farming initiatives, reinforcing students' learning through real-world applications.
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